

Real-time Depth Map Processor for Offset Aperture based Single Camera System

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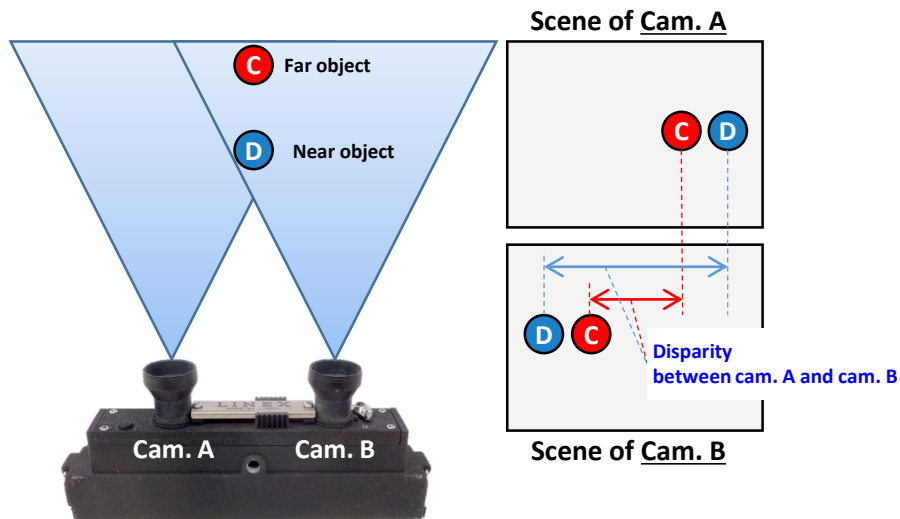
Background

- **Offset-Aperture camera**
 - Passive single lens camera
 - Both color image and depth map with single shot
- **Stereo vs. OA camera**

