3D Light Field Camera Technology for professional Applications

Changeable Optics
Standard Mount

Focus after the Fact with Extended DoF

Ultra High Resolution
10MP@7FPS

Video
2MP@30FPS
Light Field Cameras
Enabling Technology for 3D Measurements

Changeable Optics
Standard C-Mount

Focus after the Fact with Extended DoF

R8 Video
2MP@30FPS

R42 Ultra-HR
10MP@7FPS

3D Single-Lens One-Shot Compact Camera

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3D Light Field Camera Applications

- Bumps & Bonding Wire Measurement
- Quality Inspection of Small Parts
- Volume Measurement of Human Body Skin
- Metallic Surface Inspection
- Measurement of Difficult-to-Access Pins
- Metrology of Spray-Cast Materials
Microscopy

Carbon Surface Inspection

Weld Inspection

Microscopic Panel & Solar Cell Inspection

Plant Growth Analysis

Screw Head Scratch Detection

Light Field Camera Applications
# R42/R10/R8 3D Light Field Camera

**Application**
- Machine Vision | Microscopy | Life Science | R&D | Education | Flow Mechanics | Video | Medical | Computational Photography

**Models**
- **R42-Micro Color**: F/23, 41.5 Megarays, 7 FPS
- **R42-Color**: F/2.8, 41.5 Megarays, 7 FPS
- **R10-Mono**: F/2.8, 10 Megarays, 7 FPS
- **R8-Color**: F/2.8, 8 Megarays, 30 FPS

**Light Field Sensor**
- **R42**: 41.5 Megarays, 10 MP effective lateral resolution
  - high dynamic range (HDR), 2/3” sensor class, back side illuminated pixel (BSI)

**Integration time**
- **R8 (4k)**: min. 8µs, **R42 (Full resolution)**: min. 16µs

**Speed**
- **R42**: 7 FPS at 10 MP (optional R8: 30 FPS at Full HD)

**Body**
- dimensions: 39mm (W), 39mm (H), 28mm (D), weight: 71g, case material: aluminium
- award winning design, tripod adaptor

**Interface**
- USB 3.0 superspeed (micro-B with screw lockers)
- external hardware trigger input

**Optics**
- micro lens array (MLA) with aperture F/2.8
- optional R42-microscopy version with aperture F/23
- 6x extended depth of field (DoF)
- changeable C-mount standard lens

**Power consumption**
- Powered by USB 3.0 cable
- 350mA (800mA peak)

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3D Light Field Software

for professional Applications

Application
Machine Vision | Microscopy | Life Science | R&D | Education | Flow Mechanics | Video | Medical | Computational Photography

Software
- SDK/API programming interface DLL
- MVTec® Halcon® plugin
- multiview perspective shift
- 3D depth map measurement
- software re-focus after the fact
- direct access to 4D light field raw data
- glasses-free (autostereo) 3D monitor plugin

Requirements
- NVIDIA® CUDA® compute capability 2.0 (GTX 980 or higher)
- Microsoft® Windows® 7/8 64 bit, intel® i7, intel® USB 3.0

Easy 3D measurements in metric units

3D depth map view of a key
R42/R8 3D Light Field Camera for Pin-Length Inspection

3D Single-Lens One-Shot Compact Camera
R42/R8 3D Light Field Camera
for Face Detection

3D Single-Lens One-Shot Compact Camera
### R8 3D Light Field Camera

<table>
<thead>
<tr>
<th>Max Depth Resolution (Z)</th>
<th>Depth-of-Field (Z)</th>
<th>Field-of-View (X)</th>
<th>Field-of-View (Y)</th>
<th>Max Lateral Resolution (X,Y)</th>
<th>Free Working Distance (Z)</th>
<th>Focal Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>22.2µm</td>
<td>4,56mm</td>
<td>16.1mm</td>
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<tr>
<td>42.2µm</td>
<td>7,1mm</td>
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<td>86.9µm</td>
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<td>88.7µm</td>
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<td>353.4µm</td>
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<td>585µm</td>
<td>86.1mm</td>
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<td>1,75mm</td>
<td>220.5mm</td>
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<td>83.6µm</td>
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<tr>
<td>3,62mm</td>
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<td>174µm</td>
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<td>6,12mm</td>
<td>2,55m</td>
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<td>13,54mm</td>
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<td>478mm</td>
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### R42, 3D Light Field Camera

