

## Exhibition of recent works in large-scale computer holography

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### ABSTRACT

For the last decade, we have created some large-scale full-parallax computer-generated holograms (CGH), which are composed of several billion or sometimes several tens of billion pixels. We call these high-definition CGHs. The high-definition CGHs are calculated using the polygon-based method and the silhouette method for occlusion processing, and fabricated using laser lithography. Since the viewing-angle is more than 45 degree and continuous and natural motion parallax are well reconstructed, the optical reconstruction of the high-definition CGHs are comparable to that by traditional optical holography.

In this exhibition, we present some of our latest works. One of them has a size of 18 cm × 12 cm and is composed of 65 billion pixels. The pixel pitches are 800 nm and 400 nm in horizontal and vertical directions, respectively. This may be the biggest CGH in the world. Because of the high-density especially for the vertical direction, the illumination light can irradiate the CGH with a large angle. Thus, viewers do not detect any 0-th order light and conjugate light.

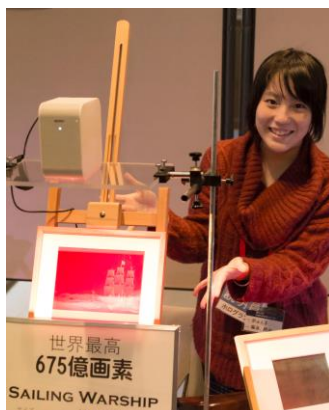
Another one is the CGH that reconstructs a transparent object like a crystal sphere. The object field is calculated by a technique based on the physical model of optical refraction. Several recent high-definition CGHs including these brilliant CGHs are on display.

**Keywords:** High-definition CGH, large scale CGH, full-parallax, transparent rendering

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Sailing Warship-II, 18 cm × 12 cm