ISO/IEC FDIS 23002-7:202x(E)

2023-10-11

ISO/IEC JTC 1/SC 29/WG 5 N 229

Secretariat: JISC (Japan)

FDIS text for the third edition of ISO/IEC 23002-7
Date: 2024-07-01

Information technology — MPEG video technologies —

Part 7: Versatile supplemental enhancement information messages for coded video bitstreams

Technologies de l'information — Technologies vidéo MPEG — Partie 7: Messages d'améliorations complémentaires polyvalents pour les flux binaires vidéo codés

Partie 7: Messages d'améliorations complémentaires polyvalents pour les flux binaires vidéo codés

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CONTENTS

Contents

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.

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 document 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 www.iso.org/directives or www.iec.ch/members_experts/refdocs).

Field Code Changed

Attention is drawnISO and IEC draw attention to the possibility that some of the elementsimplementation of this document may beinvolve the subjectuse of (a) patent(s). ISO and IEC take no position concerning the evidence, validity or applicability of any claimed patent rights. in respect thereof. As of the date of publication of this document, ISO and IEC had received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents and https://patents.iec.ch. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents) or the IEC list of patent declarations received (see patents.iec.ch).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards) see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

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 information*, in collaboration with ITU-T (as Rec. ITU-T H.274).

This third edition cancels and replaces the second edition (ISO/IEC 23002-7:2022), which has been technically revised.

The main changes are as follows:

— the addition of the shutter interval information SEI message,

— the addition of the neural-network post-filter characteristics SEI message,

— the addition of the neural-network post-filter activation SEI message, and

— the addition of the phase indication SEI message.

A list of all parts in the ISO/IEC 23002 series can be found on the ISO and IEC websites.

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 and www.iec.ch/national-committeeswww.iso.org/members.html and www.iec.ch/national-committees.

Introduction

Versions of this document

Rec. ITU-T H.274 | ISO/IEC 23002-7 version 1 refers to the first approved version of this document. The first edition published by ITU-T as Rec. ITU-T H.274 (08/2020) and by ISO/IEC as ISO/IEC 23002-7:2021 corresponded to the first version.

Rec. ITU-T H.274 | ISO/IEC 23002-7 version 2 refers to the integrated text containing nine additional SEI messages, namely the annotated regions SEI message, the alpha channel information SEI message, the depth representation information SEI message, the multiview acquisition information SEI message, the multiview view position SEI message, the scalability dimension information SEI message, the extended dependent random access point indication SEI message, the display orientation SEI message, and the colour transform information SEI message. Besides these additional SEI messages, this version also contains corrections to various minor defects in the prior content of the specification. The second edition published by ITU-T as Rec. ITU-T H.274 (05/2022) and by ISO/IEC as ISO/IEC 23002-7:2022 corresponds to the second version.

Rec. ITU-T H.274 | ISO/IEC 23002-7 version 3 (the current version) refers to the integrated text containing four additional SEI messages, namely the shutter interval information SEI message, the neural-network post-filter characteristics SEI message, the neural-network post-filter activation SEI message, and the phase indication SEI message. Besides these additional SEI messages, this version also contains corrections to various minor defects in the prior content of the specification. The third edition published by ISO/IEC as ISO/IEC 23002-7:202X2024 corresponds to the third version. This third edition of ISO/IEC 23002-7 corresponds to the third edition published by ITU-T as Rec. ITU-T H.274 (09/2023).

Conventions

The term "this document" is used to refer to this Recommendation | International Standard.

In this document, the following verbal forms are used:

— "shall" indicates a requirement. When used to express a mandatory constraint on the values of syntax elements or the values of variables derived from these syntax elements, it is the responsibility of the encoder to ensure that the constraint is fulfilled.

— "should" indicates a recommendation. It is used to refer to behaviour of an implementation that is encouraged to be followed under anticipated ordinary circumstances, but is not a requirement for conformance to this document.

— "may" indicates a permission.

