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Information technology — Coded representation of immersive media — Part 34: Immersive audio reference software

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ISO copyright office

CP 401 • Ch. de Blandonnet 8

CH-1214 Vernier, Geneva

Phone: +41 22 749 01 11

Email: copyright@iso.org

Website: www.iso.org

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](https://www.iso.org/directives-and-policies.html)).

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This document was prepared by Technical Committee *[or Project Committee]* ISO/TC *[or ISO/PC]* ###, *[name of committee]*, Subcommittee SC ##, *[name of subcommittee]*.

This second/third/… edition cancels and replaces the first/second/… edition (ISO #####:####), which has been technically revised.

The main changes are as follows:

— xxx xxxxxxx xxx xxxx

A list of all parts in the ISO ##### series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](https://www.iso.org/members.html).

Introduction

Part 34 of ISO/IEC 23090 contains reference software for ISO/IEC 23090, part 4: MPEG-I immersive audio. The reference software includes both encoder and decoder/renderer functionality.

The software has been developed by the ISO/IEC Moving Picture Experts Group (MPEG, Working Group 6 of Subcommittee 29).

Information technology — Coded representation of immersive media — Part 34: MPEG-I immersive audio reference software

# Scope

This part 34 of ISO/IEC 23090 contains simulation software for the MPEG-Immersive Audio standard as defined in ISO/IEC 23090-4.

# Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 23090‑4, Coded representation of immersive media*— Part 4: MPEG-I immersive audio*

# Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 23090-4 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

* ISO Online browsing platform: available at <https://www.iso.org/obp>
* IEC Electropedia: available at <https://www.electropedia.org/>

# Reference software structure

## Introduction

This software has been derived from reference models used in the process of developing the ISO/IEC 23090-4 standard.

Reference software is normative in the sense that it correctly implements the MPEG-I Immersive Audio decoding and rendering processes described in ISO/IEC 23090-4. Complying ISO/IEC 23090-4 implementations are not expected to follow the algorithms, or the programming techniques used by the reference software. Although the decoding software is considered normative, it cannot add anything to the textual technical description of ISO/IEC 23090-4.

The software contained in this part 34 of ISO/IEC 23090-34 is structured as follows:

* **Bitstream decoding and rendering software.** This software accepts bitstreams encoded according to the normative specification in ISO/IEC 23090-4, decodes and renders the streams into audio signals based on listener input. The decoder software implementation is provided as an electronic attachment to this standard.
* **Bitstream encoding software**. The software creates compressed bitstreams from associated audio scene descriptions (Encoder Input Format, EIF). The techniques used for encoding are not specified in this document. The encoder software implementation is provided as an electronic attachment to this standard.

Further, this part 34 of ISO/IEC 23090-34 contains information about:

* **Encoder Input Format (EIF)**. EIF describes the input format ingested by the reference software encoder.
* **Listener Space Description Format (LSDF)*.*** LSDF describes the listening space for MPEG-I immersive audio AR.

## Copyright disclaimer

Each source code module in this specification contains copyright disclaimer, which shall not be removed from the source code module. A top-level license file is provided in both encoder and renderer project (LICENSE.txt).

# Bitstream decoding and rendering software

The bitstream decoding and rendering software provided as an electronic attachment to is a normative reference implementation of ISO/IEC 23090-4. While ISO/IEC 23090-4 specifies metadata for 6DoF audio rendering, ISO/IEC 23008-3 (MPEG-H 3D Audio) is used for the coding of audio assets.

Build instructions as well as more detailed information about the implementation are provided in the file README.md in the top-level renderer directory.

1. (informative)  
     
   Bitstream encoding software

The bitstream encoding software provided as an electronic attachment to this standard may be used to create compressed bitstreams with the normative syntax as described in ISO/IEC 23090-4. The techniques used for encoding are not specified by this document. Neither quality nor complexity of the provided encoder implementation has been fully optimized.

Setup instructions as well as more detailed information about the implementation are provided in the file README.md in the top-level encoder directory.

1. (informative)  
     
   Encoder Input Format (EIF)

The EIF specification is enclosed as an electronic attachment in this specification.

1. (informative)  
     
   Listener Space Description Format (LSDF)

The LSDF specification is enclosed as an electronic attachment in this specification.

Bibliography

[1] ISO/IEC 23090‑4, *Coded representation of immersive media — Part 4: MPEG-I immersive audio*