



3D Video Conferencing: Opportunities and Pitfalls

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2D image lacks some important info: size and distance.
Not a big deal on this example, though.



But crucial here.



Photo © Dr. Sharadh Sampath

A man with a beard is wearing a bright green knitted hat that features a single large, stylized eye with a black pupil and a simple curved smile. He is holding a small glass of amber liquid, likely whiskey, up to his lips. He is wearing a dark blue patterned cardigan over a light blue collared shirt. The background is a plain, light-colored wall.

TrueConf Mad Scientist Ivan Knows 3D Inside Out

3D Video Conferencing Issues of Today



You have to wear
glasses

OR



Suffer headache

1. Capture Challenges

2. Transmission --
OK

3. Display Challenges

1. Capture Challenges



A proper camera for 3D VC still doesn't exist.

Back in 2011...



- poor resolution
- poor precision
- correction N/A
- too narrow FOV

Minoru 3D → first stereo USB camera

Consumer Stereo Cameras

- Limited DSP access
- Only for recording
- No drivers/interface



Sony HDR-TD10E



1. Capture Challenges

- 
- Low res depth <math>< 320p</math>
 - Low fps for depth map

Works for gestures not applicable for VC yet.

We started to make hardware ourselves



1. Capture Challenges

And Made 3D 2K+2K Camera :)

