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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



DRAFT International Standard

ISO/IEC DIS 23090-32

Information technology — Coded representation of immersive media —

Part 32: Carriage of haptics data

ICS: 35.040.40

ISO/IEC JTC 1/SC 29

Secretariat: JISC

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2024-05-21

Voting terminates on:
2024-08-13

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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).

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

A list of all parts in the ISO/IEC 23090 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.

Introduction

This document addresses the carriage of haptic media in an ISO base media file. A separate document, ISO/IEC 23090-31, specifies the MIHS stream format for haptic media. This document specifies the process for incorporating MIHS formatted bitstreams into an ISO base media file.

Information technology — Coded representation of immersive media — Part 32: Carriage of haptics data

1 Scope

This document specifies carriage of haptic media in ISO base media files.

2 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 14496-12:2020, *Information technology — Coding of audio-visual objects — Part 12: ISO base media file format*

ISO/IEC 23009-1:2022, *Information technology — Dynamic adaptive streaming over HTTP (DASH) — Part 1: Media presentation description and segment formats*

ISO/IEC DIS 23090-31, *Information technology — Coded representation of immersive media — Part 31: Haptics Coding*

3 Terms, definitions, and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 23090-5 and the following 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/>

3.1.1

band

haptic band described in ISO/IEC 23090-31 for containing a haptic signal

3.1.2

channel

haptic channel described in ISO/IEC 23090-31 for containing bands to be combined, with the resulting haptics rendered at a specific body location

3.1.3

experience

haptic experience described in ISO/IEC 23090-31 containing perceptions and global information

3.1.4

ISOBMFF track

track defined in ISO/IEC 14496-12

3.1.5

MIHS band track

ISOBMFF track having the 'hapt' handler type and an `MIHSBandSampleEntry`

3.1.6

MIHS sample

sample belonging to an MIHS track

3.1.7

MIHS stream

MIHS formatted bitstream described in ISO/IEC 23090-31

3.1.8

MIHS track

ISOBMFF track having the 'hapt' handler type and an `MIHSSampleEntry`

3.1.9

metadata

information about a haptic experience, perception, channel, or band described in ISO/IEC 23090-31

Note 1 to entry: ISO/IEC 14496-12 also uses the term “metadata” but with a different meaning from ISO/IEC 23090-31, hence this clarification.

3.1.10

perception

haptic perception described in ISO/IEC 23090-31 for containing channels of a specific modality such as vibration, force, pressure, etc.

3.1.11

sample

sample defined in ISO/IEC 14496-12

3.2 Abbreviated terms

IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
ISOBMFF	ISO base media file format (specified in ISO/IEC 14496-12)
MIHS	MPEG-I haptic stream
MPEG	Moving Pictures Expert Group
MPEG-I	MPEG immersive media

4 Overview

4.1 Organization of this document

Subclause 4.2 provides the overall architecture for the storage of MIHS streams in ISOBMFF.

Subclause 4.3 provides information for synchronizing MIHS streams with other media.

Subclause 4.4 provides a summary of the referenceable code points, in tabular format.

Clause **Error! Reference source not found.** specifies extensions to the ISOBMFF for the storage of MIHS streams.

4.2 Haptic media

4.2.1 Structure of haptic media

ISO/IEC 23090-31 describes haptic experiences composed of perceptions containing channels, which in turn contain bands.

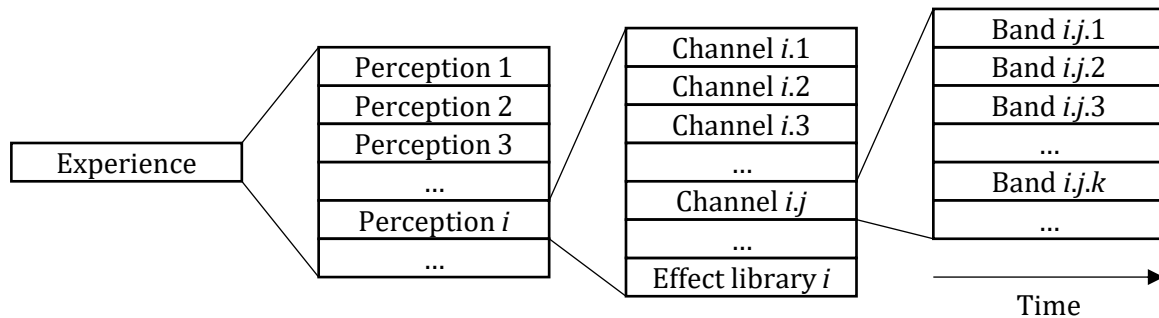


Figure 1 – Structure of haptic media.

Experiences, perceptions, channels, and bands also contain metadata, which does not depend on time.

A perception may additionally contain an effect library comprising haptic effect definitions. Bands may reference haptic effects in their containing perception's effect library.

Bands additionally contain haptic effect definitions or references to effects in the containing perception's effect library to be presented at specific times, possibly following external events.

