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Information technologies — JPEG systems —

Part 6: JPEG 360

AMENDMENT 1: Addition of new JPEG 360 image types and accelerated ROI rendering

Technologies de l'information — Systèmes JPEG JPEG 360 —

Partie 6: JPEG 360

AMENDEMENT 1

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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 19566 series can be found on the ISO and IEC websites.

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Information technologies — JPEG systems —

Part 6: JPEG 360

AMENDMENT 1: Addition of new JPEG 360 image types and accelerated ROI rendering

3.2

Add the following abbreviations terms:

FOV field of view

URI uniform resource identifier

5.3

Add a new paragraph at the end of clause 5.3 as follows:

In addition, an accelerated viewport rendering to support an efficient and low latency viewport transmission shall be done as defined in Annex C.

5.4

Renumber subclause 5.4 as 5.5 and add a new subclause 5.4 as follows:

5.4 Stereoscopic 360 image

5.4.1 General

A stereoscopic 360 image is a pair that consists of two images of the same scene or object but a slightly different angle or perspective for the left and right eye. Each pair should be an image with an ERP format. This pair is stored in three formats for JPEG 360 in addition to an existing monoscopic format which provides the only single view.

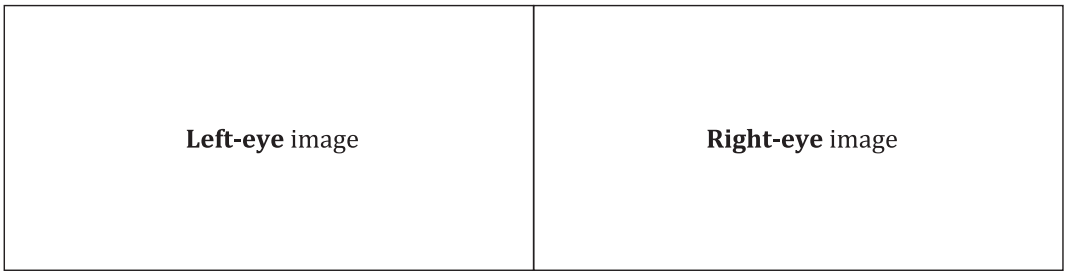
5.4.2 Stereoscopic formats

The stereoscopic format indicates an arrangement of the left and right images. This subclause defines three formats for organizing the pair of the stereoscopic 360 images as follows.

— Side-by-side: left- and right-eye images are packed horizontally.

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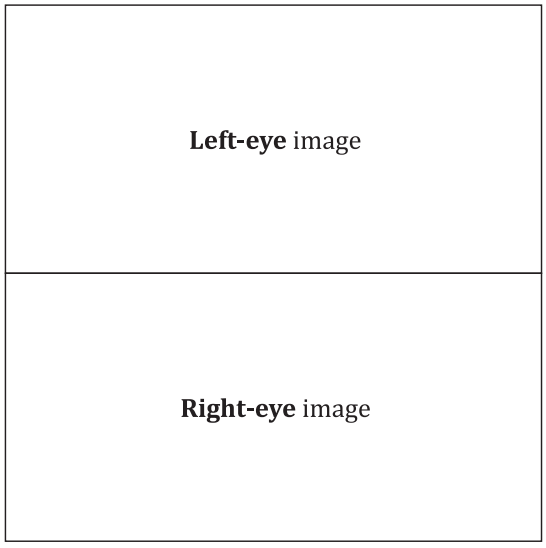
a) Structure



b) Example of the format

Figure 11 — Side-by-side format

— Top-bottom: left- and right-eye images are packed vertically.



a) Structure



b) Example of the format

Figure 12 — Top-bottom format

— Extended: one of the left- and right-eye images is stored in the form of a JPEG image, which contains the metadata required to construct a stereoscopic scene. The metadata includes information that identifies the location of the remaining image in both eyes. Figure 13 shows an example of the extended format. Although this example shows the right-eye image is contained in the same JPEG image file, the right-eye image may be referenced externally as a different JPEG image file, as per ISO/IEC 19566-5.