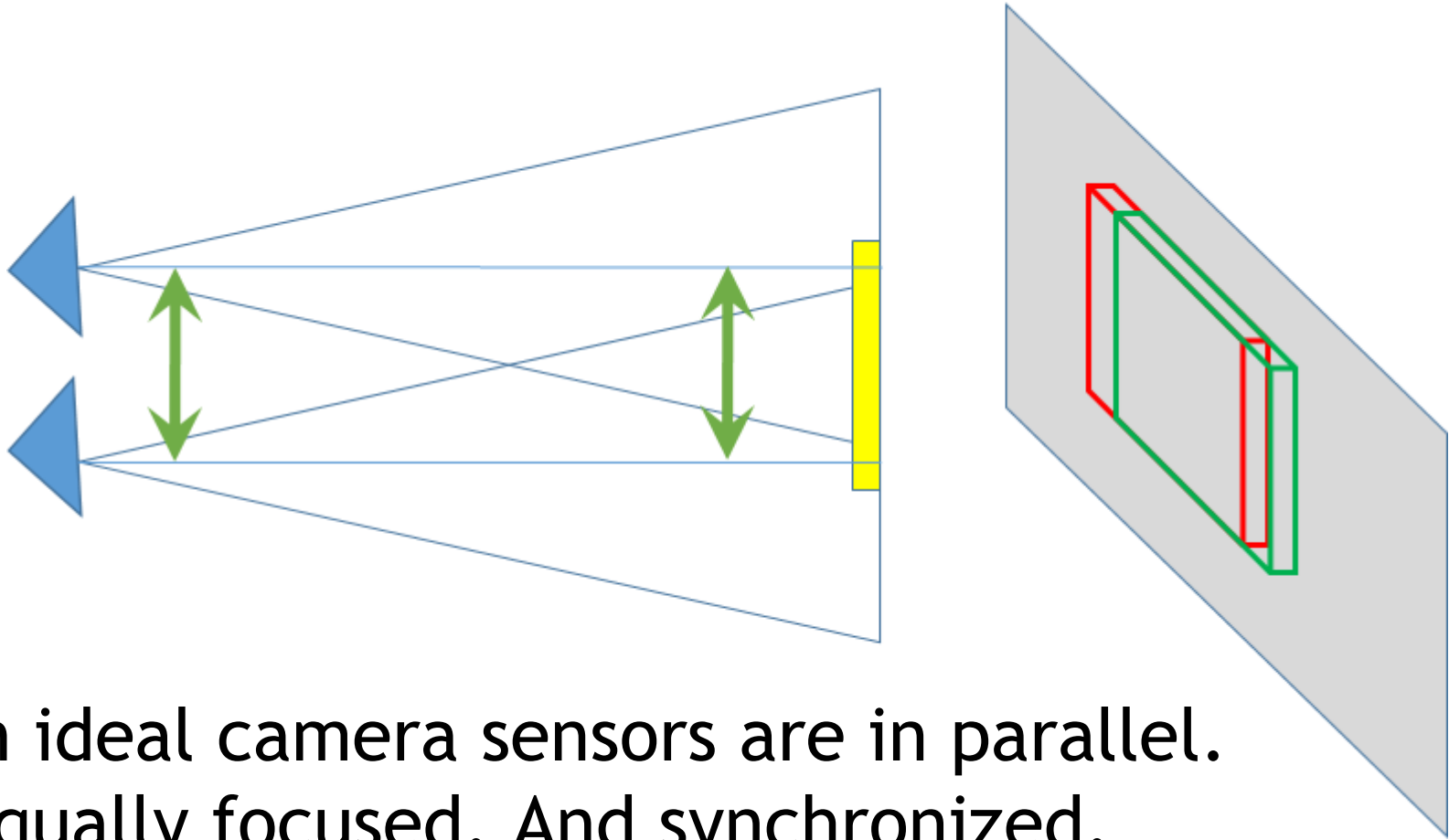


- 2x PointGrey 5Mp sensors
- Self-written drivers
- Self-made chassis
- GPU-driven processing
- No autofocus and bulky

