3D Volumetric Display

Deok Gun Park
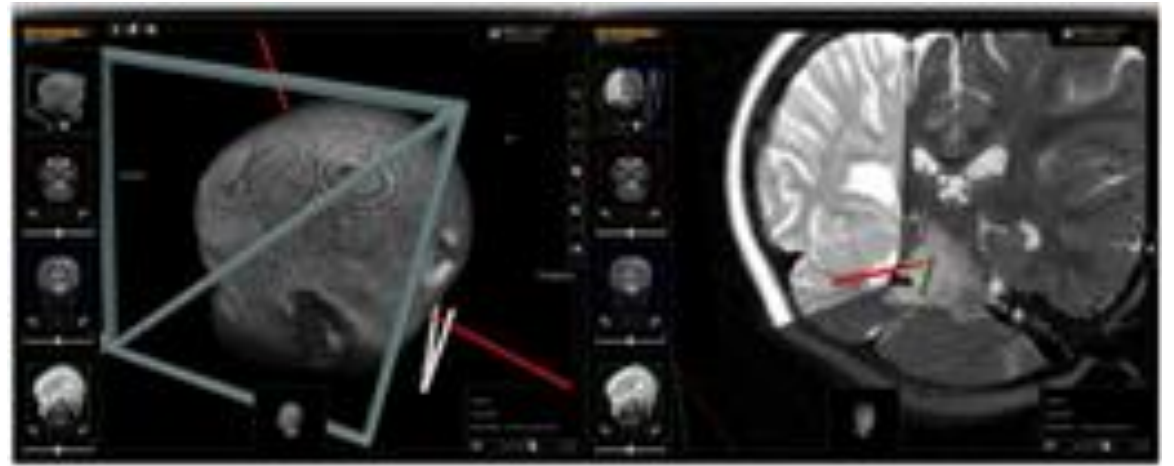
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Today's talk

- Why 3D volumetric display is required?

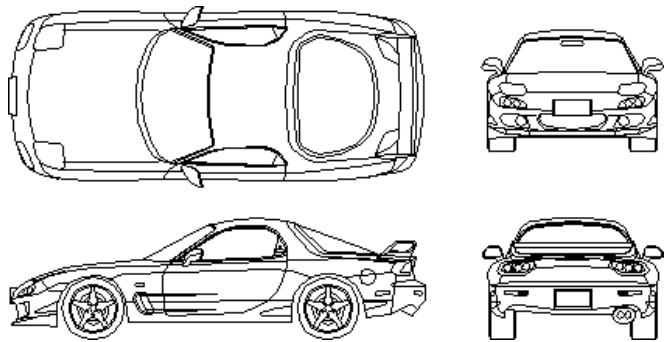- How can we make it?

- Q & A

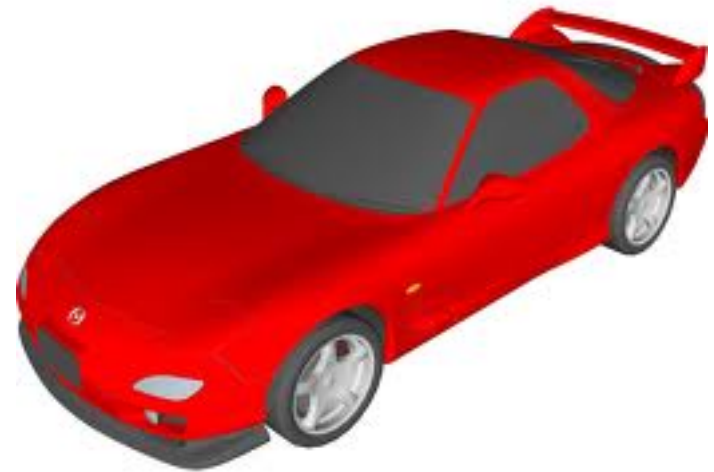# Why?

To save one life is to save the world.

Real world heroes are struggling to save one's life.

Reconstructing 3D models from 2D images requires significant cognitive effort.

2D

2.5D
= uses only monocular cue
to convey 3D information

What if there is 3D volumetric display?

