

The background is a dark blue field filled with glowing binary code (0s and 1s) and faint, light blue geometric shapes. A large, white dashed arc curves across the top and bottom of the image, framing the central text.

High-speed 3D for Industry

Philipp Schmid

:: csem

CSEM - TECHNOLOGY
ORGANIZATION IN
SWITZERLAND

 csem

Technology Transfer to Industry

Close to **industry**

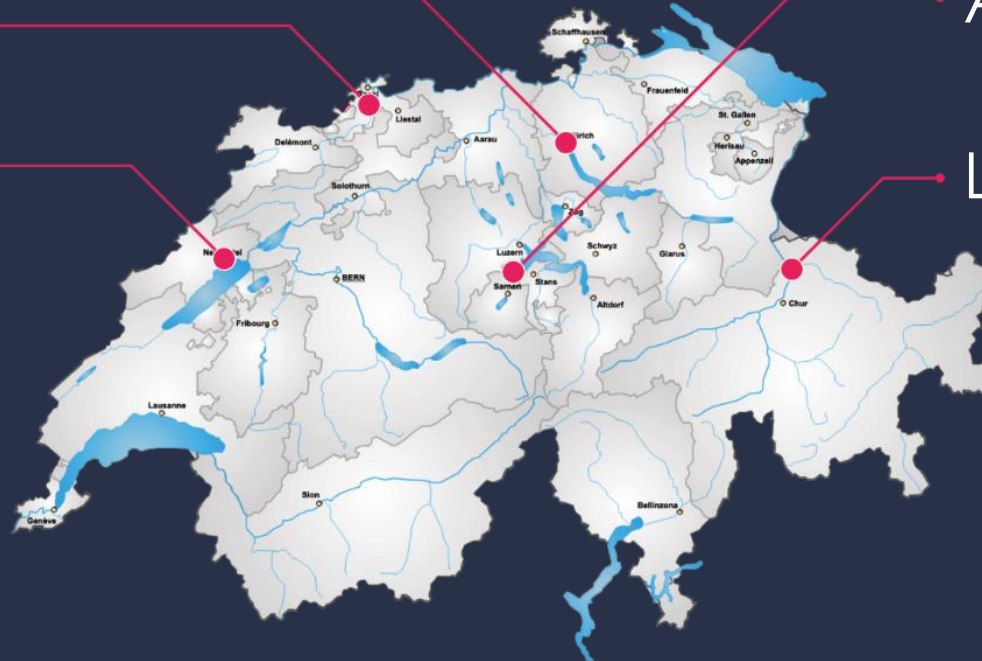
Zürich

Muttenz

Neuchâtel

Alpnach

Landquart



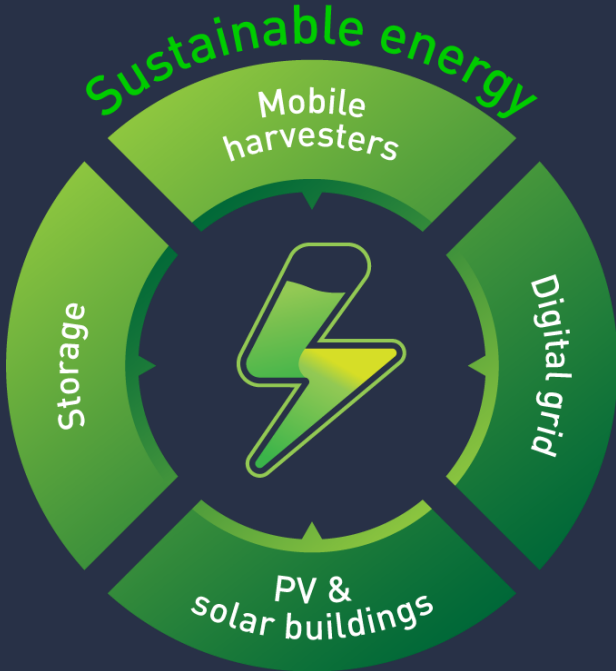
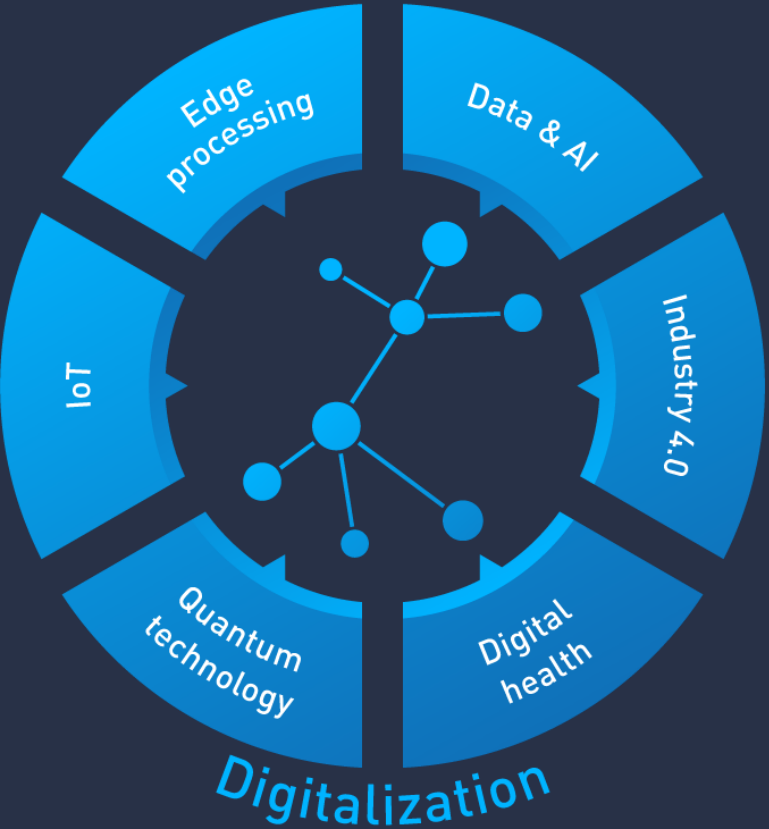
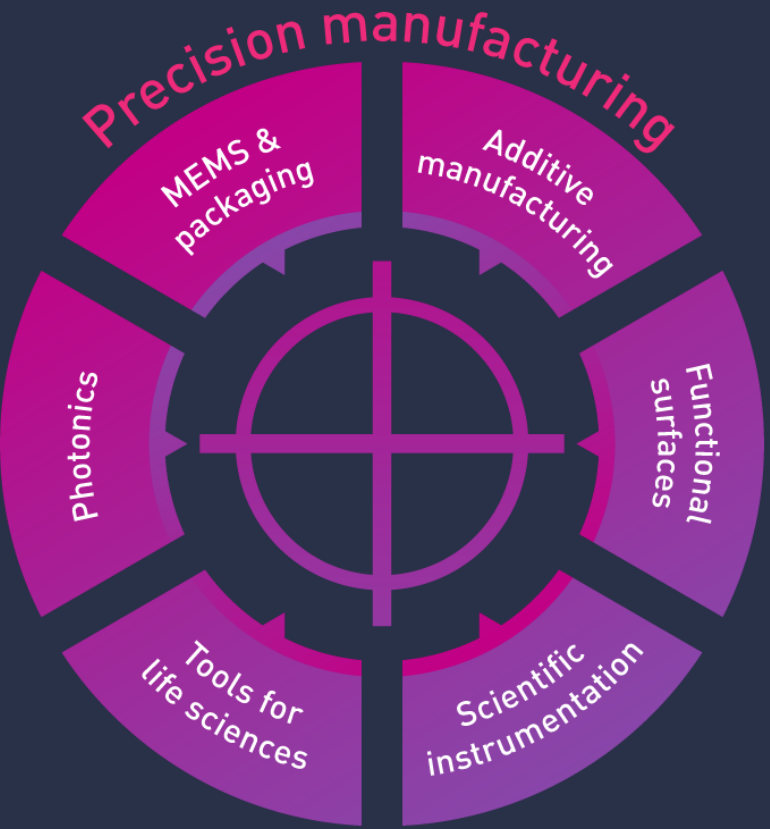
87.6
Turnover
(mio CHF)