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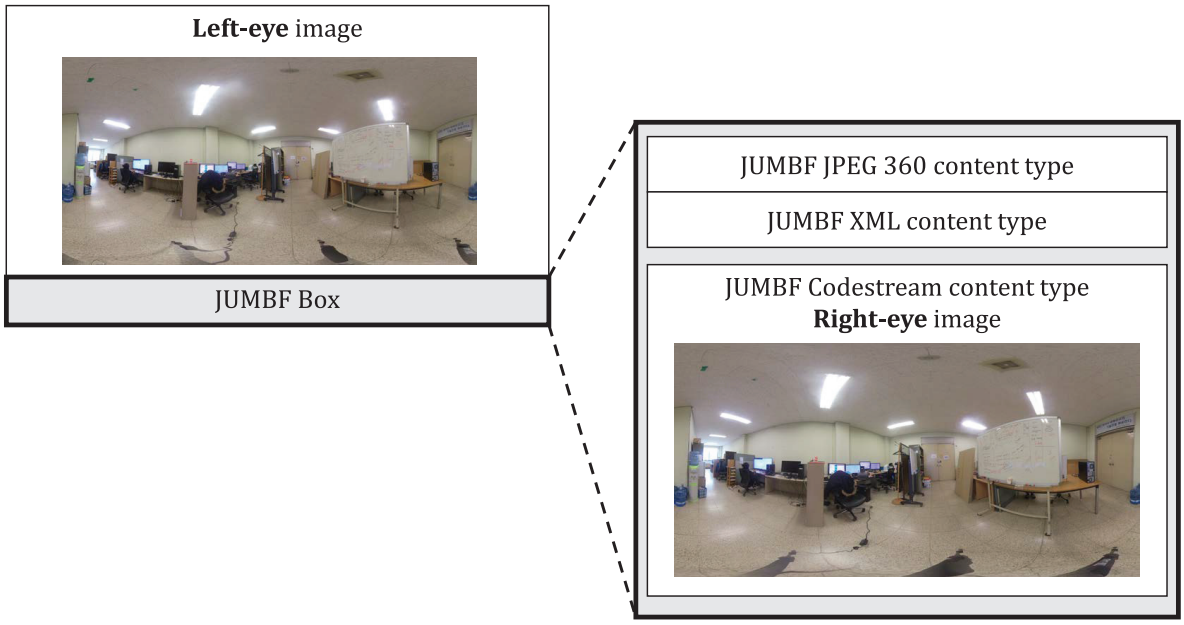
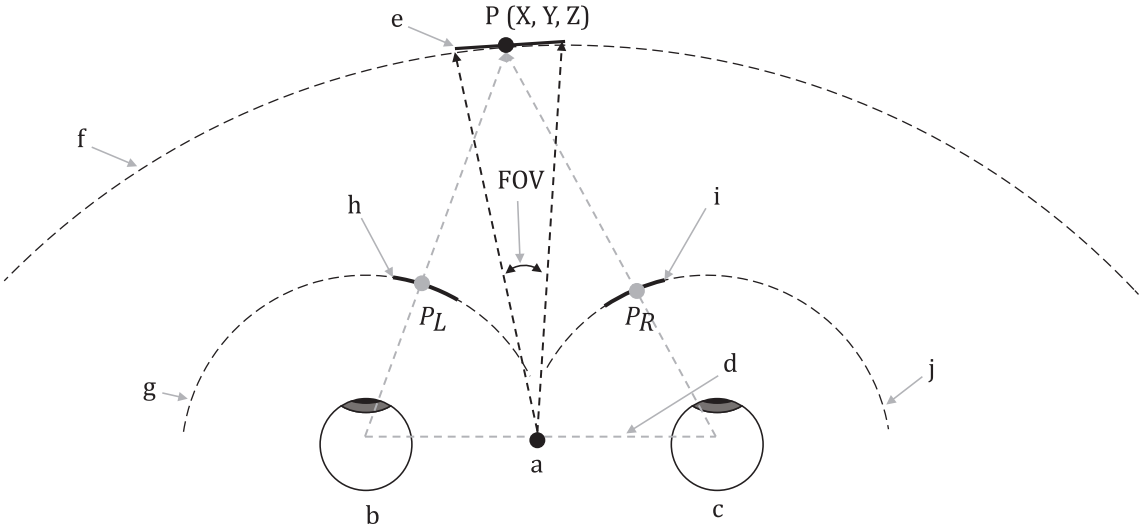


