Portable Hybrid Display for Immersive Augmented Reality with Full Field of View and High-Resolution local Field of View

Advantages
• Less expensive and higher focal resolution than cubical display alternatives
• Higher definition focal ability with 360° immersion
• Fully immersive 3D experience capable of supporting continuous work terrain data
• Portable for rapid deployment

Invention
The invention represents the design for an immersive virtual interface system composed of both a reflective hemispherical dome and a head mounted display. It can relay both full FOV peripheral feeds and high-definition narrow FOV feeds to a user.

Background
It is often necessary for people to review wide scope images for the purpose of identifying specific details within those images. For example, in piloting an unmanned aerial vehicle (UAV), the operator must view full 360° geospatial images and then identify fine features of interest on the ground or in the air. In a typical situation, such images are reviewed using a conventional computer display, such as a liquid crystal display (LCD) monitor. However, such display cannot provide the view with an authentic representation of the viewed scene given that the display is two dimensional, and therefore cannot convey spatial relationships that would provide more information to the viewer. The region of interest is only that focused on by the user; this is the only region where high resolution viewing would be appreciated. Although immersive displays have been developed that surround the viewer within a large panoramic image, such displays cannot present photographic images in high resolution. In addition, the viewer may not be able to discern fine details within the images.

With this in mind, researchers at UCF have developed an immersive display system that makes use of both low-definition full field of view (FOV) projection and high-resolution local FOV augmentation via head mounted display. This dual display system provides for an efficient immersive environment that is open to user manipulation and interaction.

Application
This design holds promise in applications from unmanned vehicle control to immersive gaming. It would be an impactful technology for those developing systems for interaction with virtual environments. More specifically, the proposed invention can be used in the visualization of geospatial data including maps and satellite imagery. It can also be utilized to display immersive 3D data for a variety of other industries, such as military, flight simulation and oil industries.

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