

SMPTE STANDARD

Disparity Map Representation
for Stereoscopic 3D



Table of Contents	Page
Foreword	2
Intellectual Property	2
Introduction.....	2
1 Scope	3
2 Conformance Notation	3
3 Definitions and Acronyms	3
3.1 Disparity Units (DU)	3
3.2 Disparity Value	4
3.3 Disparity Map	4
3.4 Vertical Misalignment.....	4
4 Disparity Value Representation	4
5 Disparity Map Characteristics	4
5.1 Map Width	5
5.2 Map Height.....	5
5.3 Map Image Tag	5
6 Special Values	5
6.1 Unknown	5
Annex A Bibliography (Informative)	6

Foreword

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SMPTE Engineering Documents are drafted in accordance with the rules given in Part XIII of its Operations Manual.

SMPTE ST 2066 was prepared by Technology Committee 10E.

Intellectual Property

SMPTE draws attention to the fact that it is claimed that compliance with this Standard may involve the use of one or more patents or other intellectual property rights (collectively, "IPR"). The Society takes no position concerning the evidence, validity, or scope of this IPR.

Each holder of claimed IPR has assured the Society that it is willing to License all IPR it owns, and any third party IPR it has the right to sublicense, that is essential to the implementation of this Standard to those (Members and non-Members alike) desiring to implement this Standard under reasonable terms and conditions, demonstrably free of discrimination. Each holder of claimed IPR has filed a statement to such effect with SMPTE. Information may be obtained from the Director, Standards & Engineering at SMPTE Headquarters.

Attention is also drawn to the possibility that elements of this Standard may be subject to IPR other than those identified above. The Society shall not be responsible for identifying any or all such IPR.

Introduction

This section is entirely informative and does not form an integral part of this Engineering Document.

Stereoscopic 3D image capture and generation equipment provide images having intrinsic depth cues due to disparity, that can be perceived when stereoscopic imagery is properly presented to both eyes. Lest depth cue conflicts result, these disparities are considered when such stereoscopic sources are composited, including with other stereoscopic images, subtitles, captions, and graphic overlays. Other manipulations of stereoscopic images also benefit from knowledge of disparity values: For example, in depth keying, a matte or keying signal is derived from disparity information and used in the compositing of two stereoscopic sources. Disparity information also enables the exaggeration or attenuation of the intrinsic depth cues downstream from a stereoscopic source.

For stereoscopic images generated computationally (for instance, from graphic animation devices that produce a stereoscopic output), disparity values can be provided that are authoritative. However, in the case of stereoscopic image capture systems (that is, devices to capture real-world images, such as stereoscopic camera rigs), disparity is estimated. This can be from the images themselves, or from a fusion of image data and another data source, for example, LIDAR (Light Detection and Ranging). When estimated, the disparity values that result are sometimes less than certain.

In general, for compositions and other manipulations, an accurate representation of disparity values corresponding to each pixel of each image in a stereoscopic image pair is needed to achieve the highest quality result.

During the composition or manipulation of stereoscopic images, the intrinsic depth cues due to disparity are changed. When desired, a new disparity map is obtained through a corresponding operation, or is derived anew from the resulting stereoscopic image pair. The new disparity map accompanies the corresponding stereoscopic image pairs for use in subsequent processing.