

3D reconstruction and extended depth-of-field based on only one snapshot and a single monocular camera

Single-lens **3D**
Light Field
Camera

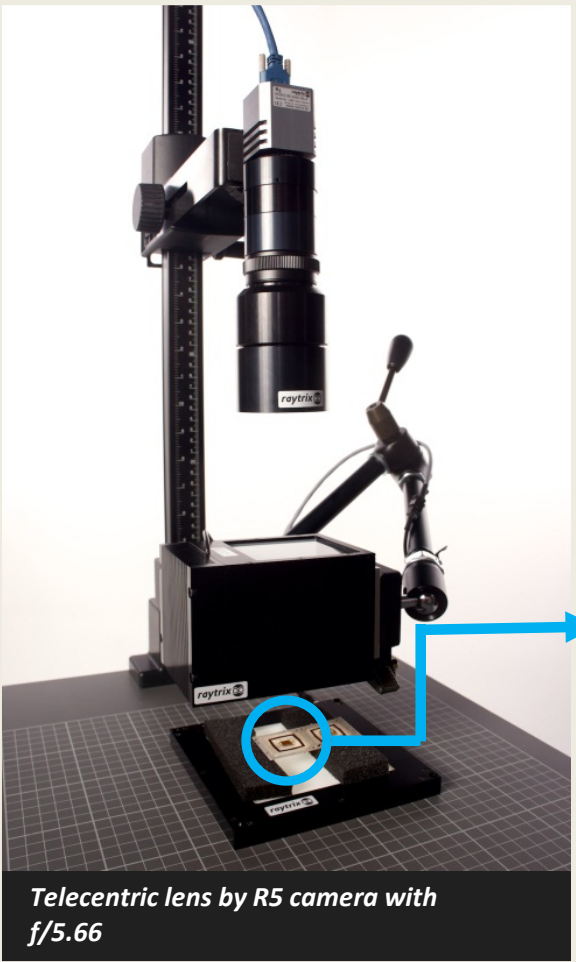


R5 High Speed Camera System



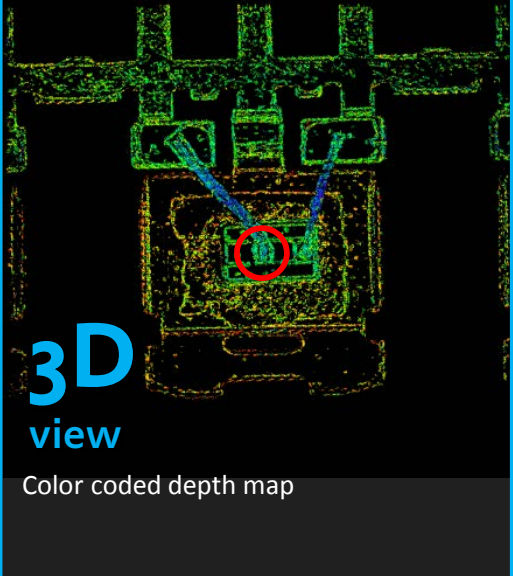
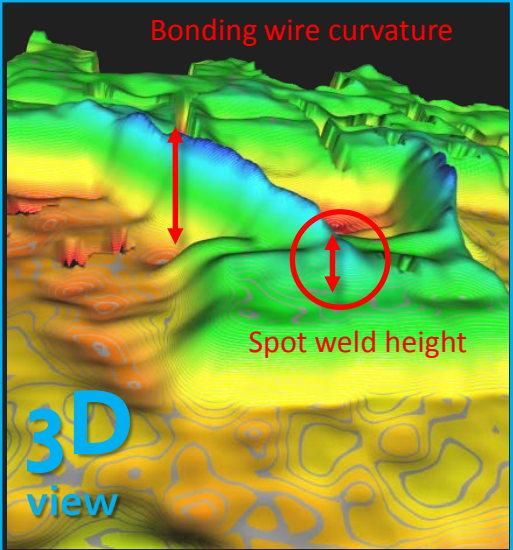
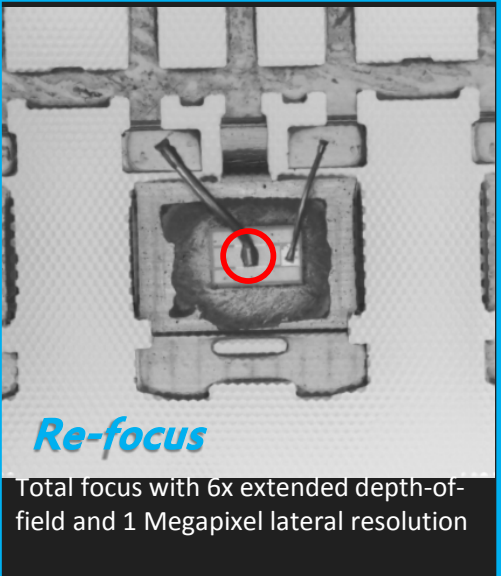
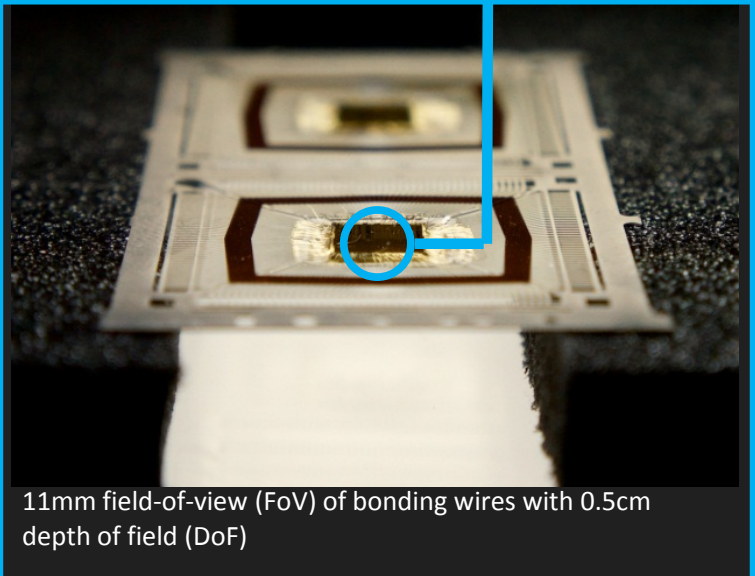
R5 3D Bonding Wire & Spot Weld Inspection