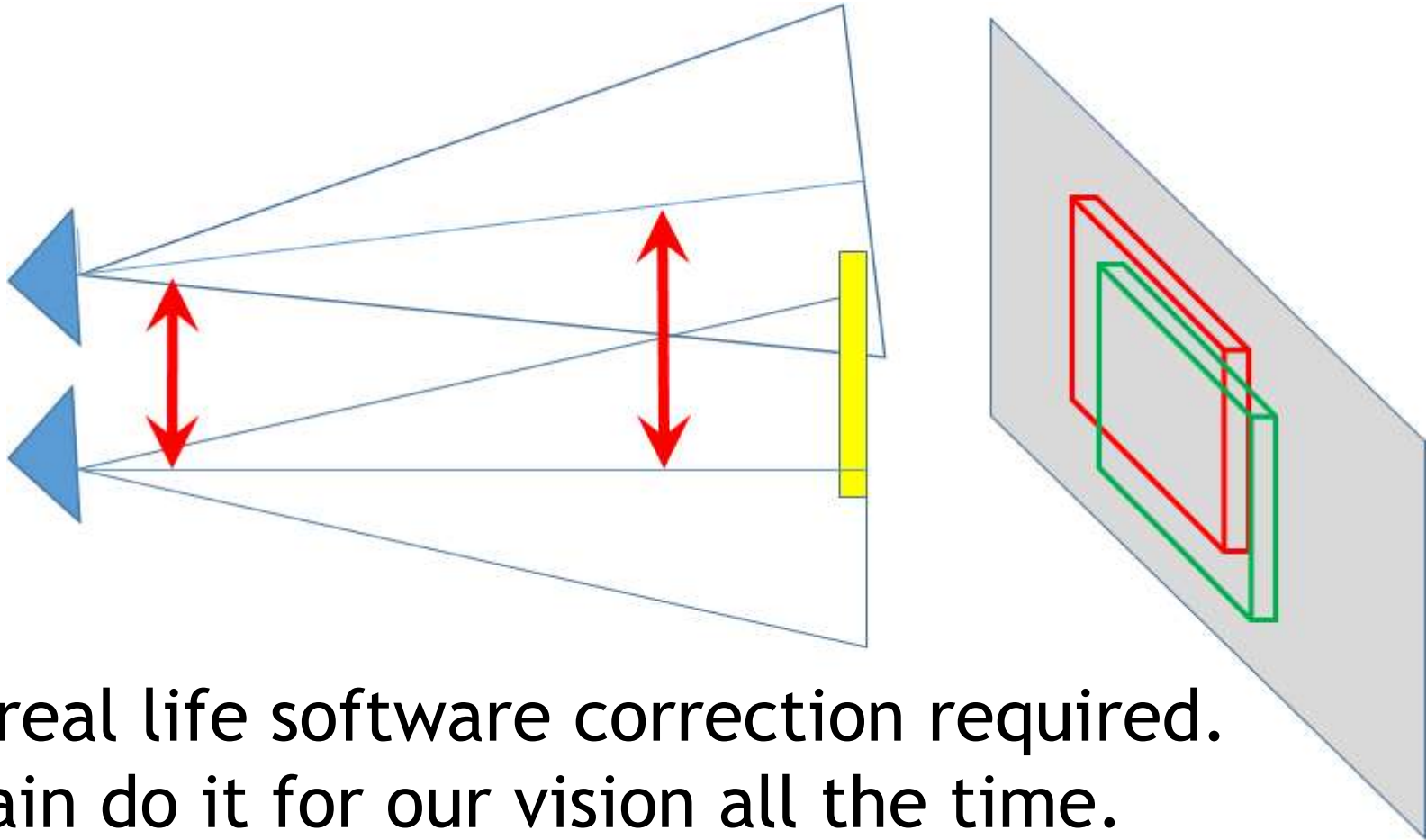
2016: New Wave & New Stereo Cams

1. Capture Challenges

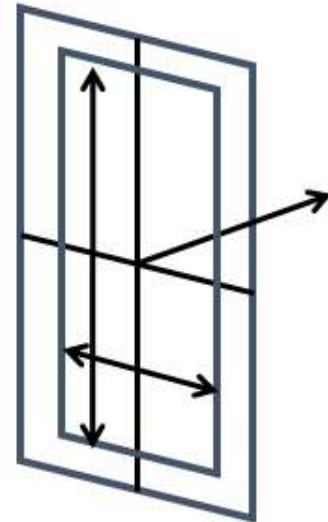
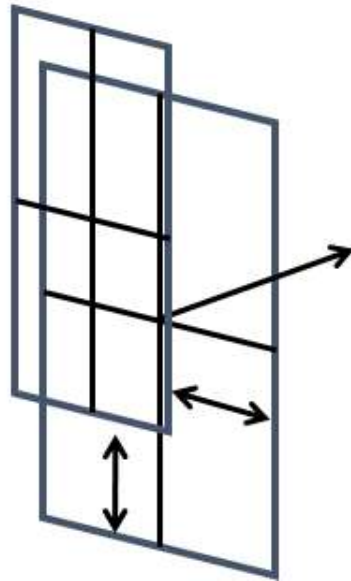
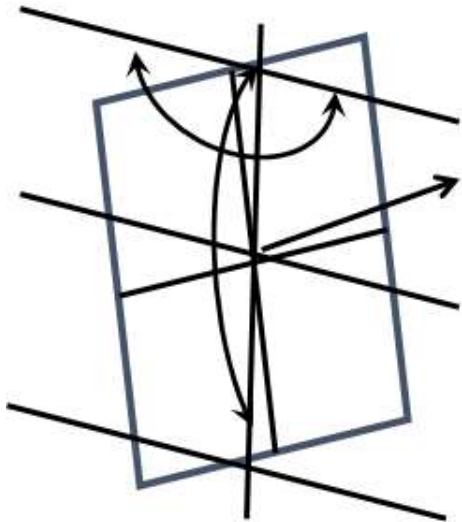
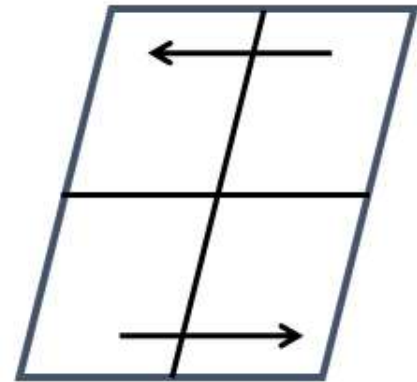
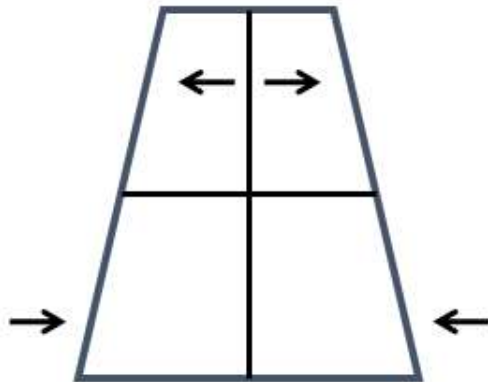
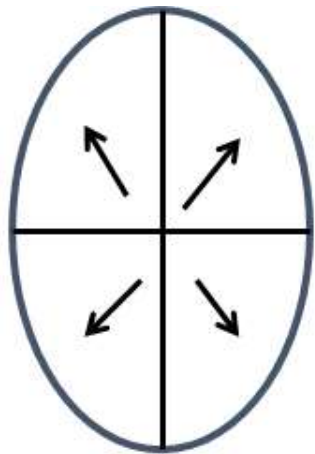