530+
Persons

212
Industrial
clients

80
European
projects

Technologies **in focus** at CSEM



Industry 4.0 & Machine Learning

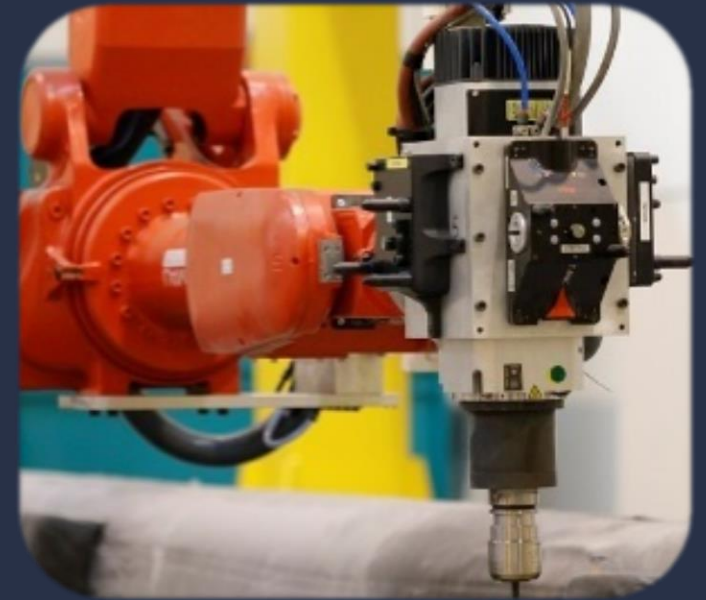
Quality and Process Control



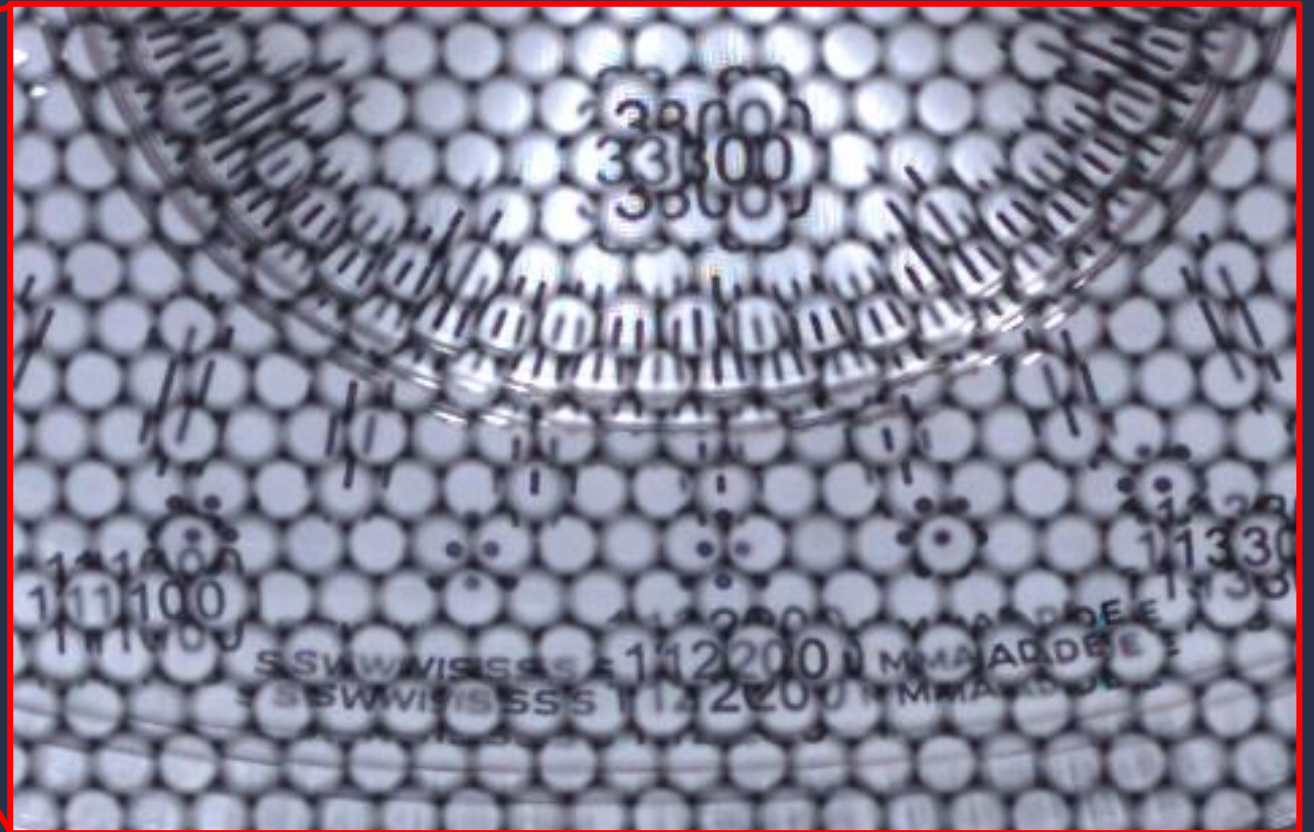
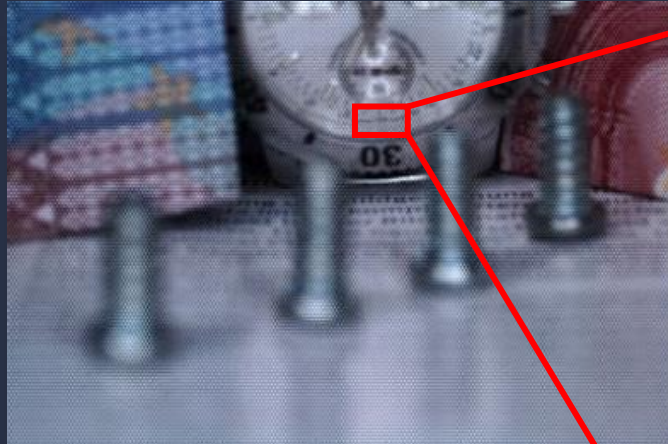
Predictive Maintenance