3D reconstruction and extended depth-of-field based on only one snapshot and a single monocular camera



Single-lens 3D Light Field Camera

- calibration-free monocular camera
- robust & space-saving setup
- down to micron resolution
- extended depth-of-field by software re-focus
- captures fast moving objects by a single shot
- no special structured illumination required
- mono, color and NIR cameras available



* US-Pat.-No.: 2012/0050562 A1 , European patent No. 2244484, CHIP-Award 2012: „Innovation of the year“

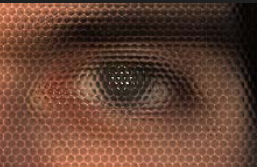
R5 High-Speed 3D Light Field Camera

3D reconstruction and extended depth-of-field based on only one snapshot and a single-lens camera

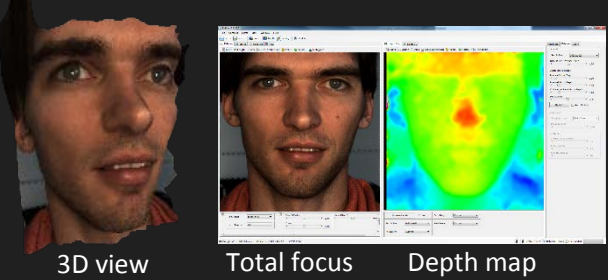
3D
Light Field
Camera



illustration may differ



4D light field raw image data



3D view Total focus Depth map

- calibration-free monocular camera
- robust & space-saving setup
- down to micron resolution
- extended depth-of-field by software re-focus
- captures fast moving objects by a single shot
- no special structured illumination required
- mono, color and NIR cameras available

R5 Specifications	
Lateral resolution	max 1 MP (25% of original image sensor resolution)
Extended depth-of-field	max 6x of standard cameras
Frame rate	25 FPS (GigE), 56 FPS (Dual-GigE), 30-90 FPS (USB 3.0), 180 FPS (Camera-Link)
Light field image sensor	4.2 Megarays, 2048 x 2048 pixel, 5.5µm pixel pitch, CMOSIS, CMV4000, CMOS
3D depth resolution	max 100 discrete depth layers
Fixed aperture	f/2.4, f/5.66, f/26 (microscopy), ... <i>(we offer full customized micro lens array optics meeting your needs)</i>
Interface	Single/Dual Gigabit Ethernet, Camera-Link, USB 3.0 superspeed
Lens mount	C-mount
Software support	MVTec Halcon plugin interface, SDK/API programming interface for Microsoft Windows
Hardware requirements	NVIDIA GeForce GTX-Titan with 6 GB GPU memory (or higher)
Software requirements	Microsoft Windows 7, CUDA with OpenGL 4.0 and Compute Capability 2.0
Applications	Fluid flow (3D Particle tracking, PIV), Light Field R&D, machine vision, endoscopy, microscopy, visual quality inspection, life science, face recognition, ...