Figure 13 — Example of the extended format

5.4.3 Viewport definition in the stereo vision model



Key

a	centre of the baseline	f	sphere
b	left eye	g	left 360-degree image
c	right eye	h	viewport mapped on the left image
d	baseline	i	viewport mapped on the right image
e	viewport	j	right 360-degree image

Figure 14 — Viewport definition in the stereo vision model

Figure 14 illustrates the stereo vision model used for stereoscopic 360 images and how a viewport is organized. The viewport is a rectangular sub-region of the sphere specified by the FOV span values from the centre of the sphere that is supposed to be the centre of the two eyes in the model.

In this model, P, which is a point on the sphere with Cartesian coordinate, is mapped on to the left and right images, P_L and P_R, differently depending on the configuration of the capture devices. This

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allows the human visual system to perceive the point P more realistically when left and right images are projected on both eyes, respectively. In this case, the viewports for both eyes are not necessarily defined for the left and right eyes separately but can be defined by the viewing direction from the centre of both eyes. Therefore, the viewport is specified by the FOV span values at the centre of the sphere that is considered as the centre of the two eyes in the model.

5.4.4 Compatible with a conventional 360 image viewer

An interaction modality, such as a head-mounted display, is able to present a stereoscopic scene while a conventional 360 image viewer may parse only monoscopic JPEG 360 image and present a viewport. However, when the conventional viewer loads the stereoscopic JPEG 360 image file, it is possible to extract the left- or right-eye image from the file based on the metadata embedded in the file then present it to the viewer.

Furthermore, when the stereoscopic JPEG 360 image is an extended format, the conventional viewer will display one of the left- and right-eye images without additional processing. This follows the backward compatible mechanism, as described in subclause 5.2, which allows that an image is decoded when the file is opened by conventional JPEG viewing applications.

6.1

Change the number of Figure 11 to 15.

B.2

Replace the meaning of the BoxReference in Table B.1 with the following:

Refers to a label for either a JUMBF Codestream Content Type box or a JUMBF Embedded File Content Type box, as per ISO/IEC 19566-5.

B.7

Replace the XMP expression with the following:

```
<?xpacket begin="ï»¿" id="W5M0MpCehiHzreSzNTczkc9d"?>
  <x:xmpmeta xmlns:x="adobe:ns:meta/" x:xmptk="XMP Core 5.5.0">
    <rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#">
      <rdf:Description rdf:about=""
          xmlns:xmp="http://ns.adobe.com/xap/1.0/"
          xmlns:umf="http://ns.intel.com/umf/2.0">
        <umf:next-id>0</umf:next-id>
        <umf:schemas>
          <rdf:Bag>
            <rdf:li rdf:parseType="Resource">
              <!-- JPEG 360 Metadata -->
              <umf:schema>JPEG360Metadata</umf:schema>
                <umf:descriptors>
                  <rdf:Bag>
                    <rdf:li rdf:parseType="Resource">
                      <umf:name>JPEG360ImageMetadata</umf:name>
                      <umf:fields>
                        <rdf:Bag>
                          <rdf:li rdf:parseType="Resource">
                            <umf:name>JPEG360Version</umf:name>
                            <umf:type>integer</umf:type>
                          </rdf:li>
                          <rdf:li rdf:parseType="Resource">
                            <umf:name>MediaType</umf:name>
                            <umf:type>string</umf:type>
                          </rdf:li>
```


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