light field for micro inspection

Applications

www.raytrix.de
Solar panels

Is the surface roughness within tolerance after cutting?

2D texture

false color depth map

analysis of point cloud data
Bonding wires

What is the curvature of the bonding wires?
What is the volume of the soldering bumps?
Micro screws

3D model with texture

3D model with false color depth as texture
How deep is the cavity?
3D model (texture / false color depth)
Stent - micro flow

Will blood flow between the stent and the blood vessel?
Life science - blood cells

Volume of red and white blood cells
False color stack of three fluorescence excitations

2D texture for each wavelength

False color depth map

Confidential
light field for micro inspection

Why light field?

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Light field in micro inspection

- extended Depth of Field
- occlusion free
- fast

*Soldering Bump @ 5x R12μ* confidential
Extended Depth of Field

Bonding wire @ 10x

10MP 2D camera

Raytrix light field camera R10µ

false color 3D model
Extended Depth of Field

Three lens types are focused on different depths

light field raw image
Extended Depth of Field

Micro lens DoFs are designed to connect thereby extending the overall Depth of Field up to six times.
Occlusion

**Stereo Camera System** reconstructs pin as cone

Camera 1  Camera 2

Occlusion areas in red

**Light Field Camera** reconstructs pin as rectangle

Microlens Array

No occlusion areas due to many views

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Occlusion

Every point in object space is imaged by multiple micro lenses, through which a light field camera is less susceptible to occlusion (foreground objects blocking the view) than comparable techniques. This results in sharper edges in the 3D Model.
<table>
<thead>
<tr>
<th>CAMERA</th>
<th>MAX. EFF. RES.</th>
<th>MAX. FPS</th>
<th>2D / 3D</th>
<th>MONO</th>
<th>RGB</th>
<th>NIR</th>
<th>CMOS</th>
<th>CCD</th>
<th>PIV</th>
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<td>USB, GigE, CL, CXP, Wi-Fi</td>
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Fast

- Up to 180 fps captured
- Up to 60 fps processed per GPU
- Multi GPU support

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Contact

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