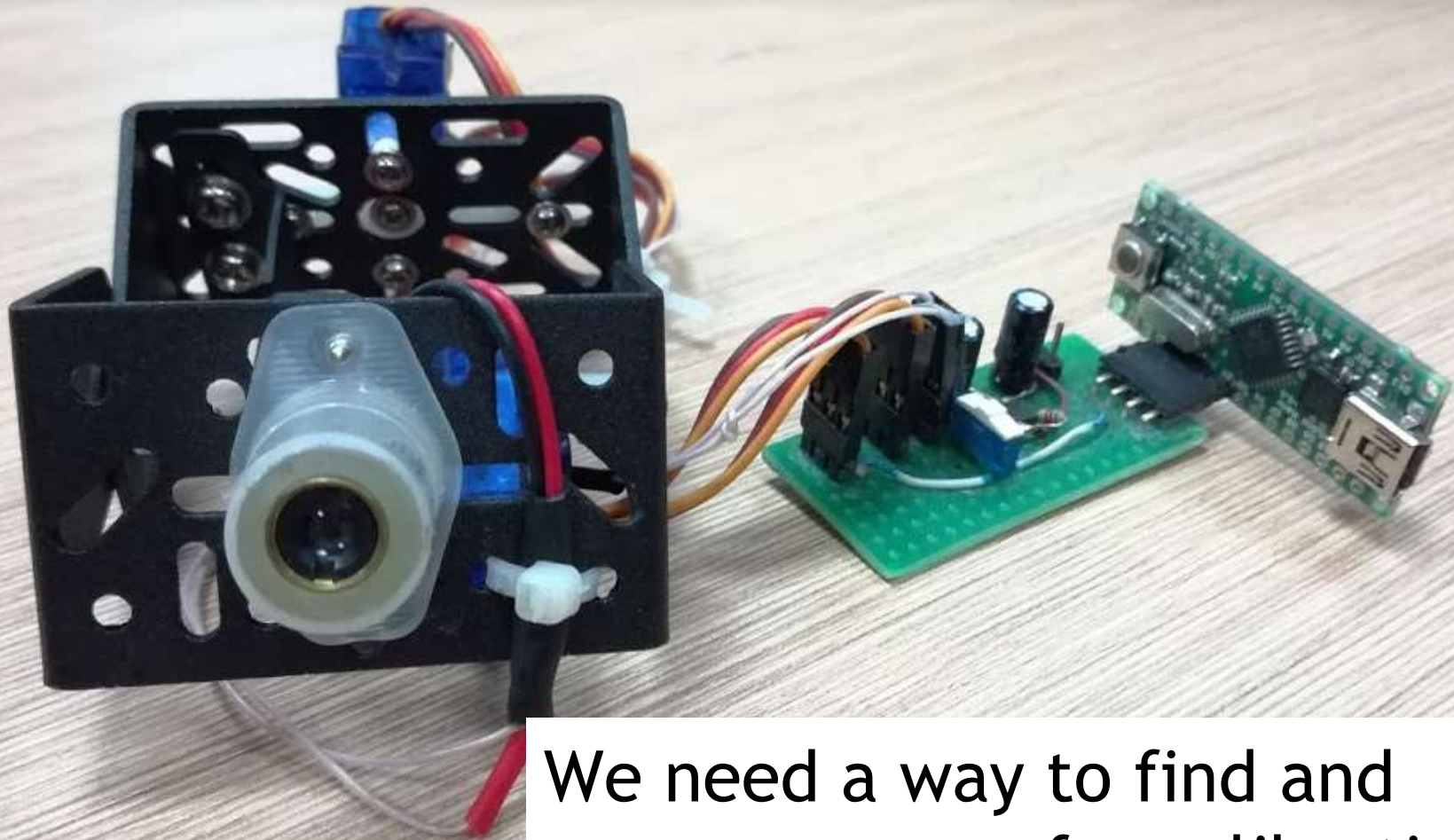


In ideal camera sensors are in parallel.
Equally focused. And synchronized.



In real life software correction required.
Brain do it for our vision all the time.