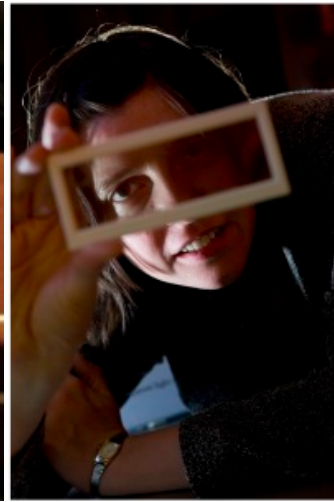Will it be useful for the
neurosurgeon?

Scientist & Engineers are working hard to make such display. But the visual quality
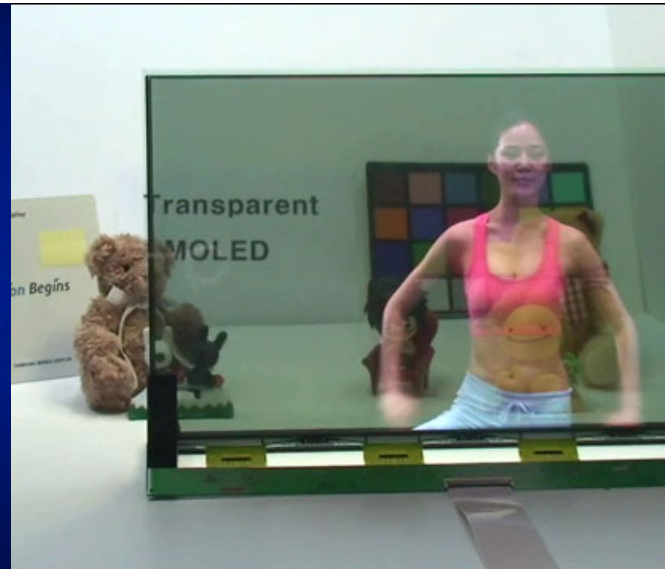