4.2.2 MIHS streams

ISO/IEC 23090-31 describes an MIHS format for streaming haptic media. An MIHS stream is composed of MIHS units. Each MIHS unit is composed of MIHS packets.

There are several types of MIHS units: *initialization*, *temporal*, *spatial*, and *silent*; and several types of MIHS packets: *timing*, *experience metadata*, *perception metadata*, *channel metadata*, *band metadata*, *effect library*, and *data*.

Figure 2 shows the structure of the different types of MIHS units. Boxes with dashed lines denote optional packets.

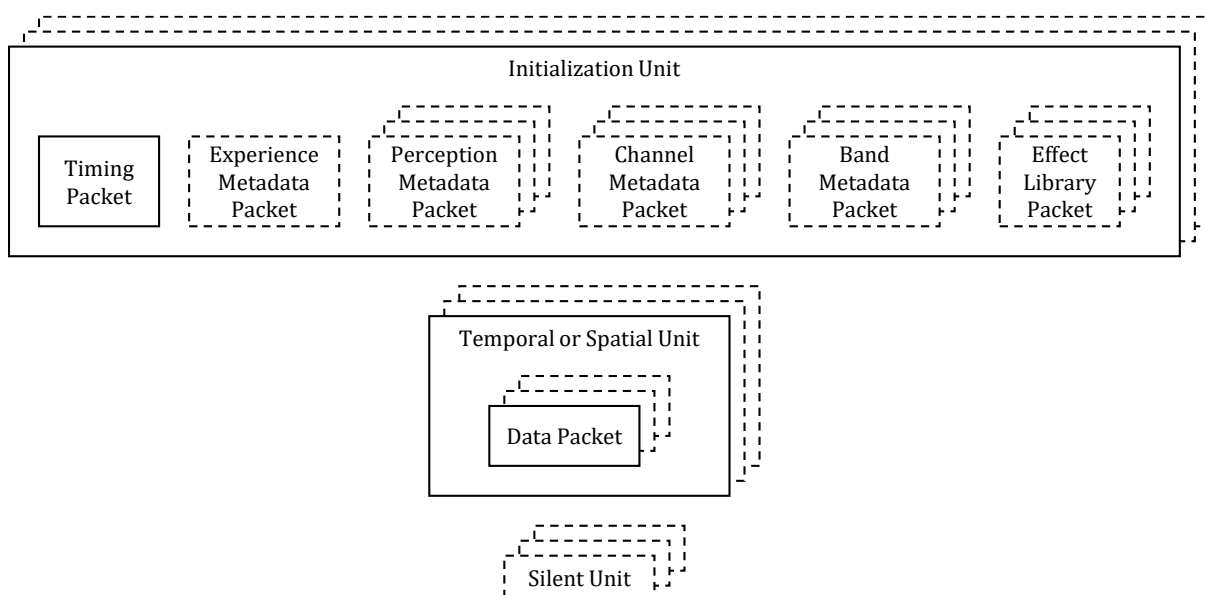


Figure 2 – MIHS stream units and packets.

An MIHS stream begins with an initialization unit. The initialization unit contains a timing packet providing a timestamp and a timescale. The initialization unit may also contain packets with metadata for the haptic experience, perceptions, channels, and bands, and an effect library packet.

One or more temporal or spatial units follow the initialization unit. Each temporal or spatial unit contains one or more data packets. The data packets contain haptic effect data.

Temporal units contain a *sync* flag indicating whether the temporal unit is a sync unit. The data packets in sync units do not depend on data in previous data packets.

Silent units may appear at any time in the MIHS stream to establish periods of haptic silence.

Initialization units may appear from time to time in the MIHS stream to update timing information or provide additional metadata or effect library information.

The metadata and effect library packets in the first initialization unit of an MIHS stream, before any temporal unit, are used as decoder configuration information for the MIHS track.

The initialization, spatial, and silent units are sync units by definition.

4.2.3 Temporal units and MIHS samples

The haptic data for the bands of a channel are stored in one or more temporal units. The data packets in each temporal unit form an MIHS sample.

