True 3D Display

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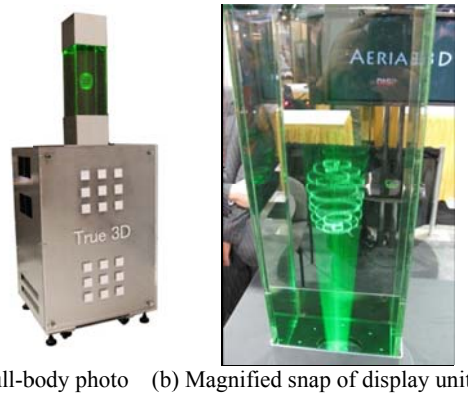
1. Introduction

Realizing a true three-dimensional (3D) display environment has been an ultimate goal of visual computing communities. Burton Inc. in Japan and others built upon the modern laser-plasma technology to come up with *3D Aerial Display* device in 2006, with which the users are allowed to plot a unicursal series of illuminants freely in the midair, and thus the surrounding audience can enjoy watching different aspects of the 3D image from different positions, *without any eye strain* [Kimura et al. 2006].

Through the subsequent updates after the successful exhibition at SIGGRAPH 2006, we herein present our latest version of the device, called SRV (Super Real Vision)-5000, where we condensed our state of the art laser-plasma technology into a small acrylic case (**Fig. 1**).



(a) Full-body photo (b) Magnified snap of display unit
Figure 1. *True 3D display device SRV-5000.*

2. Hardware Performance Advances

Table 1 compares the SRV-5000 model with our previous model exhibited at SIGGRAPH 2006 Emerging Technologies in terms of performance.

Table 1. *Performance advances during these five years.*

	SRV-5000	**2006 Model**
Light source	6W	200MJ
Resolution	50,000 points/sec.	300 points/sec.
Display volume	20 ㎝×20 ㎝×20 ㎝	50 ㎝×50 ㎝×50 ㎝
Power source	100V	200V

One remarkable advance lies in its resolution: from 300 points/sec. to 50,000 points/sec. whereas the display volume gets a bit diminished. Additional good news is that by very recent invention of red and green as well as blue laser plasma display capability, the current *monochromatic* problem will be completely solved at one burst by the next version.

Fig. 2 exemplifies how faithfully the SRV-5000 can display the objects in real time. The accompanying video shows more clearly the big difference from the 2006 model. We believe that the SRV-5000 model will increase the potency of utilization in various application fields.

(a) Tornado (b) Human face
Figure 2. *Examples of displayed objects with SRV-5000.*

3. Software Support

Though the present device has been substantially updated, the current version of hardware still suffers from the *sparse appearance* problem, which should lead infallibly to inhibition of dissemination of the device to application fields where solid and realistic rendering plays a major role, such as design and film/game industries.

We are currently considering a software-based solution to ameliorate this problem. To this end, a curvature-based surface descriptor is designed to adaptively control the point density and brightness reflecting the geometric features of the original polygonal models. We will demonstrate at our booth how the software solution can enhance the SRV-5000's display capability further.

Gaining such software supports, our Super Real Vision series is surely providing a promising environment for paving a way to the true 3D display and natural user interaction.

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References

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