Digital Manufacturing

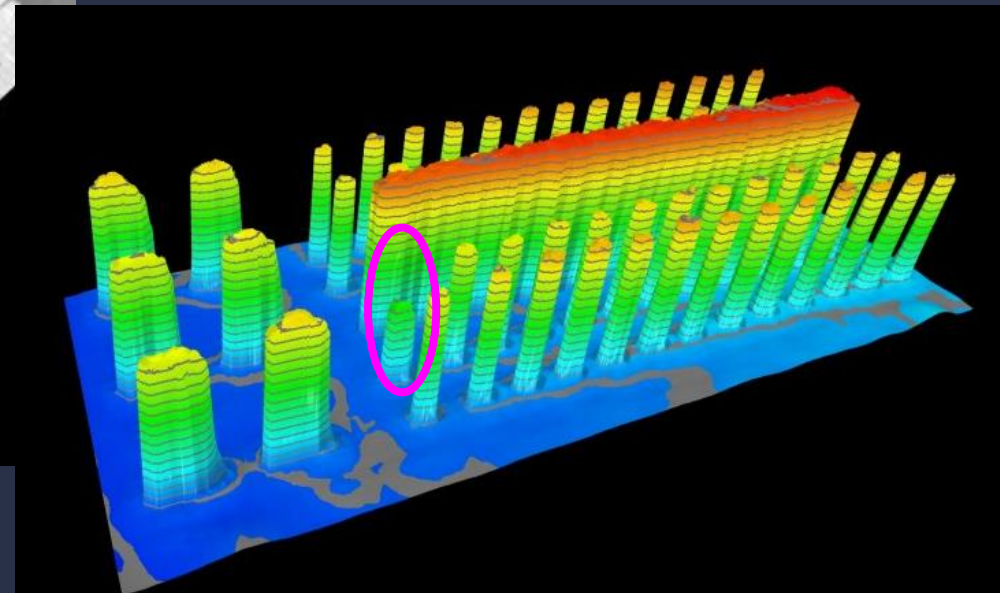
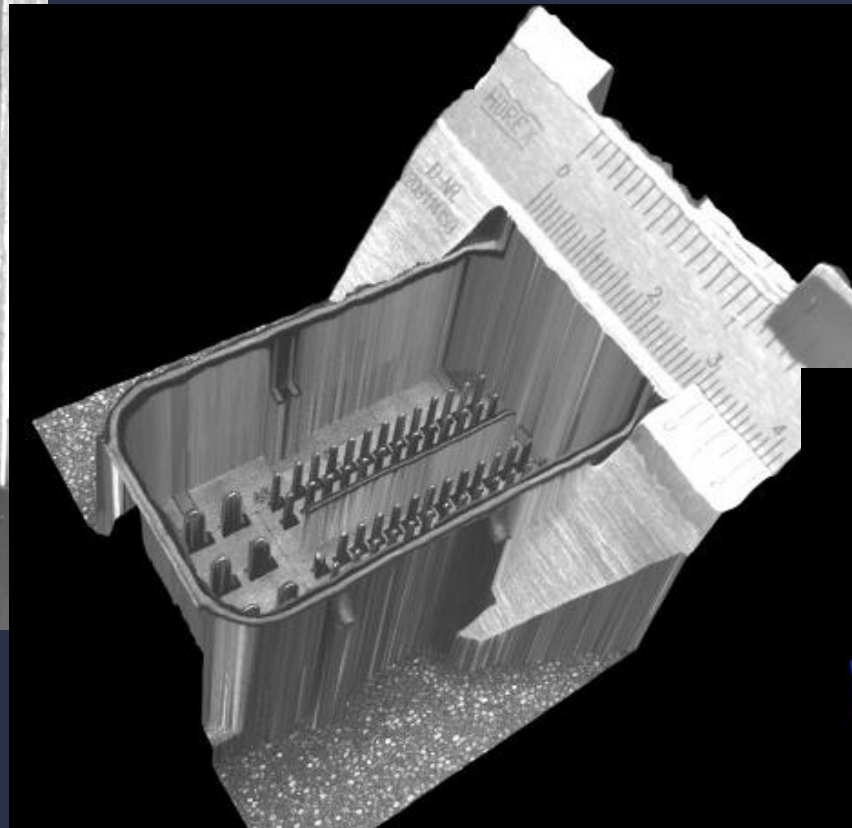
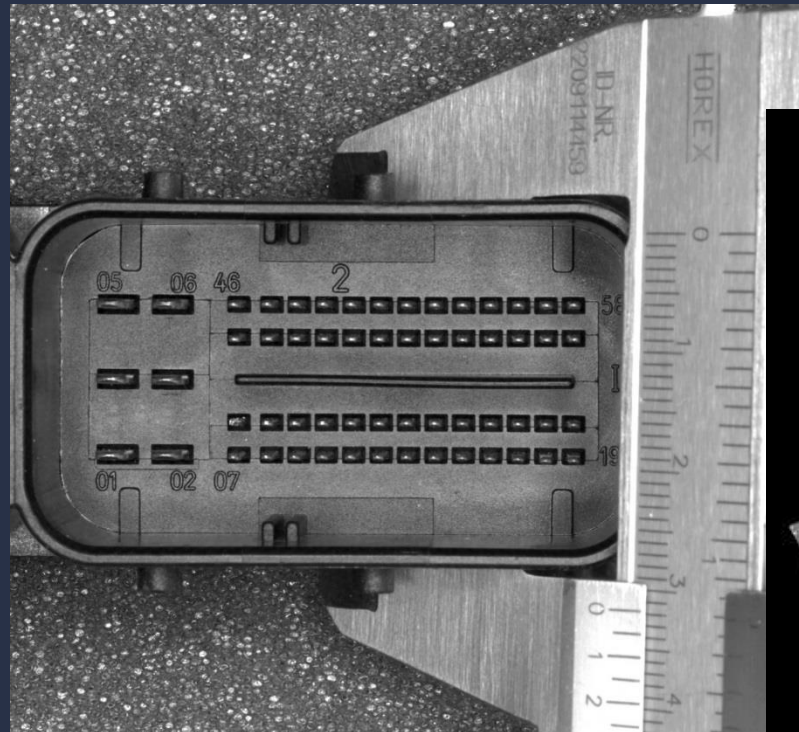