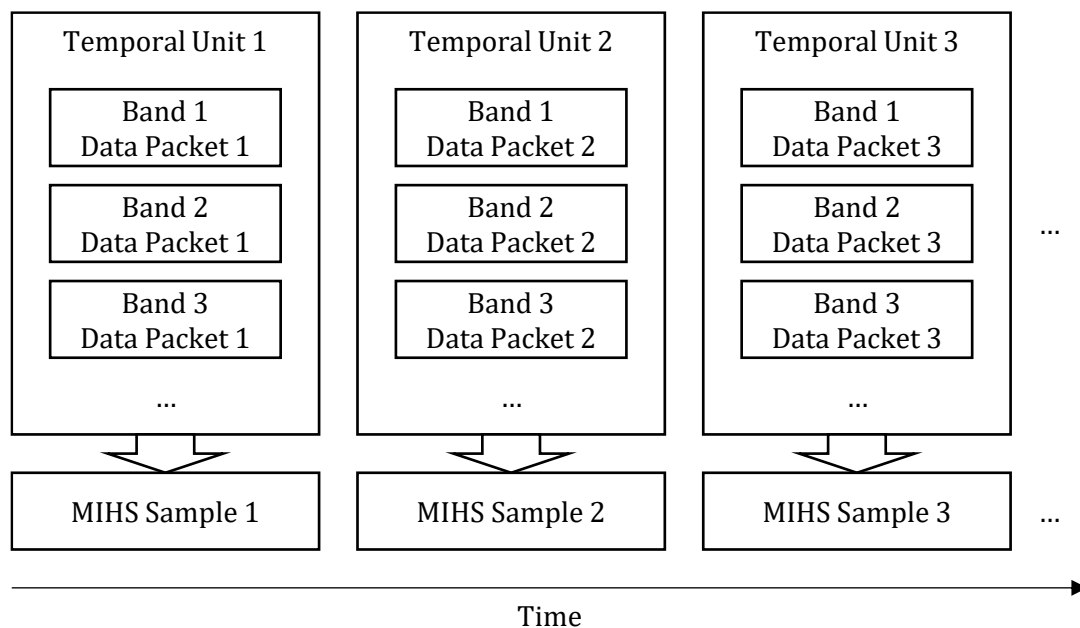


Figure 3 – Temporal units and MIHS samples.

MIHS samples created from temporal units that are sync units are sync samples. An MIHS sample may also include one or more spatial units.

A silent unit results in an MIHS sample containing a single data packet with a payload size of zero.

4.3 Synchronization with other media

An MIHS track may use a '*sync*' track reference to indicate that the MIHS track contains haptic data that are synchronized and should be presented with the media in the referenced tracks. When an MIHS track uses a '*sync*' track reference, the MIHS samples in the MIHS track may be grouped by the '*mhp*' sample grouping type as specified in subclause 5.2.17 to indicate the MIHS samples that should be presented with the referenced tracks. If there is no `SampleGroupDescriptionBox` with

grouping_type 'mhpq', all samples in the MIHS track shall be deemed to be dependent on the referenced tracks.

4.4 Summary of referenceable code points

4.4.1 Brands

ISO/IEC 14496-12 defines the concept of brands, which may be indicated in the `FileTypeBox`. Brands are used in this document to indicate conformance to an encapsulation mode and a specific set of tools, as well as requirements on other specifications (e.g., ISO/IEC 14496-12).

The brands specified in this document are listed in Table 1.

Table 1 – Brands specified in this document.

Brand	Clause	Informative description
mih1	A.2	Encapsulation of an MIHS bitstream using one or more MIHS tracks only (no MIHS band tracks)
mhb1	A.3	Encapsulation of an MIHS bitstream using one or more MIHS tracks referencing MIHS band tracks

4.4.2 Sample entry types

The sample entry types specified in this document are listed in Table 2.

Table 2 – Sample entry types specified in this document.

Sample entry type	Clause	Informative description
mih1	5.2.4	Sample entry for an MIHS track carrying haptics data or referencing one or more MIHS band tracks
mhb1	5.2.5	Sample entry for an MIHS band track carrying haptics data

4.4.3 Box types

In the table, the box types specified in ISO/IEC 23090-32 are in bold text with links to the corresponding clauses in the specification. Related container boxes specified in ISO/BMFF are not bolded. Non-related ISO/BMFF boxes are not included in the table. Mandatory boxes are, as in ISO/BMFF, marked with an asterisk. Box types without a four-character code are marked with '-' in the structure.

The box types specified in this document are listed in Table 3

Table 3 – Box types specified in this document.

Box types, structure and cross-reference (Informative)											
moov										*ISO/BMFF	container for all the metadata
	trak									*ISO/BMFF	container for an individual track or stream
		mdia								*ISO/BMFF	container for the media information in a track
			minf							*ISO/BMFF	sample information container
				stbl						*ISO/BMFF	sample table box, container for the time/space map
					stsd					*ISO/BMFF	sample descriptions (codec types, initialization, etc.)
						-				5.2.4	<i>haptic sample entry</i>
							mhlC			5.2.6	<i>MIHS configuration box</i>
							hexd			5.2.7	<i>haptic experience description box</i>
								hexh		5.2.7	<i>haptic experience header box</i>
								havd		5.2.9	<i>haptic avatar description box</i>
								hprd		5.2.10	<i>haptic perception description box</i>
								hprh		5.2.10	<i>haptic perception header box</i>
								hrdd		5.2.12	<i>Haptic reference device description box</i>
								hchd		5.2.13	<i>haptic channel description box</i>
								hchh		5.2.13	<i>haptic channel header box</i>
								hbnd		5.2.15	<i>haptic band description box</i>