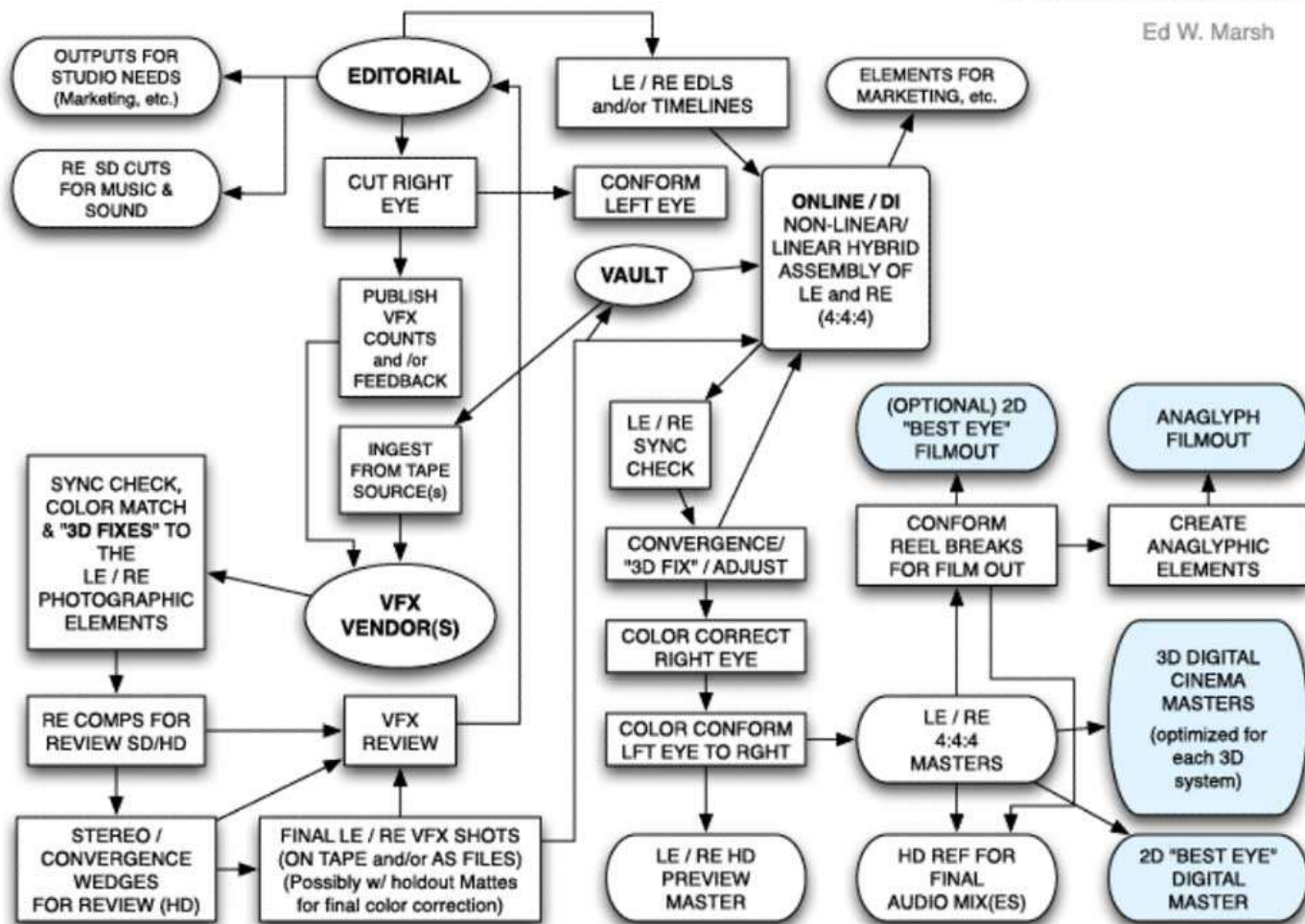




We need a way to find and measure errors for calibration.

