



# Industry 4.0 & Machine Learning

:: csem

# Industry 4.0 & Machine Learning

Quality and  
Process Control



Predictive  
Maintenance

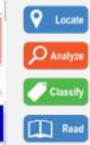
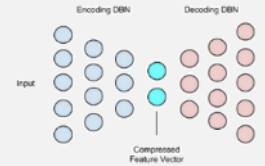
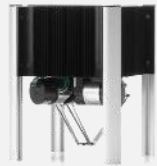


Cognitive  
Robotics



« Highest Efficiency and Perfect Quality »

# From «small» to «smart» – Development of a tech platform



2001-2007

2005-2010

2007-2017

2015-2022

2022 -

Micro-robots

Feeding tools

Visual inspection

Predictive quality

Intelligent production

Micro handling

Process monitoring

Control of systems and assets

Self-aware equipment and processes

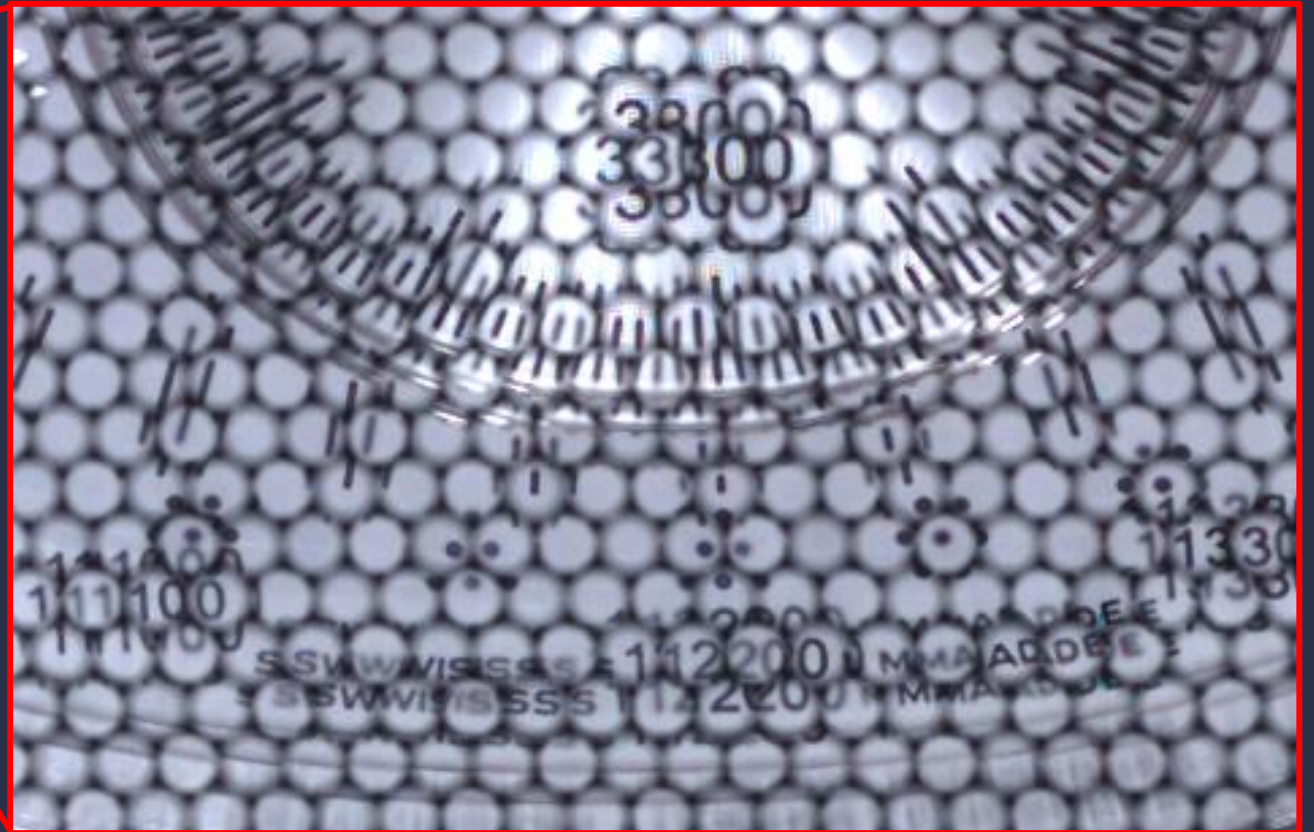
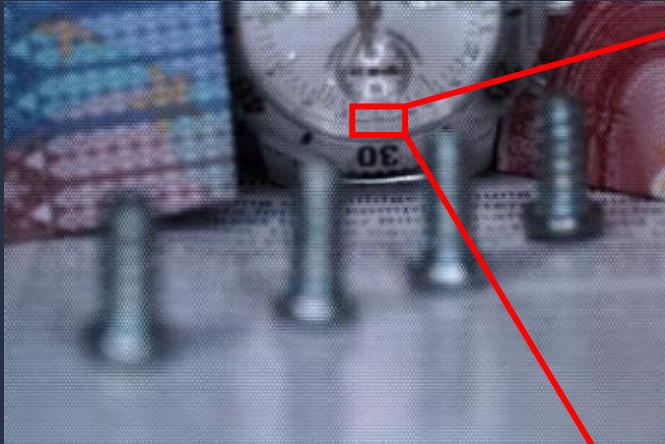
Robotic hardware

