Virtual Reality Starts from Reality

THE CHALLENGES AND COMPLEXITIES WHEN DESIGNING THE CAPTURING SYSTEM
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Virtual Reality Definition

Generate realistic images (and sound) that replicate a real environment

or

Immersive, interactive experience generated by a computer
Where VR is used today?

- Consumer market
- Academic researches, education
- Art, film production, entertainment
- Sports, Media
- Industrial installations

... and many more
Where VR is used today?

- Consumer market
- Academic researches, education
- Art, film production, entertainment
- Sports, Media
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… and many more: NBT – Next Big Thing
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The Essentials

• What is needed?
  • Capture the Reality in 3D,
  • and create/reconstruct it’s model
  • With high resolution, high frame rate multiple viewpoints and synchronous capturing
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Ingredients

- Suitable sensors
  - The more pixels the better (HD at least)
  - At least 30 fps
  - High dynamic range
- Interface to deliver image data to the point of use
- Processing and storage software
- ... and much more
## Sensors

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High resolution, like:

<table>
<thead>
<tr>
<th>Mfg.</th>
<th>Sensor</th>
<th>Image Size [MB]</th>
<th>Max fps</th>
<th>Data Rate [MB/s]</th>
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<tbody>
<tr>
<td>CMOSIS</td>
<td>CMV20000 @12bit</td>
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Many challenges

• Many sensors, many interfaces, many cables
  • Space
  • Reliability
  • Complexity

• Bandwidth
• Distance
• Processor protocol overheads
## Interface requirements

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### PCIe solution

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PCIe does it all
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USB3 vs PCIe Integration Solution
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PCle Integration Solutions

- Connections
  - Arranging
  - Assembling
  - Maintaining
  - TCO
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USB3 vs PCIe Integration Solution
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Integration solutions

- Aggregation
  - Bandwidth
  - Heterogeneous downstream
  - Homogeneous upstream
  - Fiberoptic support
  - TCO
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PCle does it all

- **Space**
  - Smaller connectors, different orientations
- **Reliability**
  - Maturity
  - Low to no latency
  - Less components
- **Cost**
  - Standard OTS
  - TCO: Less components and all standard
- **Complexity**
  - Standard
  - Mature
  - Heterogeneous downstream, homogeneous upstream
- **Processor protocol overheads**
  - DMA
- **Distance**
  - Fiber optic Stds. implemented multifold
- **Bandwidth**
  - Scalable up to 64Gb/s
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PCle does it all

See it live at XIMEA
Booth 1C51
Thank you for your attention