EDITORIAL WORKFLOW

Ed W. Marsh



2. Transmission

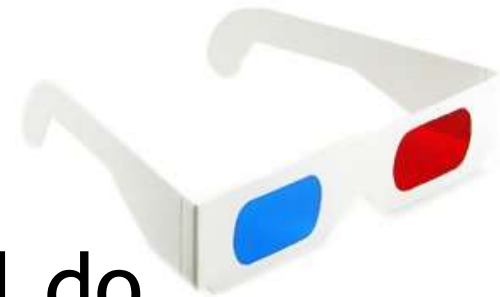
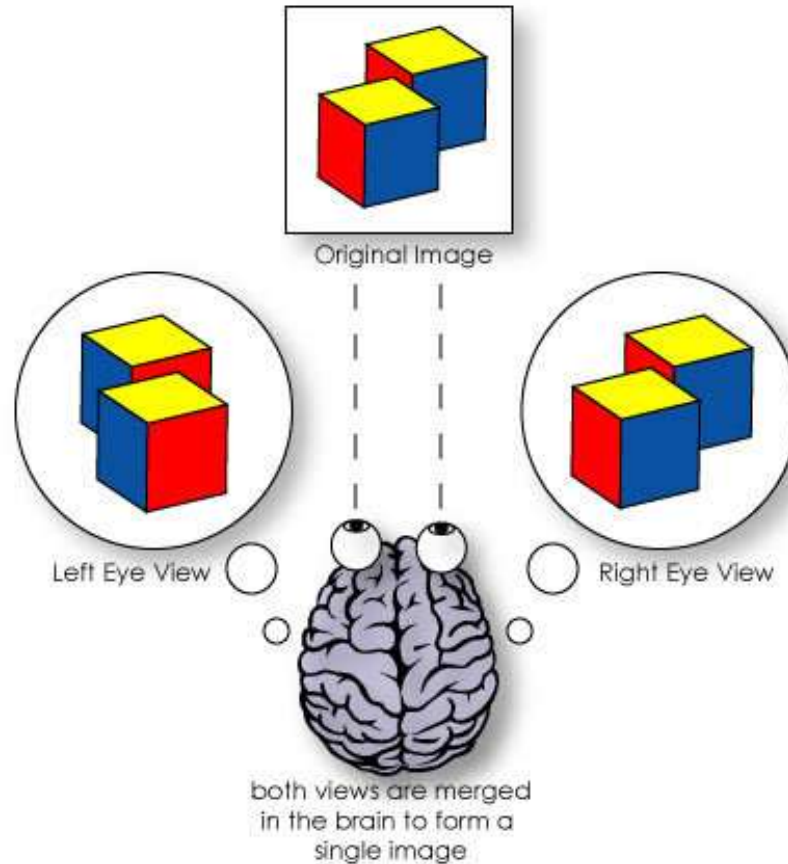
- Multi stream synchronization is an essential part of multipoint video conferencing, which was solved many years ago by all vendors.
- Stereo video content is just a special case of it.
- Network bandwidth could be an issue for multiview (>2) 3D content. Not for stereo.

3D Effect Expectations Pitfall

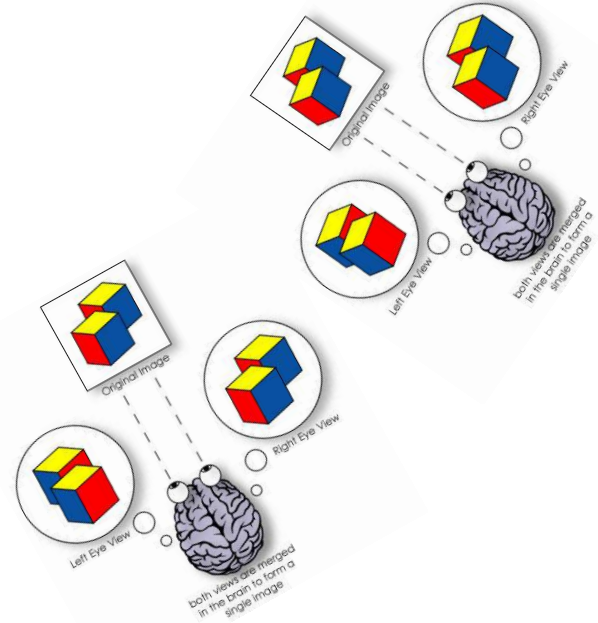
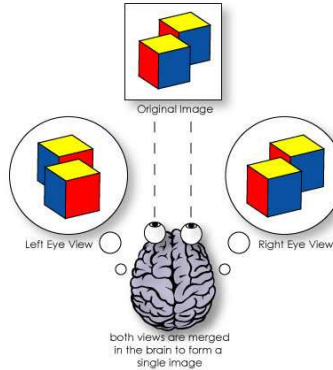
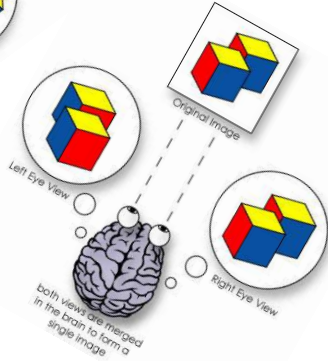
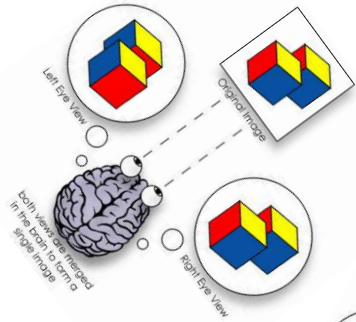
3. Display Challenges



Photo © LG Electronics



Head is Static. **Stereo 3D** will do.