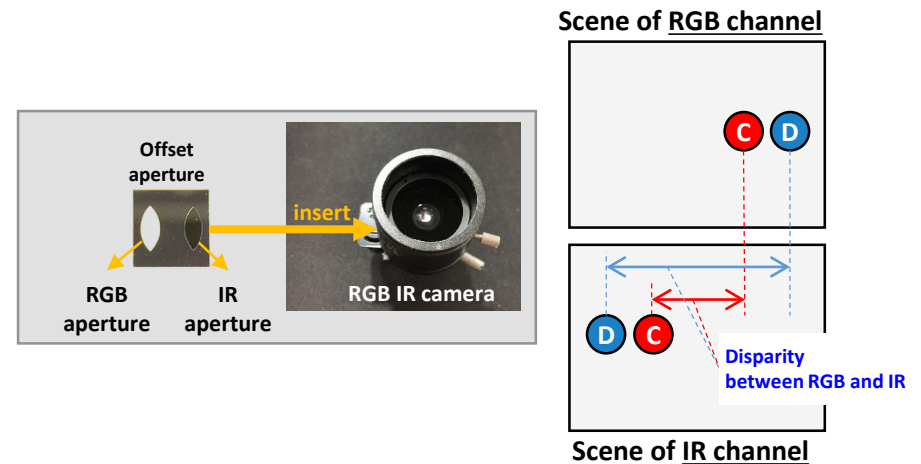
<Depth sensing>



<Stereo>



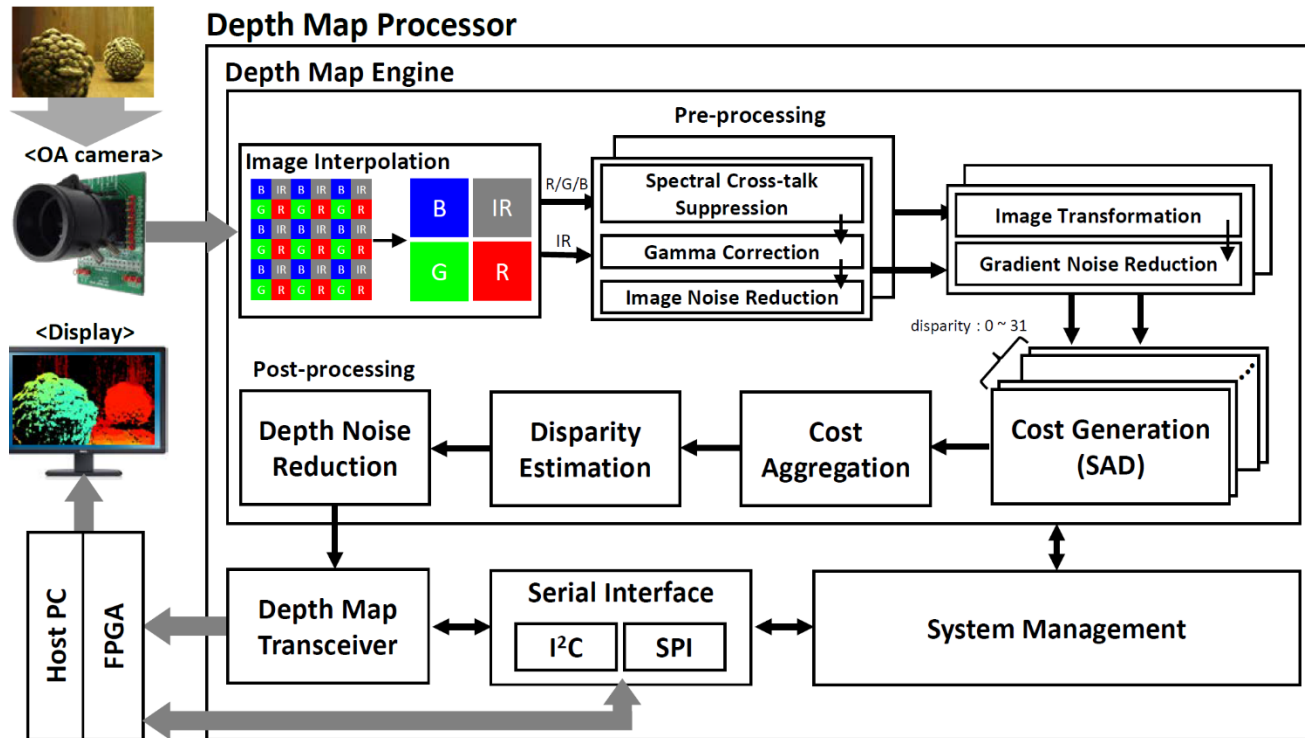
<OA camera>



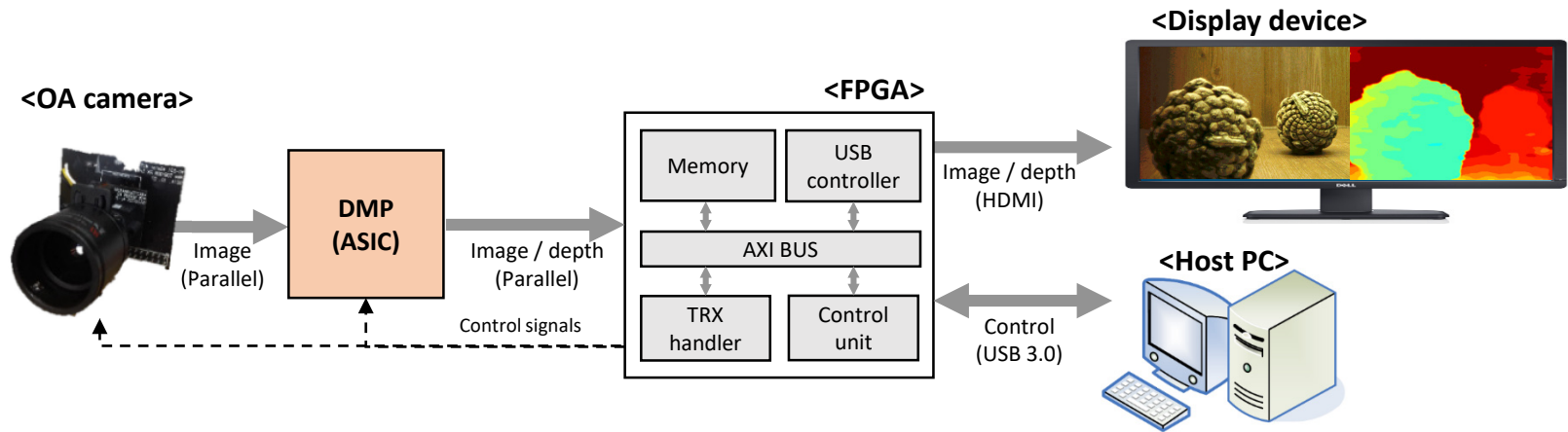
Structure of Depth Map Processor

• Depth Map Processor (DMP)

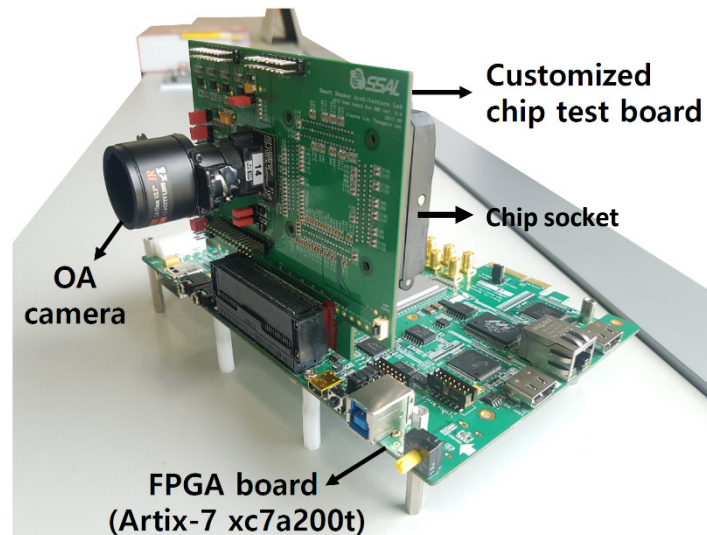
- Real-time low-power ASIC for depth sensing of OA camera
- Scanline processing without DRAM access
- Efficient RGB-IR crosstalk elimination