Lightfield (Plenoptic) Camera – 3D Vision



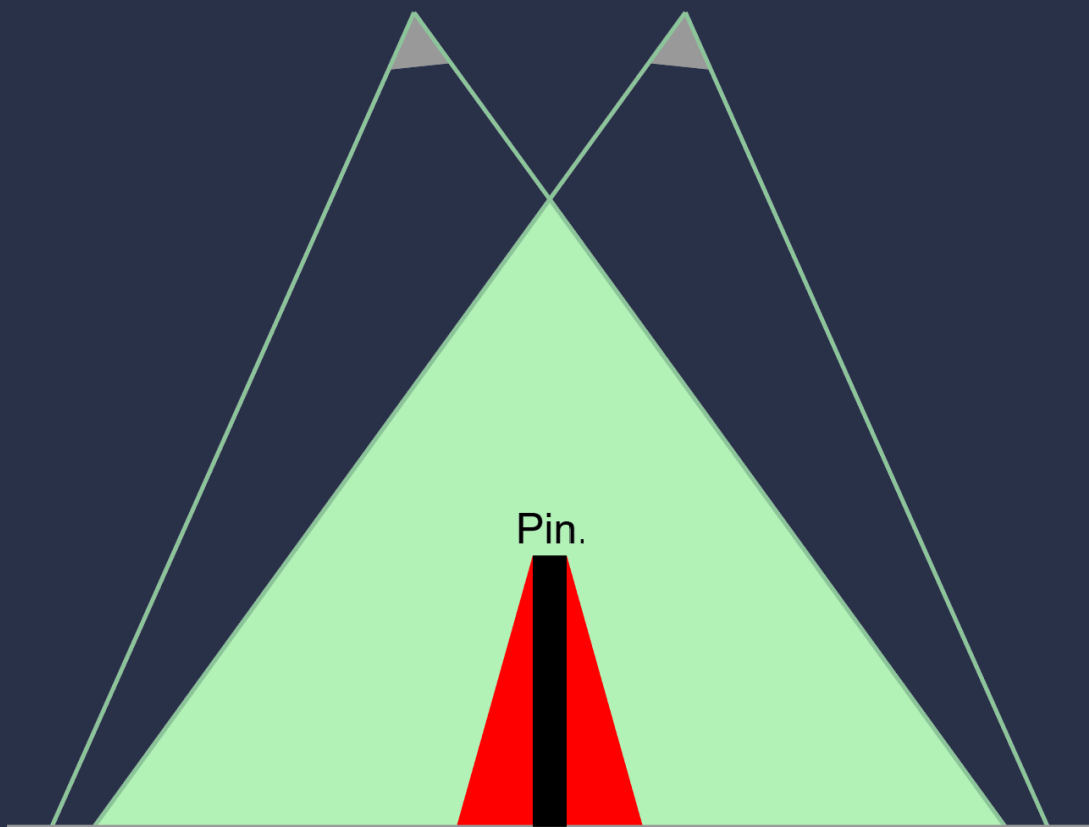
GPU Power

3D Lightfield