* US-Pat.-No.: 2012/0050562 A1 , CHIP-Award 2012: „Innovation of the year“

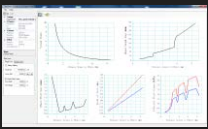
R5 High-Speed 3D Light Field Camera

Camera	Illustration*	Description	Price
R5 M 2GigE		f/2.4, Mono, Gigabit Ethernet	9990 €
R5 C 2GigE		f/2.4, Color, Gigabit Ethernet	10990 €
R5 NIR 2GigE		f/2.4, Near IR, Gigabit Ethernet	14990 €
R5 M 2CL		f/2.4, Mono, Camera-Link, 180 FPS	14990 €
R5 C 2CL		f/2.4, Color, Camera-Link, 180 FPS	15990 €
R5 NIR 2CL		f/2.4, Near IR, Camera-Link, 180 FPS	19990 €
R5 M USB		f/2.4, Mono, USB 3.0	Not available
R5 C USB		f/2.4, Color, USB 3.0	Not available
R5 NIR USB		f/2.4, Near IR, USB 3.0	Not available

Optics	Illustration*	Description	Price
Filter		White image filter	190 €
35mm		C-mount high resolution optics	990 €
Telecentric		C-mount high resolution optics	From 3990 €
50mm		C-mount high resolution optics	990 €

Software	Illustration*	Description	Price
Multiview		Multiview perspective shift	490 €
3D+		3D depth map estimation	990 €
Focus+		Software re-focus after the fact	490 €
4D SDK		Light field raw image data access, Windows DLL programming interface	2990 €
HALCON plugin		Machine vision interface for MVTec Halcon	490 €

Hardware	Illustration*	Description	Price
Light Field Engine		Windows computer with high speed light field processing GPU	3990 €
GPU		High speed light field processing GPU	1990 €
Frame Grabber		Frame Grabber for Camera-Link cameras	1990 €



R5 3D Light Field Camera

3D reconstruction and extended depth-of-field based on only one snapshot and a single-lens camera

3D light field camera	R5 f/5,6	R5 f/2,4	R5 f/2.4	R5 f/2,4
Application example	Surface inspection	Life science (motion tracking)	Inspection of mechanical parts	Gesture recognition
X field of view	10mm	35mm	50mm	500mm
Y field of view	10mm	35mm	50mm	500mm
Z field of view (depth of field)	4mm	20mm	40mm	1,2m
Working distance	0,40m	0,3m	0,33m	0,4m
Z depth resolution	30µm	120µm	250µm	7mm
Illumination example	low angle	ring light	low angle	ambient light
Main lens optics	100mm macro	50mm	50mm macro	33mm
Sample object examples	Steel, small screws,...	Insects, seedlings,..	Screws, valves, threads ...	Gesture/face recognition



Raytrix GmbH

Schauenburgerstrasse 116

D-24118 Kiel, Germany

Fon: +49 (0)431 5606240

Fax: +49 (0)431 26090065

Website: www.raytrix.de , Email: info@raytrix.de

General manager:

Dr. Lennart Wietzke, Dr. habil. Christian Perwass

VAT: DE264446080

Bank details

Account holder: Raytrix GmbH

Bank name: Foerde Sparkasse

Account number: 1400055669

Bank number: 21050170

SWIFT/BIC: NOLADE21KIE

IBAN: DE38210501701400055669

This catalogue, the included or enclosed images, texts and data media are the intellectual property of the Raytrix GmbH company and are protected by internationally valid laws.

Any kind of copying, duplicating, translating or transferring into any kind of electronic media or machine-readable formats are not permitted, either in their entirety or partially, without prior written authorization from the Raytrix GmbH.

Any kind of violation is subject to international prosecution.

All mentioned trademarks or product names are the property of their respective owners. Raytrix GmbH does not assume any guarantee or liability for the correctness of data and facts provided within this catalogue, enclosed information sheets, price-lists or media.

All images, illustrations and details only serve illustration purposes and are non-binding in design, shape, color and technical specifications. Changes in technical specifications, design and deliverability are subject to change without prior notice. All data and statements within this catalogue refer to the status as of the printing date January 2011.

For deliveries and services "Raytrix's General Terms and Conditions" are applicable without exceptions.

The regulations of the "Raytrix Software License Agreement" also apply to the delivery of Raytrix software products. Place of fulfillment and jurisdiction is Kiel.

All listed prices are calculated per unit, are expressed in euro and subject to the valid sales tax, ex works Kiel.

Products remain the property of the Raytrix GmbH until the full payment is effected.

Copyright © 2008-2013 by Raytrix GmbH, Germany. All rights reserved.