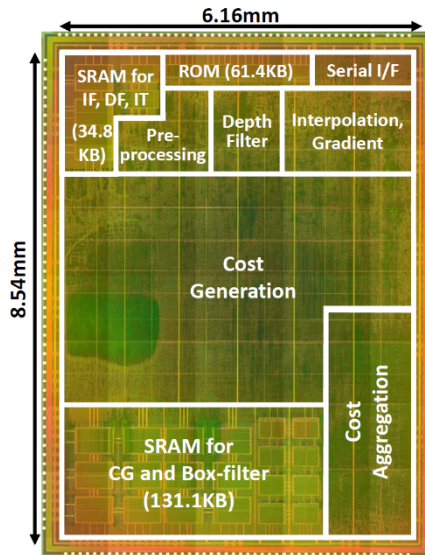
Experimental Environment



<Demo Platform>



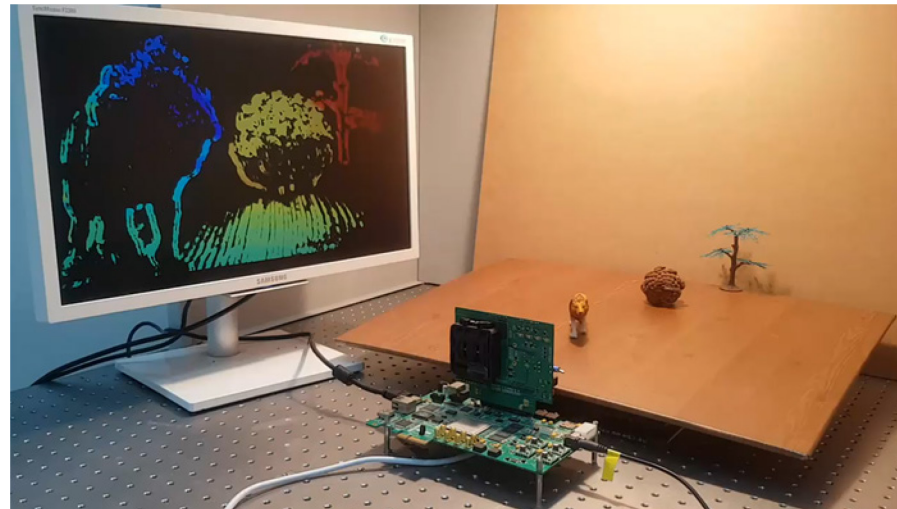
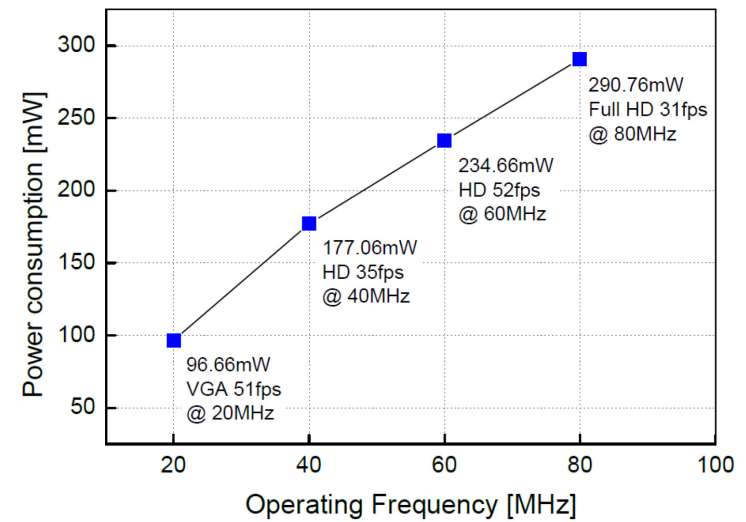
Test Result



	This work
Camera	OA ⁺ single camera
Technology	110nm 2P4M CIS
Core area[mm ²]	52.63
On-chip memory [KB]	227
Gate counts [M]	1.156
Operating frequency [MHz]	76.8 (76.8 [±])
Image size & throughput	1920x1080 @30fps
Depth level	32
Operating voltage [V]	1.5 core (1.8 I/O)
Board Power [mW]	280.53 @30fps

*Proposed offset-aperture camera [1]

*Worst-case post simulation results



<Demonstration>