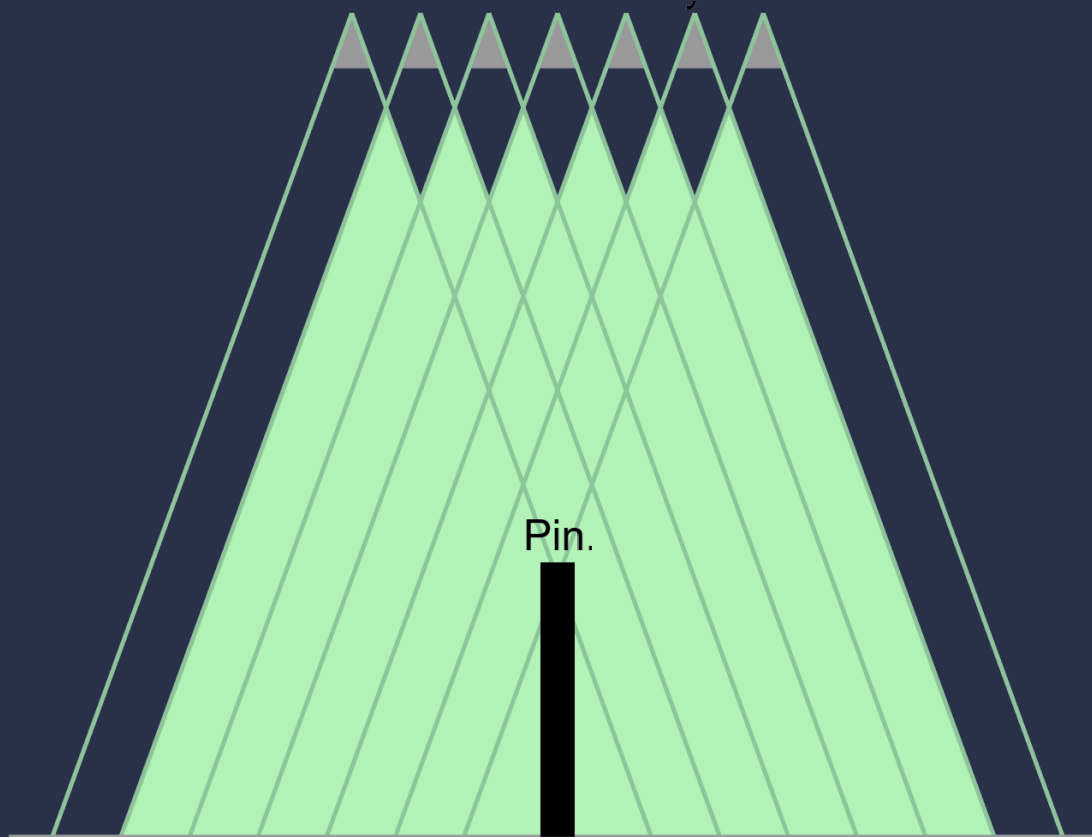


Occlusion

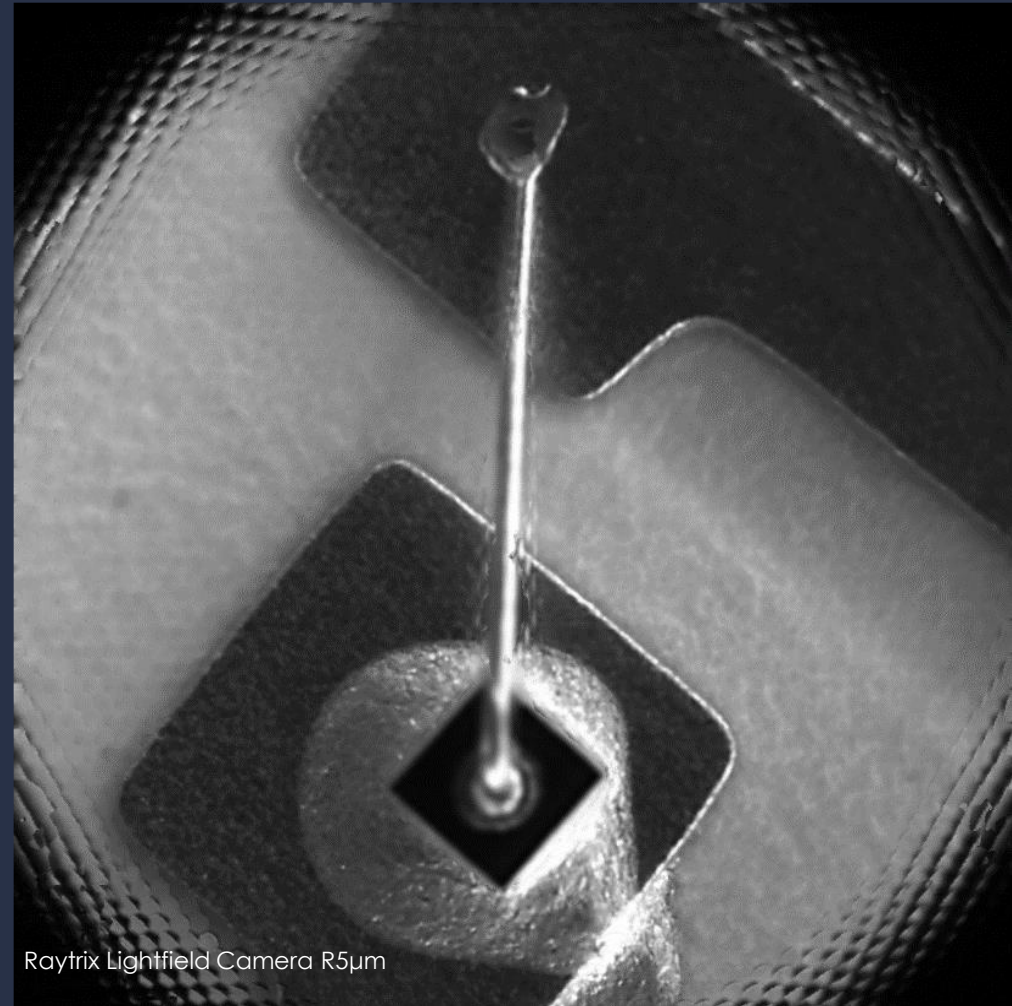
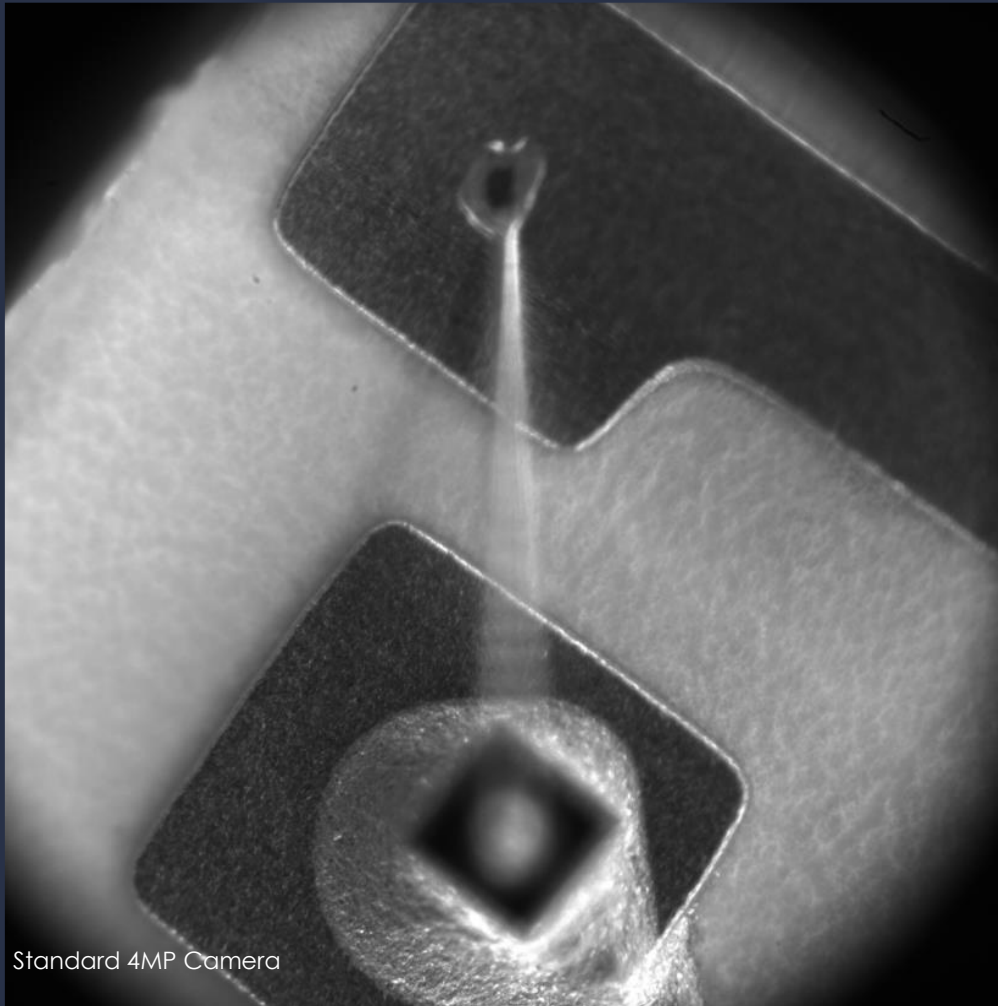
Stereo Camera