Head is moving. 3D VR could help.

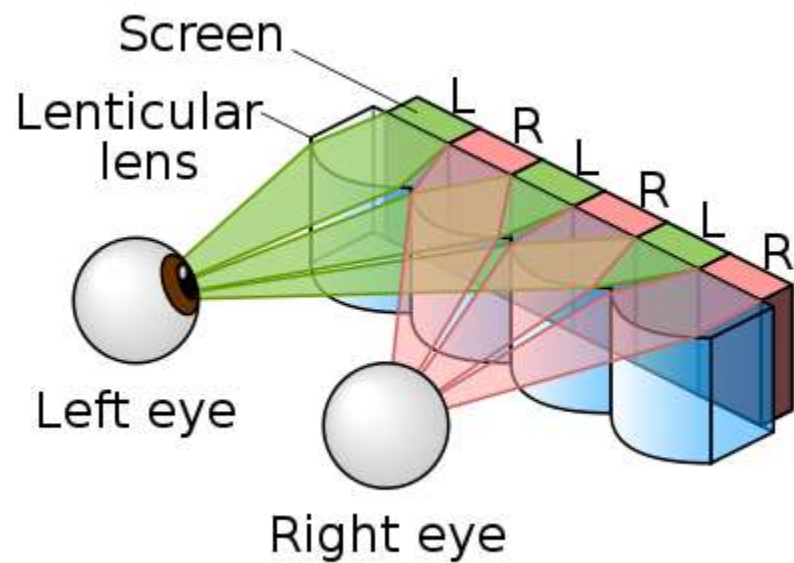
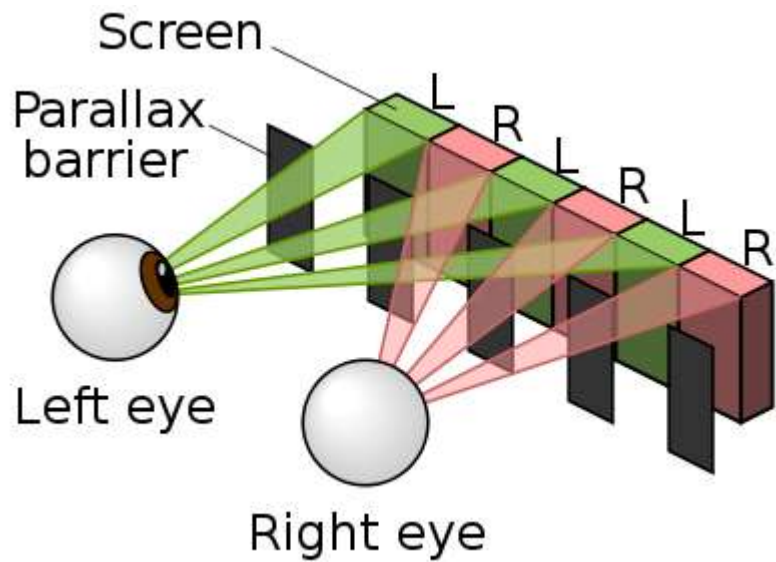
Autostereoscopic Glasses Free Displays



Holografika HoloVision



*Philips / Dimenco
from our lab*

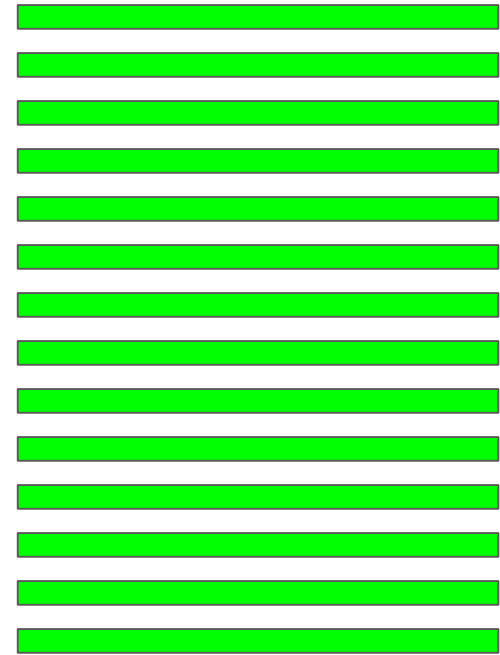
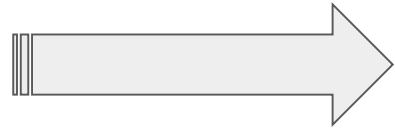