— "can" indicates a possibility or a capability.

Information marked as "NOTE" is intended to assist the understanding or use of the document. "Notes to entry" used in Clause 3Clause 3 provide additional information that supplements the terminological data and can contain provisions relating to the use of a term.

Patent declarations

The International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) draw attention to the fact that it is claimed that compliance with this document may involve the use of a patent.

ISO and IEC take no position concerning the evidence, validity and scope of this patent right.

The holder of this patent right has assured ISO and IEC that he/she is willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with ISO and IEC. Information may be obtained from the patent database available at www.iso.org/patents or https://patents.iec.ch.

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

Information technology — MPEG video technologies

Part 7:
Versatile supplemental enhancement information messages for coded video bitstreams

1 Scope

This document specifies the syntax and semantics of video usability information (VUI) parameters and supplemental enhancement information (SEI) messages. The VUI parameters and SEI messages defined in this document are designed to be conveyed within coded video bitstreams in a manner specified in a video coding specification or to be conveyed by other means determined by the specifications for systems that make use of such coded video bitstreams. This document is particularly intended for use with coded video bitstreams as specified by Rec. ITU-T H.266 | ISO/IEC 23090-3, although it is drafted in a manner intended to be sufficiently generic that it can also be used with other types of coded video bitstreams.

VUI parameters and SEI messages can assist in processes related to decoding, display or other purposes. However, unless otherwise specified in a referencing specification, the interpretation and use of the VUI parameters and SEI messages specified in this document is not a required functionality of a video decoder or receiving video system. Although semantics are specified for the VUI parameters and SEI messages, decoders and receiving video systems can simply ignore the content of the VUI parameters and SEI messages or can use them in a manner that somewhat differs from what is specified in this document.

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 10646, *Information technology — Universal coded character set (UCS)*

ISO/IEC 11578:1996, *Information technology — Open Systems Interconnection — Remote Procedure Call (RPC)*

ISO/IEC 15938-17, *Information technology — Multimedia content description interface — Part 17: Compression of neural networks for multimedia content description and analysis*

Recommendation Rec. ITU-T H.273 | ISO/IEC 23091-2, *Information technology — Coding-independent code points — Part 2: Video*

Recommendation Rec. ITU-T T.35:2000, *Procedure for the allocation of ITU-T defined codes for non-non-standard facilities*

ISO/CIE 11664-1, *Colorimetry — Part 1: CIE standard colorimetric observers*

IETF RFC 1321, *The MD5 Message-Digest Algorithm*

IETF RFC 4151, *The 'tag' 'tag' URI Scheme*

IETF RFC 5646, *Tags for Identifying Languages.*

IETF Standard 66RFC 3986, *Uniform Resource Identifiers (URI): Generic Syntax*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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/obphttps://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/https://www.electropedia.org/

3.1
AU
access unit
set of *PUs* that belong to different *layers* and contain *coded pictures* associated with the same *output time*

3.2
APS
adaptation parameter set
syntax structure containing *syntax elements* that apply to zero or more *slices* as determined by zero or more *syntax elements* found in *slice headers*

3.3
alpha blending
process in which an auxiliary *coded picture* is used in combination with a primary *coded picture* and with other data not specified by this document in the display process

Note 1 to entry: In an alpha blending process, the luma samples of an auxiliary coded picture are interpreted as indications of the degree of opacity (or, equivalently, the degrees of transparency) associated with corresponding samples of the primary coded picture.

3.4
associated IRAP picture
previous *IRAP picture* (when present) in *decoding order*, for a particular picture, in the same *layer* as the particular *picture*

3.5
azimuth circle
circle on a sphere connecting all points with the same azimuth value

Note 1 to entry: An azimuth circle is always a *great circle* like a longitude line on the earth.

3.6
byte
sequence of 8 bits, within which, when written or read as a sequence of bit values, the left-most and right-most bits represent the most and least significant bits, respectively, and the bits are written or read from left to right