Lightfield Camera



Extended Depth-of-field



High-Speed 3D in Industry





manufacturing

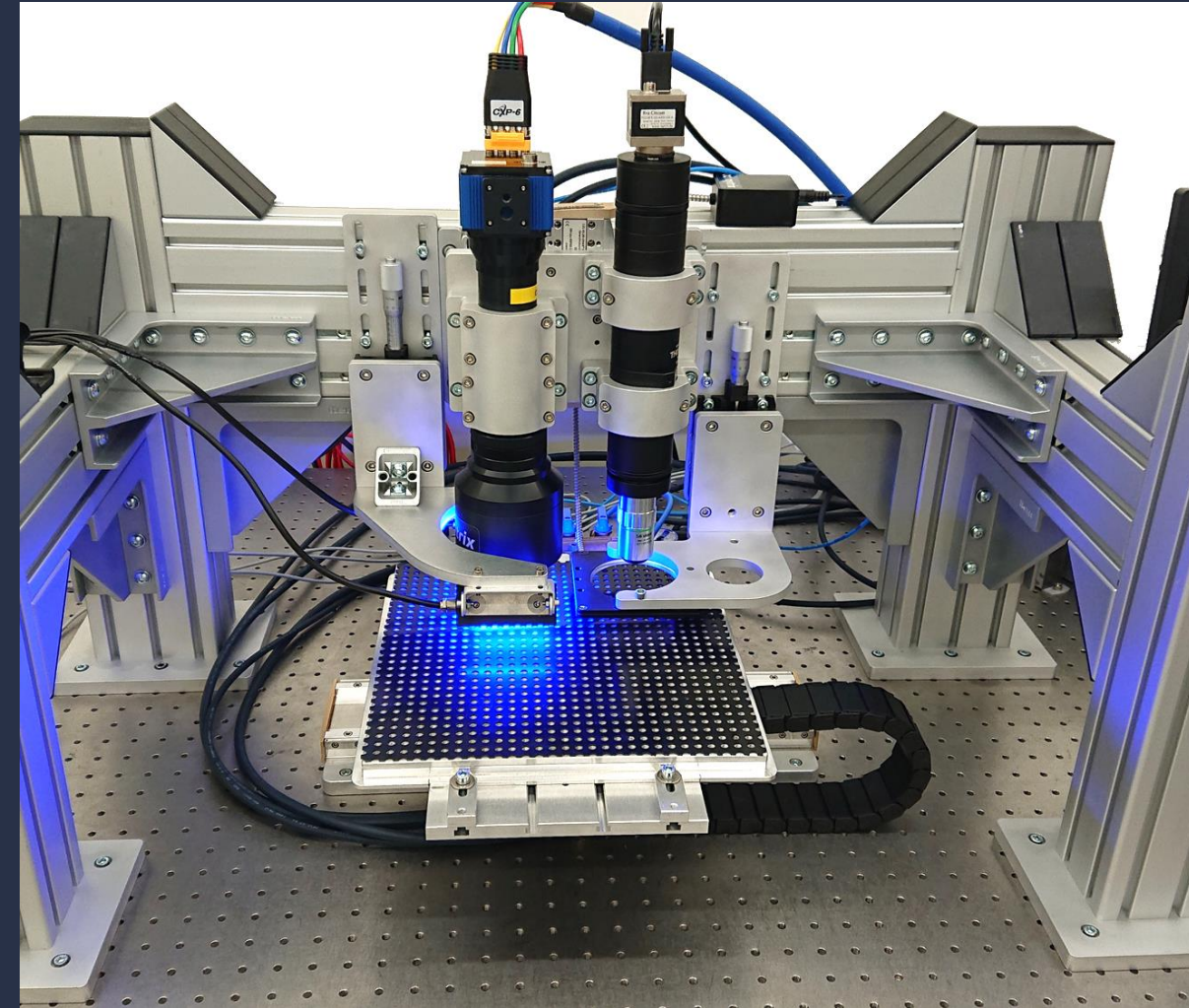
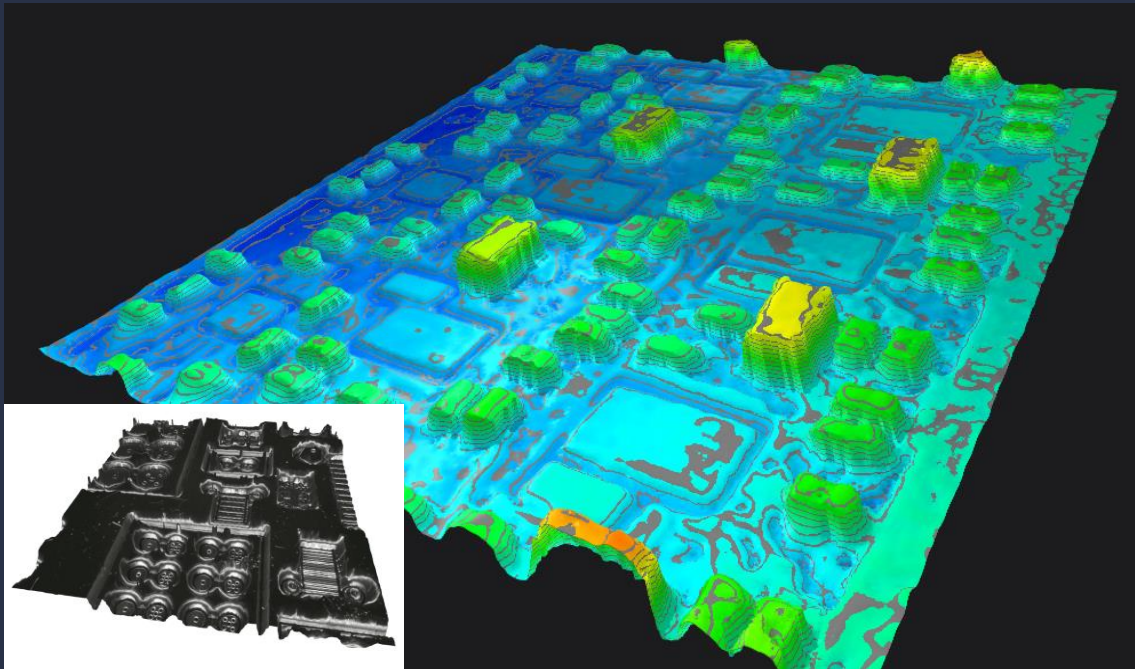
• More than 440 employees

