Multi Focal Accommodation Near-Eye 3D Displays

Enterprise IG/ML series Mixed Reality Multi Focal Accommodation 3D Image Headsets

Enterprise or IG/ML series mixed reality multi focal accommodation near eye 3D image displays - used in IG - AR Headsets and ML - Medical 3D image Near Eye lenses are aimed at professionals in fields of smart manufacturing, training and simulation, medical procedures and other applications requiring optically precise 3D visualization of highly detailed visual objects in 3-dimensions reconstructing 3D objects and images at most optimal viewing distances (0.3m - 0.8m) from eyes.

IG/ML optical architecture provides comfortable viewing experience and eye strain free usage of a system for longer periods. Optical system creates eye accommodation depth cues across several diopters (up to 4). LightSpace Technologies multifocal optical architecture offers high resolution mixed reality 3D image display without Vergence Accommodation Conflict for human vision system.

Multi focal technology

Advantages

Reproduction of true 3D images in real-time
- without any moving parts
- continues depth perception by binocular and monocular depth cues
- reconstructs all physical and psychological depth cues
- perceptually flicker free

The technology is scalable
- can be implemented in large-size displays, as well as in wearable or otherwise portable display devices

Key enabling technology
- the proprietary liquid crystal based optical switching element with ultra-low response time

Technology provides accommodation and convergence depth cues
- which is a culprit of all currently available conventional stereoscopic 3D imaging methods with a single focal plane images

Does not cause eyestrain and fatigue
- after longer viewing periods, in comparison to conventional 2D displays or stereo 3D VR/AR headsets*

*Clinically approved testing in progress
Features of multi focal 3D Technology

The multi focal plane Stereoscopic 3D optical architecture delivers continuous focal depth cues over whole displayable field of depth starting with 0.3m to infinity. As such it does not create vergence accommodation conflict which so far has been major obstacle in VR/AR system usability. It does create realistic 3D reality reconstruction if inter plane distance does not exceed 0.6 diopters.

Reference Model Comparison table
(preliminary specifications)*

<table>
<thead>
<tr>
<th>Reference model</th>
<th>IG1000</th>
<th>IG2000</th>
<th>ML3000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>high resolution AR headset with multi focal accommodation (high brightness)</td>
<td>high resolution AR headset with multi focal accommodation</td>
<td>high resolution medical 3D near eye lens with multi focal accommodation</td>
</tr>
<tr>
<td>Status</td>
<td>laboratory prototypes now; beta prototypes 2020 Q3, pilot production 2020 Q4</td>
<td>in development, prototypes expected Q2 2020</td>
<td>in development, prototypes expected Q3 2020</td>
</tr>
<tr>
<td>Number of accommodation focal planes</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Horizontal field of view</td>
<td>52 (diagonal) 45 (horizontal) 50 (horizontal)</td>
<td>35-40(horizontal), 50-60 pps</td>
<td>0.45m to 5m</td>
</tr>
<tr>
<td>Field of focal depth, meters</td>
<td>0.45m to 5m</td>
<td>0.45m to 5m</td>
<td>0.3m to 1.0m</td>
</tr>
<tr>
<td>Average interplane distance, diopters</td>
<td>&lt;0.7</td>
<td>&lt;0.8...1.0</td>
<td>&lt;0.6</td>
</tr>
<tr>
<td>Color modes</td>
<td>RGB up to 24 bpv</td>
<td>RGB up to 24 bpv</td>
<td>RGB up to 24 bpv</td>
</tr>
</tbody>
</table>

*All specifications subject to change without notice.

AR Headsets (Glasses) top Highlights

Lightspace Technologies Enterprise series AR smart glasses are based around patent pending multi focal plane stereoscopic 3D near eye display technology. They deliver full accommodation for human vision across whole reconstructed 3D image depth space.

This is currently the leading technically feasible technology allowing high refresh rate visualization of 3D imagery located at arm length (0.3 - 0.8m) distance from a viewer.

Glasses use separate image and spatial configuration capturing module that can be tailor customized for various tasks - overlay image registration, head tracking, hand gesturing control, various image guided tasks.