Visual quality control

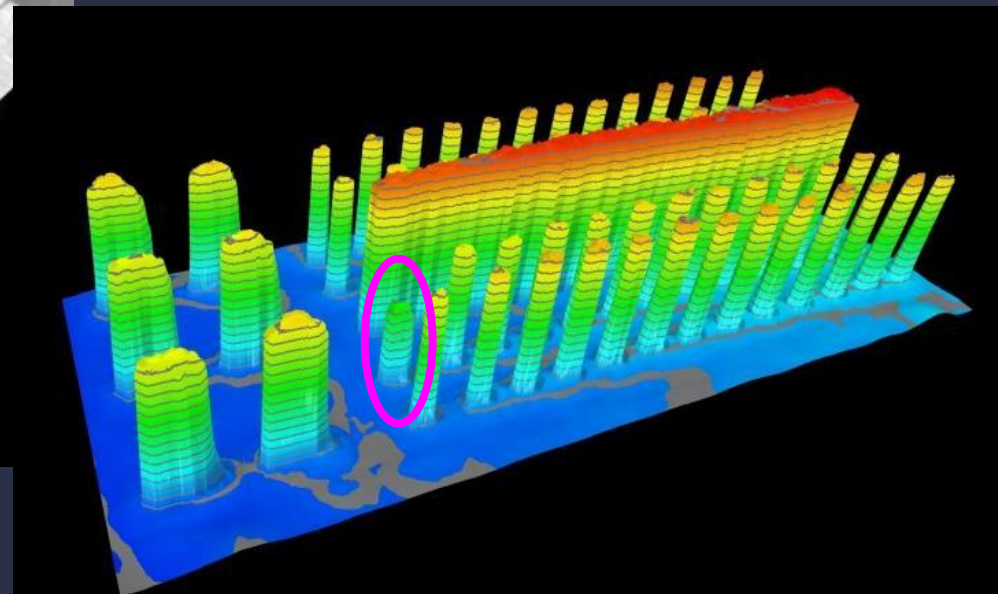
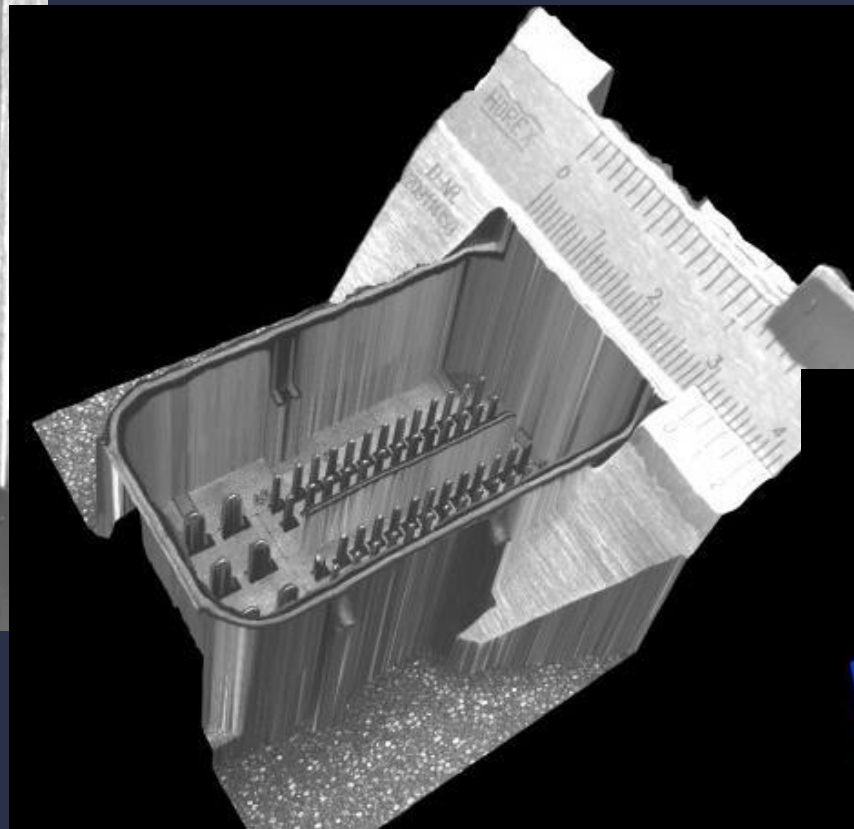
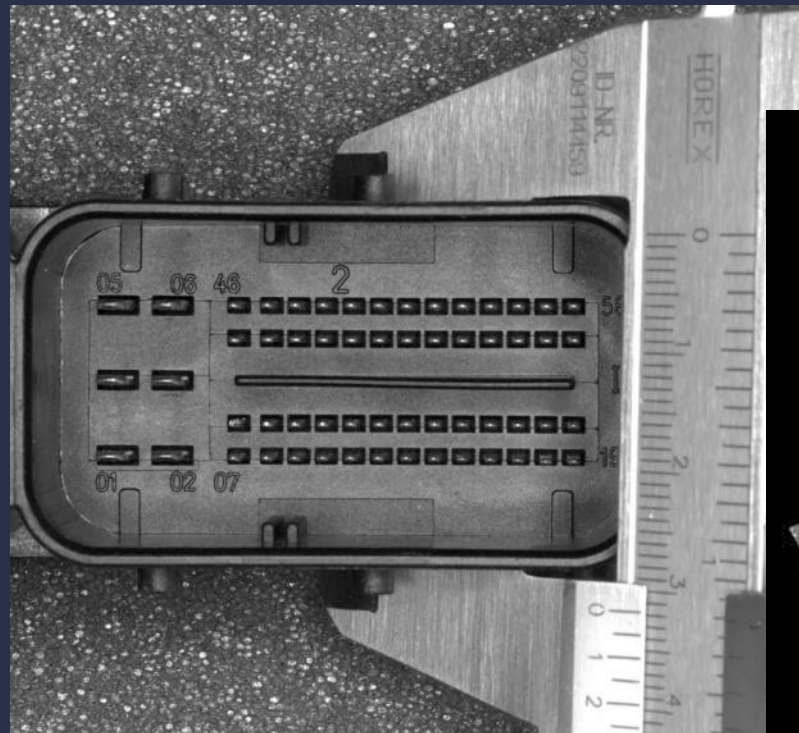
Control beyond vision

