10th International Symposium on Display Holography

SAMSUNG

Optical design of Hologram Optical Element-based See-through glasses

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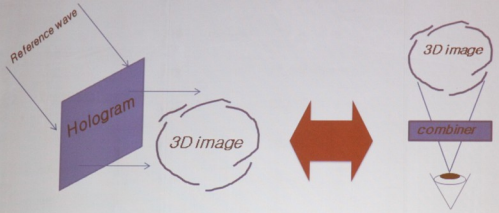
1. Similar feature of Hologram and Augmented reality

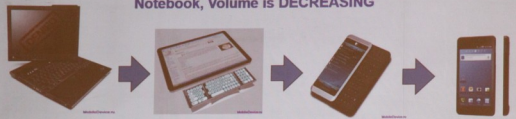
Hologram and augmented reality device have same purpose
: 3D image creation



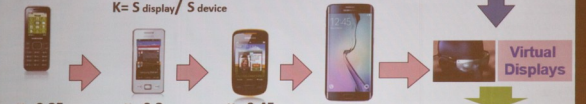
<Hologram> <AR glass>

2. Display Ergonomics contradictions

Notebook, Volume is DECREASING



$K = S_{display} / S_{device}$

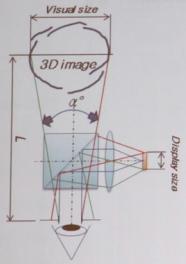


- Portable
- Compact
- Dynamic

Mobile phone, Display ratio is INCREASING

2. display size ≠ visual size

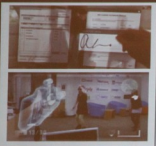
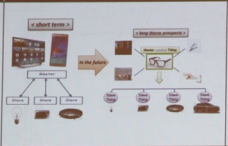
(example of PBS)



If α=40°, L=3 m => visual size=86 inch

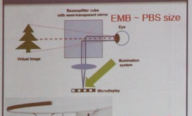
Visual size=2·L·tan($\frac{\alpha^\circ}{2}$)

4. Potential application area of Augmented reality

Display Enhancement	Real(IoT) and virtual object control by gesture	3D AR modeling (and then 3D-Printer)
		
Biofeedback	**Instruction**	**Navigation**
		

5. Why HOE compared with other constructions

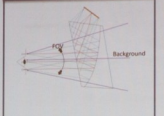
PBS



- Small EMB
- Bulky system

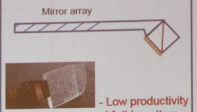
Google Glass

TIR free-form prism



- Bulky system

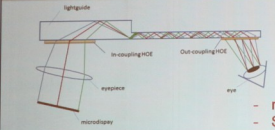
Mirror array



- Low productivity
- Visible pattern

Lumus

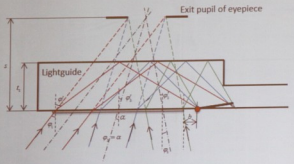
Simple layout of HOE-based glass



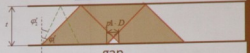
- nonvisible pattern from inside and outside
- Small size of system in front of eyes

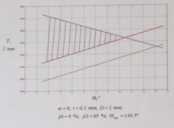
6. Theoretical base

In-coupling

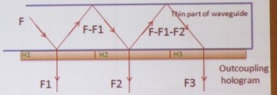


Out-coupling

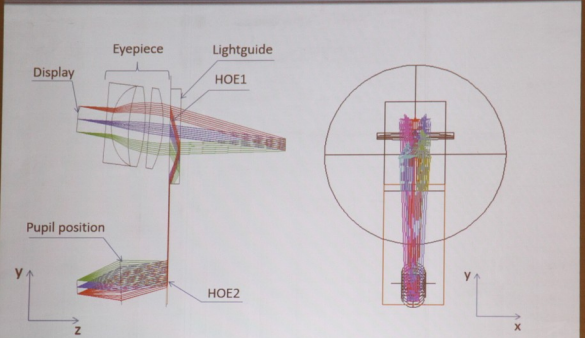




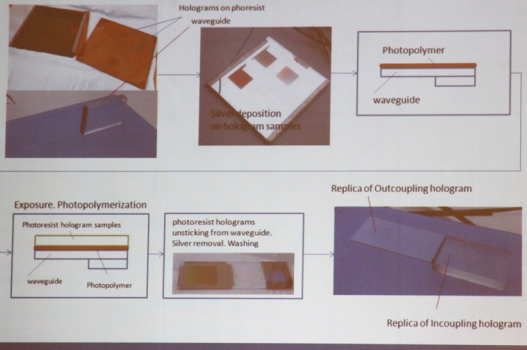
Multiplication



7. Simulation result

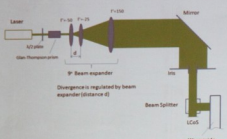


8. Experimental procedure

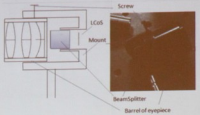


9. Prototype Result

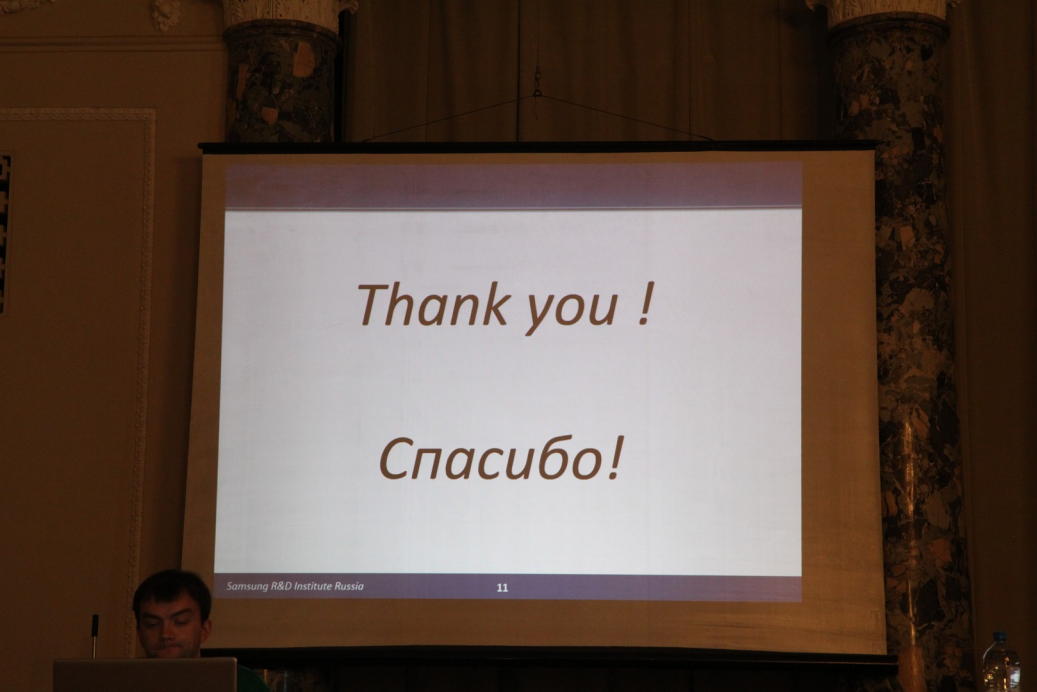
illumination part



Eyepiece module



Prototype result


Thank you !
Спасибо!
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