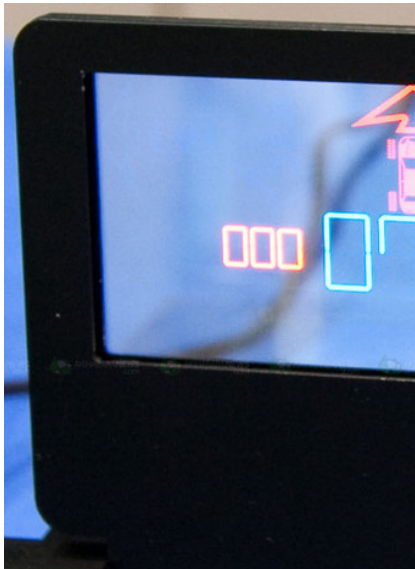Like resolution, colors are not there.
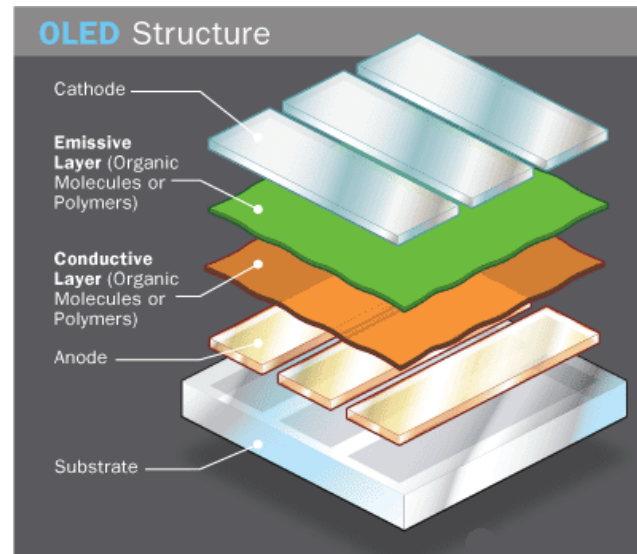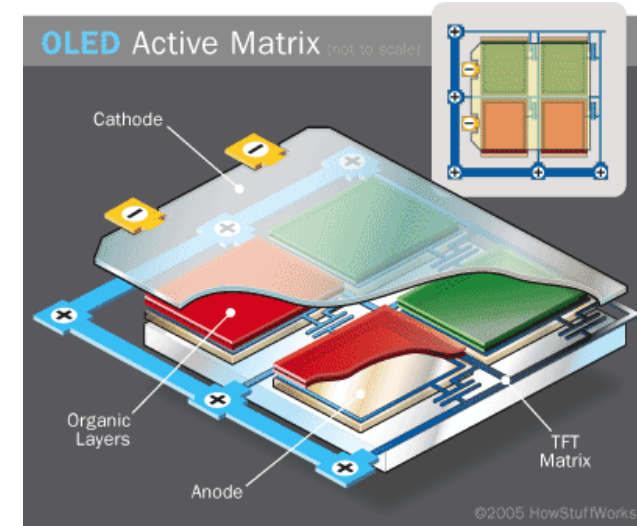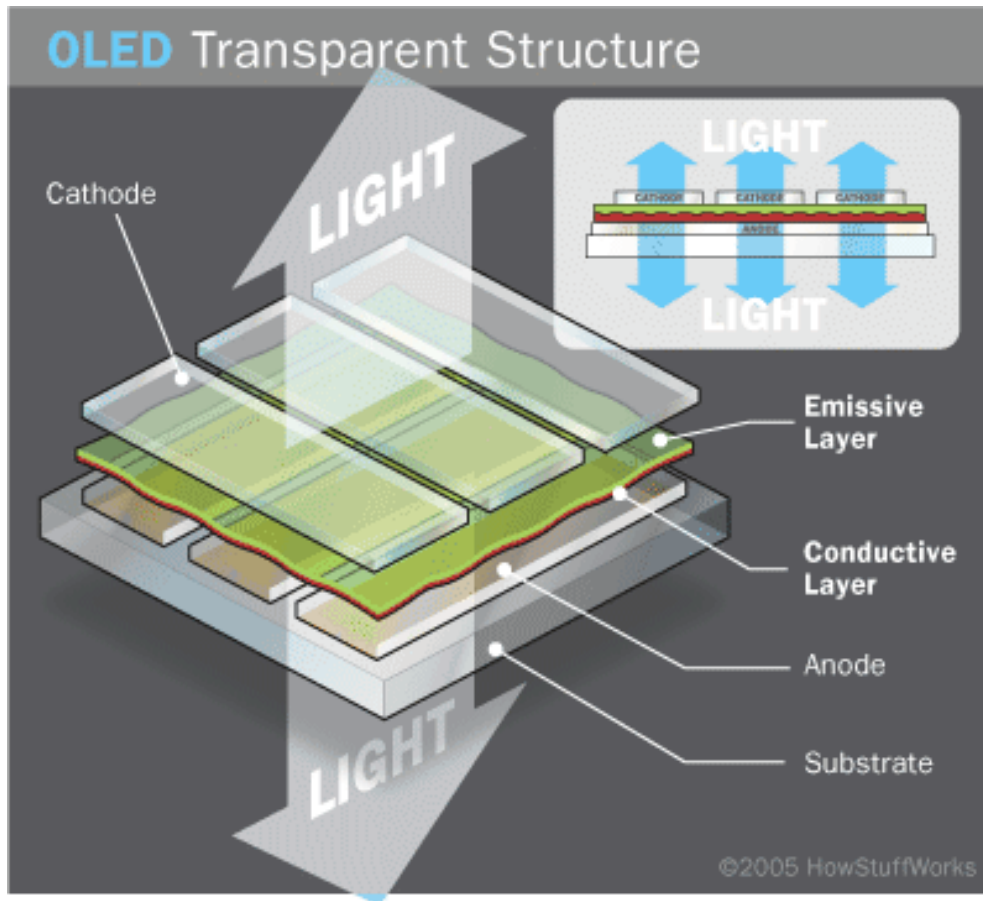
How?