**R42, F/2.8**

**Focal Length**

<table>
<thead>
<tr>
<th>Max Depth Resolution (Z)</th>
<th>Depth-of-Field (Z)</th>
<th>Field-of-View (X)</th>
<th>Field-of-View (Y)</th>
<th>Max Lateral Resolution (X,Y)</th>
<th>Free Working Distance (Z)</th>
<th>Focal Length</th>
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<tbody>
<tr>
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<td>16,1mm</td>
<td>11,2mm</td>
<td>4,41µm</td>
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<td>100mm</td>
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<tr>
<td>21,55µm</td>
<td>4,03mm</td>
<td>22,6mm</td>
<td>15,7mm</td>
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<td>42,5mm</td>
<td>12mm</td>
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<tr>
<td>44,1µm</td>
<td>8,4mm</td>
<td>32,24mm</td>
<td>22,4mm</td>
<td>8,82µm</td>
<td>50mm</td>
<td>25mm</td>
</tr>
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<td>44,6µm</td>
<td>9,2mm</td>
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<td>22,4mm</td>
<td>8,84µm</td>
<td>440mm</td>
<td>100mm</td>
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<tr>
<td>187,3µm</td>
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<td>68,0mm</td>
<td>47,3mm</td>
<td>18,5µm</td>
<td>102,5mm</td>
<td>12mm</td>
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<tr>
<td>197µm</td>
<td>140mm</td>
<td>68mm</td>
<td>47mm</td>
<td>18,6µm</td>
<td>850mm</td>
<td>100mm</td>
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<tr>
<td>303,1µm</td>
<td>52,1mm</td>
<td>85,5mm</td>
<td>59,43mm</td>
<td>23,34µm</td>
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<tr>
<td>967µm</td>
<td>146,2mm</td>
<td>155mm</td>
<td>108mm</td>
<td>42,12µm</td>
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<td>25mm</td>
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<tr>
<td>3,76mm</td>
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<td>228mm</td>
<td>88µm</td>
<td>900mm</td>
<td>25mm</td>
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<tr>
<td>7,07mm</td>
<td>1,17m</td>
<td>414mm</td>
<td>288mm</td>
<td>113µm</td>
<td>4,86m</td>
<td>100mm</td>
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<tr>
<td>9,51mm</td>
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<td>28,2mm</td>
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<td>588mm</td>
<td>229µm</td>
<td>9,86m</td>
<td>100mm</td>
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</tbody>
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### R10μ Mono 3D Light Field Camera

**Focal Length**: R42, F/2.8

**Free Working Distance Depth-of-Field**

<table>
<thead>
<tr>
<th>Max Depth Resolution (Z)</th>
<th>Depth-of-Field (Z)</th>
<th>Field-of-View (Y)</th>
<th>Field-of-View (X)</th>
<th>Max Lateral Resolution (X,Y)</th>
<th>Free Working Distance (Z)</th>
<th>Magnification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,5μm</td>
<td>0,2mm</td>
<td>1mm</td>
<td>1,2mm</td>
<td>0,3μm</td>
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<tr>
<td>5μm</td>
<td>0,6mm</td>
<td>1,9mm</td>
<td>2,3mm</td>
<td>0,6μm</td>
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<td>3,7mm</td>
<td>4,5mm</td>
<td>1,2μm</td>
<td>6,5mm</td>
<td>2,5x</td>
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# R10-microscope

**3D Light Field Camera**

for Solar Cell Quality Inspection

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<table>
<thead>
<tr>
<th>Max Depth Resolution (Z)</th>
<th>Depth-of-Field (Z)</th>
<th>Field-of-View (Y)</th>
<th>Field-of-View (X)</th>
<th>Max Lateral Resolution (X,Y)</th>
<th>Free Working Distance (Z)</th>
<th>Magnification</th>
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</thead>
<tbody>
<tr>
<td>1,5µm</td>
<td>0,2mm</td>
<td>1mm</td>
<td>1,2mm</td>
<td>0,3µm</td>
<td>16mm</td>
<td>10x</td>
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<tr>
<td>5µm</td>
<td>0,6mm</td>
<td>1,9mm</td>
<td>2,3mm</td>
<td>0,6µm</td>
<td>17mm</td>
<td>5x</td>
</tr>
<tr>
<td>15µm</td>
<td>2mm</td>
<td>3,7mm</td>
<td>4,5mm</td>
<td>1,2µm</td>
<td>6,5mm</td>
<td>2,5x</td>
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