



Report ITU-R BT.2506-0
(09/2022)

**Requirements for spatial characteristics
of an ideal head-mounted display
for immersive video**

BT Series
Broadcasting service
(television)



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Note: This ITU-R Report was approved in English by the Study Group under the procedure detailed in Resolution ITU-R 1.

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1 Introduction

Advanced immersive sensory media (AISM) systems enable users to enjoy immersive experiences with an unprecedented degree of presence. An ideal immersive video system should provide the user with an experience similar to that induced by the observation of natural scenes in the real world. One of the most promising approaches for displaying immersive video is the use of a head-mounted display (HMD). In this context, the requirements for an ideal HMD, including spatial and temporal characteristics, range of luminance, colour gamut, tonal variation, physical weight and comfort of wear, need to be clarified. As a first step, this Report presents ergonomic findings related to the spatial characteristics required for an ideal HMD.

2 Spatial characteristics of an ideal HMD**2.1 Field of view**

The field of view in the head-centred coordinate system needs to be assessed by psychophysical experiments to determine if the HMD can present optical stimuli to the entire field of view of the human visual system. Many prior studies on the human visual field [1–3] have performed measurements on the retinal coordinate system. However, since users move their eyes freely when wearing an HMD fixed to the head, they see visual objects in the retinal coordinates of any eye position over a wide range of eye movements (Fig. 1). In order to ascertain the required field of view of an ideal HMD, it is necessary to measure the field of view in the head-centred coordinate system. Research on the range of eye movement [4] has suggested that, by linearly integrating the range of eye movement, it may be possible to derive the field of view in the head-centred coordinate system. The result will be adjusted to take account of facial structures such as the nose, forehead and shape of the eye fissure.