By stacking OLED and LCD layers.
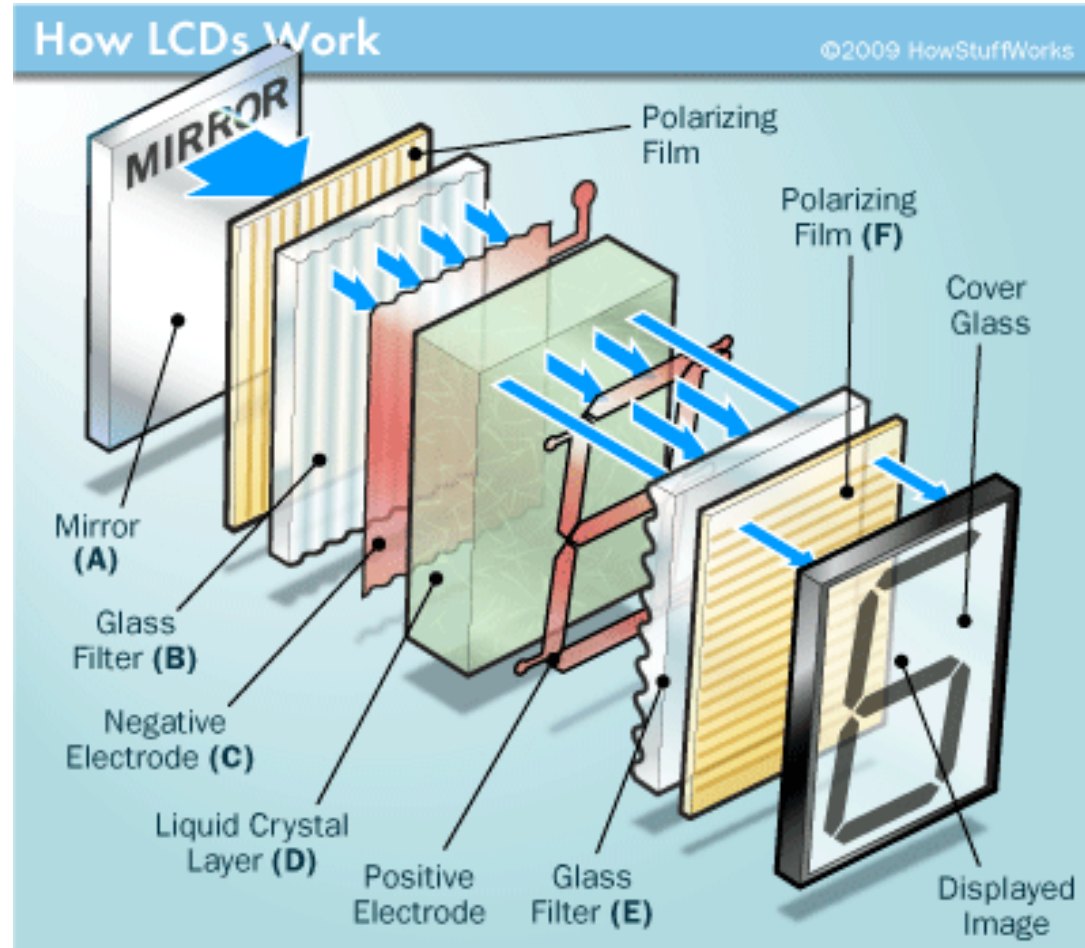
Transparent OLED