<https://youtu.be/UcpGLpz02FM>

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High-Resolution 3D Inspection System

- 3D lightfield technology
- Sub- μm resolution
- MEMS inspection



www.citcom.eu

3D Vision with Deep Learning



The screenshot shows the CSEM VISARD software interface. The main window displays several modules: Robotics (Xenaxvi75V8, Lua), Vision (Raytrix Camera Manager, Image File Logger, TP Image Anomaly Detector), and Health Data (Cleverer Manager, System Health Monitor). A 'Bearing Q-Check' module is highlighted. Below the modules, a 'Blackboard Viewer' table displays system data.

Fav	Module Full Name	Module Type	Value Name	Time Stamp	Value	Statistic	Value Type	Category	Log
+	/Project/BearingQ_Check	BearingModule	Result	15:15:45...	VisardDemo.Coordinator.BearingModule_190x @ 8.4...	BearingModuleResult			
+	/Project/ClevererManager/TempHumidity_1	UsbTempHumidity	Data	15:16:29...	28.5°C / 41.1%	745x @ 0.7...	TempHumidityData		
+	/Project/ImageFileLogger	ImageFileLogger	Data	00:00:00...		0x @ 0.0 Hz	FileInfoResult	Logger	
+	/Project/LeapMotion	LeapMotionModule	Data	15:16:30...	VisardDemo.Hardware.LeapMotion.Lea...	64,726x @...	LeapMotionResult		
+	/Project/LeapMotion	LeapMotionModule	IMG	00:00:00...		0x @ 0.0 Hz	ImageModuleResult		
+	/Project/LeapMotion	LeapMotionModule	Trigger	15:15:43...	HighLow	8x @ 0.2 Hz	Trigger		
+	/Project/RaytrixCameraManager/RayCam0	RaytrixCamera	Data	15:15:45...	csem.Visard.Modules.Vision.Cameras.Ra...	190x @ 8.4...	RaytrixCameraResult		
+	/Project/SystemHealthMonitor	SystemHealthMonitor	Data	00:00:00...		0x @ 0.0 Hz	SystemHealthMonitorResult		
+	/Project/Xenaxvi75V8	Xenaxvi75V8	Data	00:00:00...		0x @ 0.0 Hz	Xenaxvi75V8Result		

Configured CSEM VISARD

The screenshot shows a customized GUI for 3D application. It features a 'Bearing Quality Check' window with a 'Total Focus' image, a '3D - View' of a bearing, and an 'Optical Anomaly Detection (Deep CNN-AE)' image. Below these images is a table of measurement data and a 'Selected Bearing' section with a 'Diameter' gauge.

Measurement Name	Value	Unit	History
D1	7.29	mm	
D	6.06	mm	
d	3.00	mm	
B	2.51	mm	
C	0.62	mm	
r	0.12	mm	
c	0.24	mm	
Evaluation Time	87	ms	

Selected Bearing

Tray Index	2
D1	7.29
D	6.01
d	3.00
B	2.51
C	0.60
r	0.11
c	0.24
Pin Height	1.73
Defects	-
Tray Counter	8,506

Diameter

Customized GUI for 3D application



High-speed 3D

- :: CSEM Source Code
- :: Deep Learning
- :: No black box

Contact

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