Multiview Processing is a VC Problem

3. Display Challenges

Left Eye Stream

Right Eye Stream



N streams



We've to Wear Glasses for 3D VC



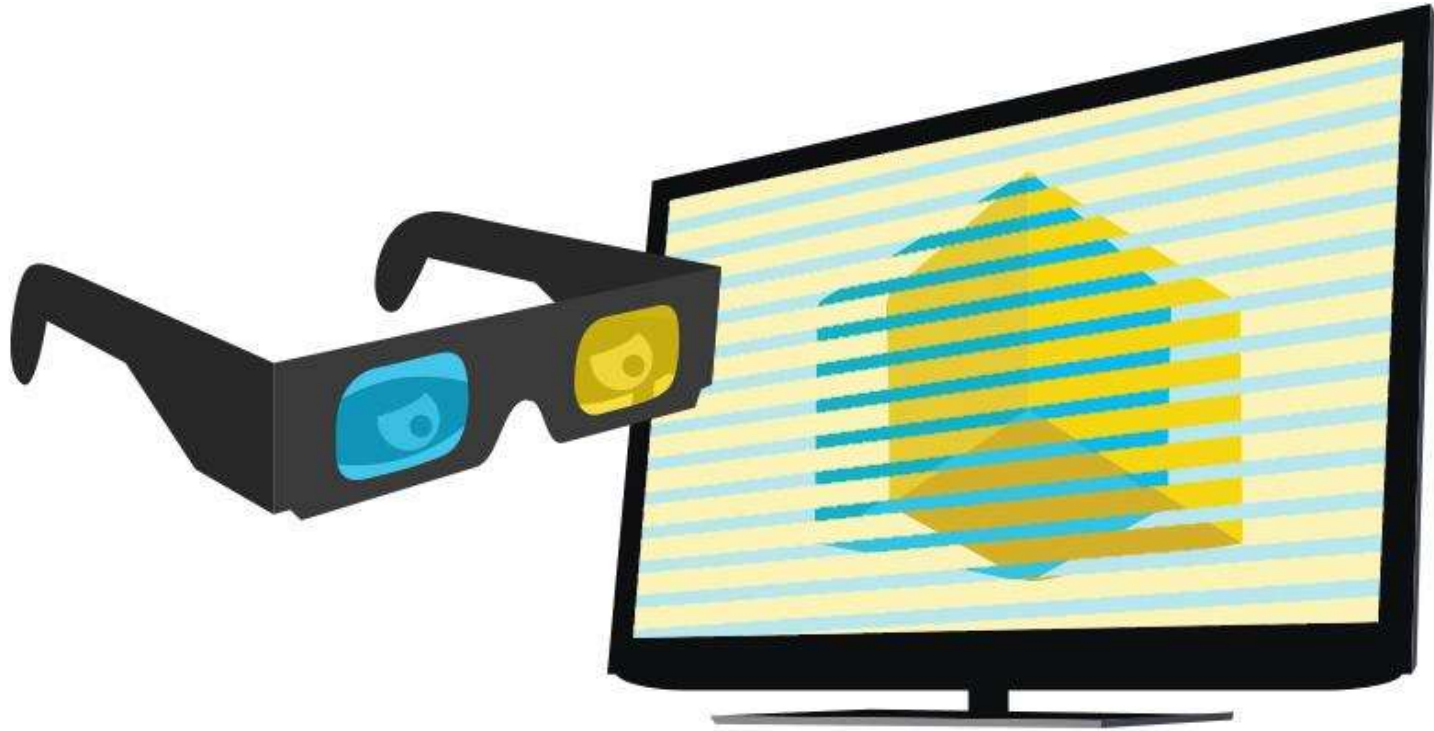
- Passive
- Our choice

- Active
 - Battery inside
- Transmitter required





<https://www.youtube.com/watch?v=Uef17zOCdb8>



Passive technology: polarized 3D glasses



3D video conferencing and streaming exists for years. For very specific cases. Time to bring 3D to a new areas!



Thank you. Questions?

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