Tech #1 – Transparent OLED
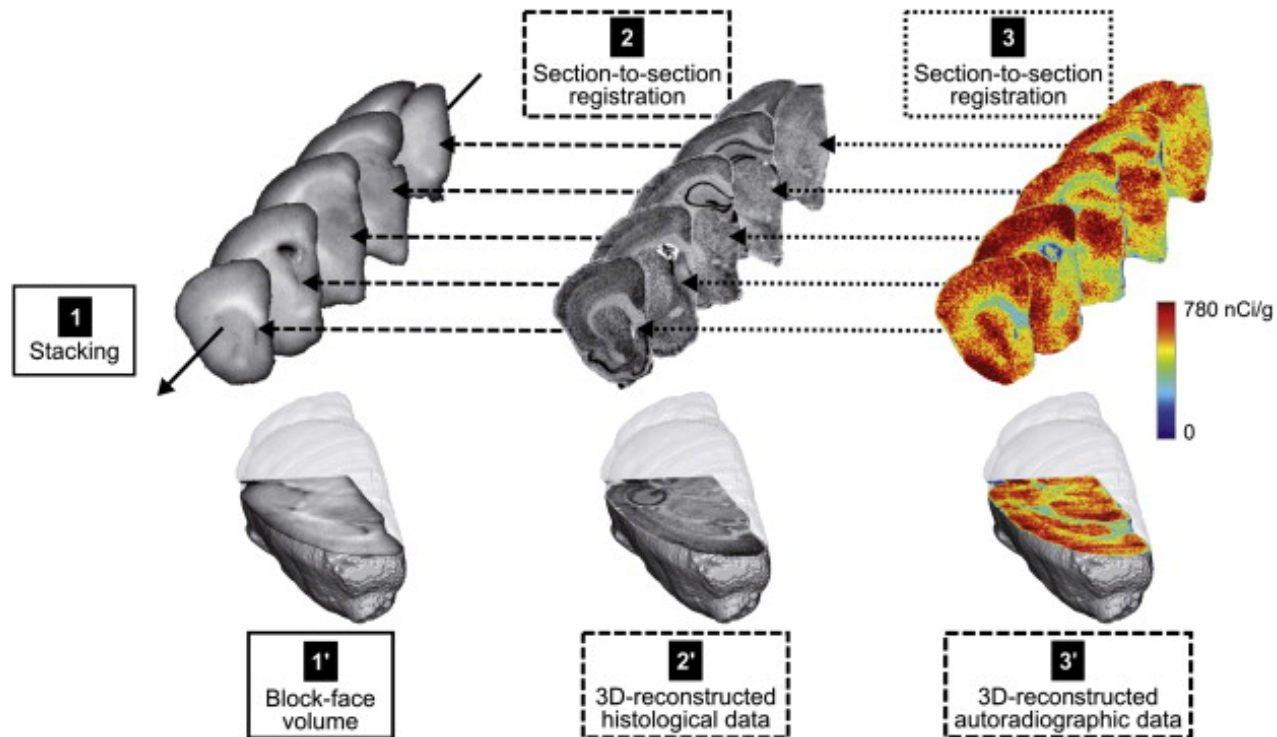
Transparent Liquid Crystal Display

Tech #2 – Transparent LCD

How to make depth ?
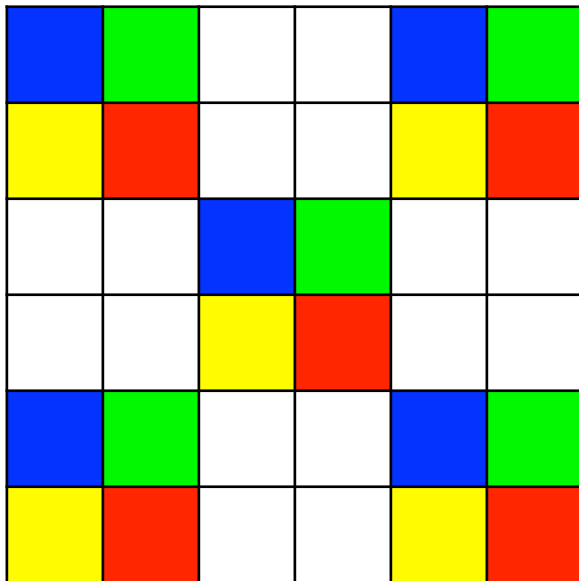
- We basically stack OLED layers

How to make Opacity?

- Without opacity, every light will be combined and will result in the blurry meaningless image

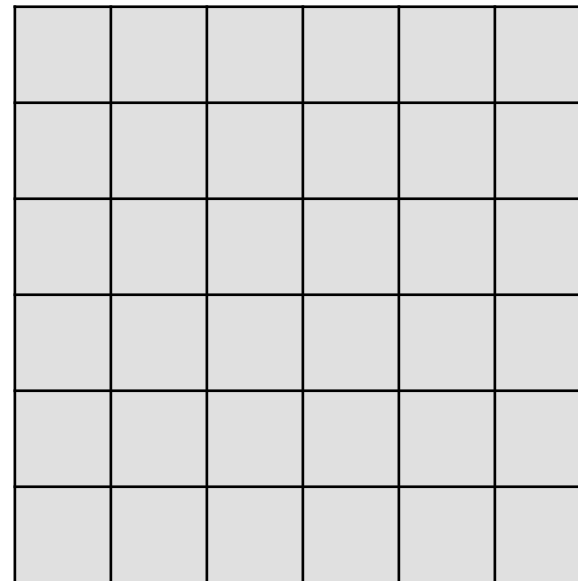- We use LCD as a light blocker

Structure Proposal#1

- LCD layers and OLED layers are prepared separately and combined
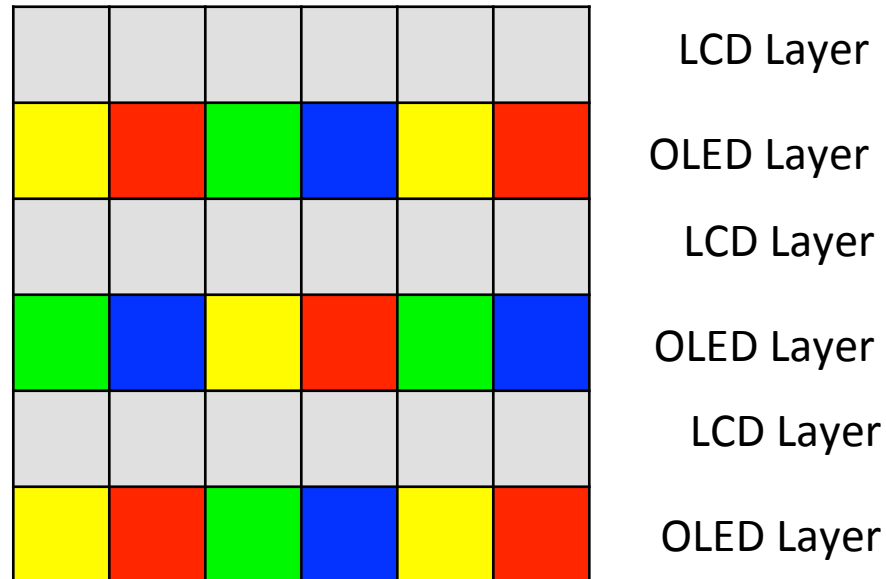
OLED Layer

LCD Layer

Top View of display

Structure Proposal#1

- Easy to implement
- Low resolution due to the depth of glass
- For the LCD is 1 direction, can cause alias

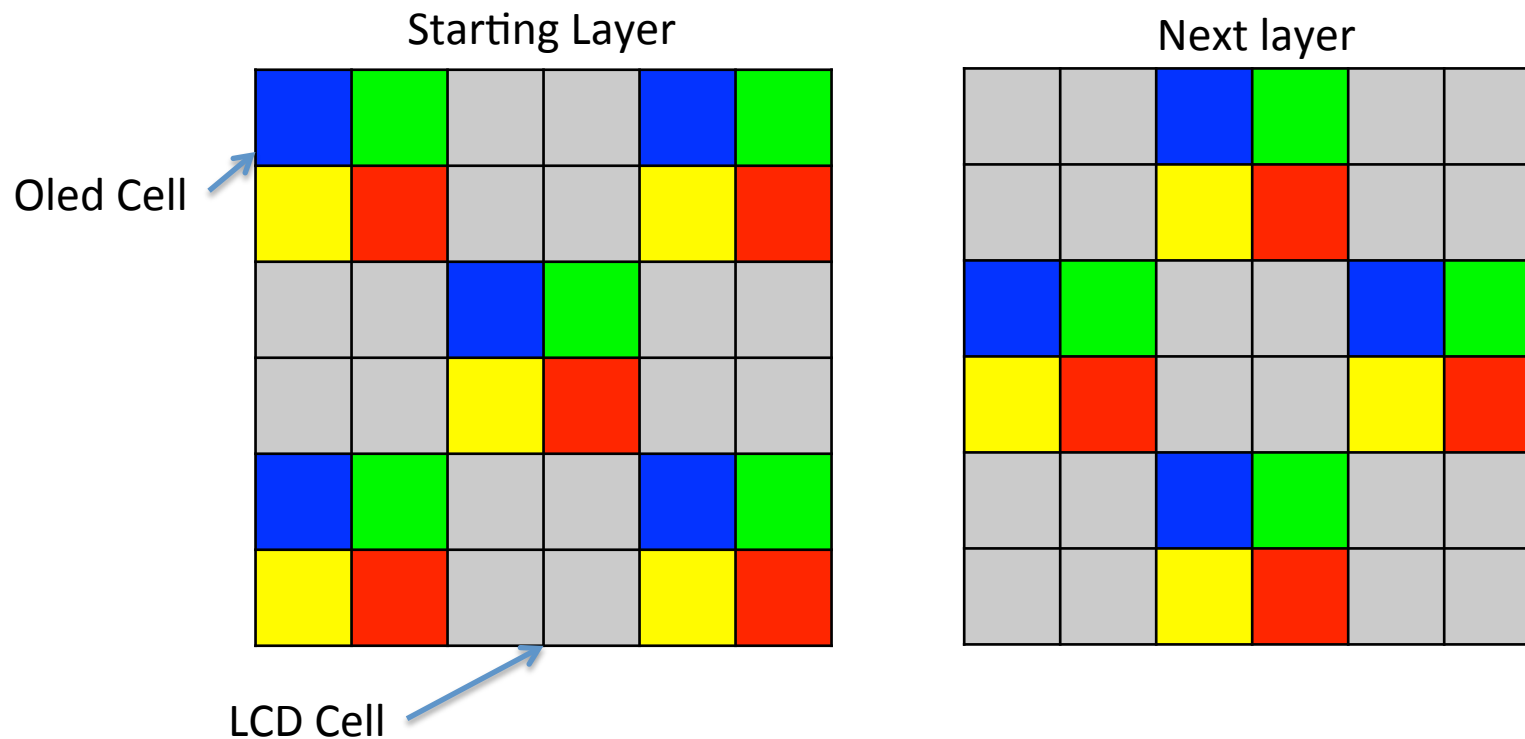**Side View of display**

LCD Layer

OLED Layer

LCD Layer

OLED Layer

LCD Layer

OLED Layer

Structure Proposal#2

- LCD layers and OLED layers are prepared together one sheet and pasted staggered

Starting Layer

Next layer

Oled Cell

LCD Cell

Structure Proposal#2

- Hard to implement

- High resolution due to the depth of glass

- LCD cell is surrounding Oled Cell in 2 direction

Side View of display
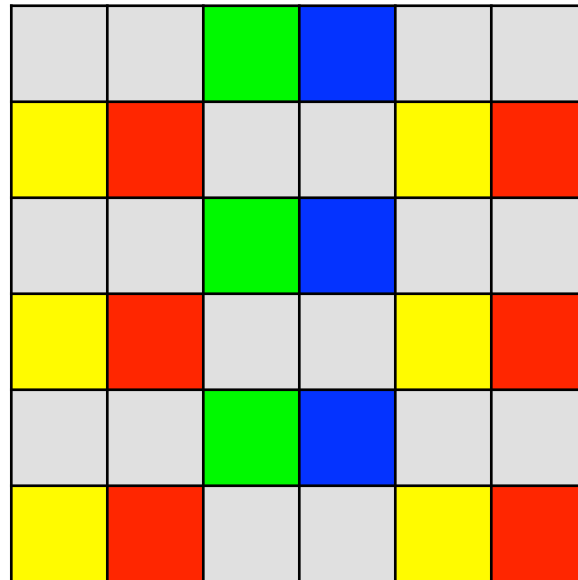
Q&A

Do you have a question?

Technical challenge

- Heat generated by OLED
- Transparency of the layer
- Depth resolution is determined by the glass thickness.
- Data Bandwith

PDLC

- The problem with the stacked LCD, is that LCD requires two polarizer film which can reduce the transparency.

- Polymer Dispersed Liquid Crystal(PDLC) can be a solution even though it is not perfectly clear.