Multi-data analytics

# Lightfield (Plenoptic) Camera

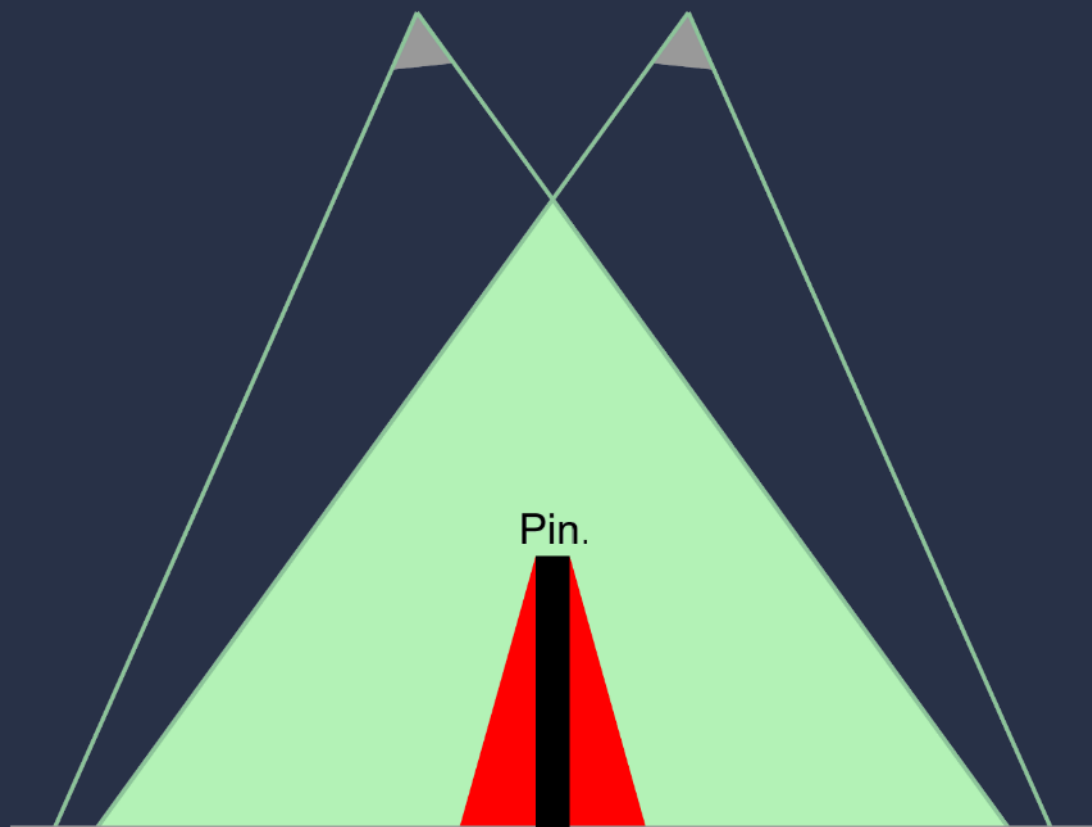


# 3D Lightfield

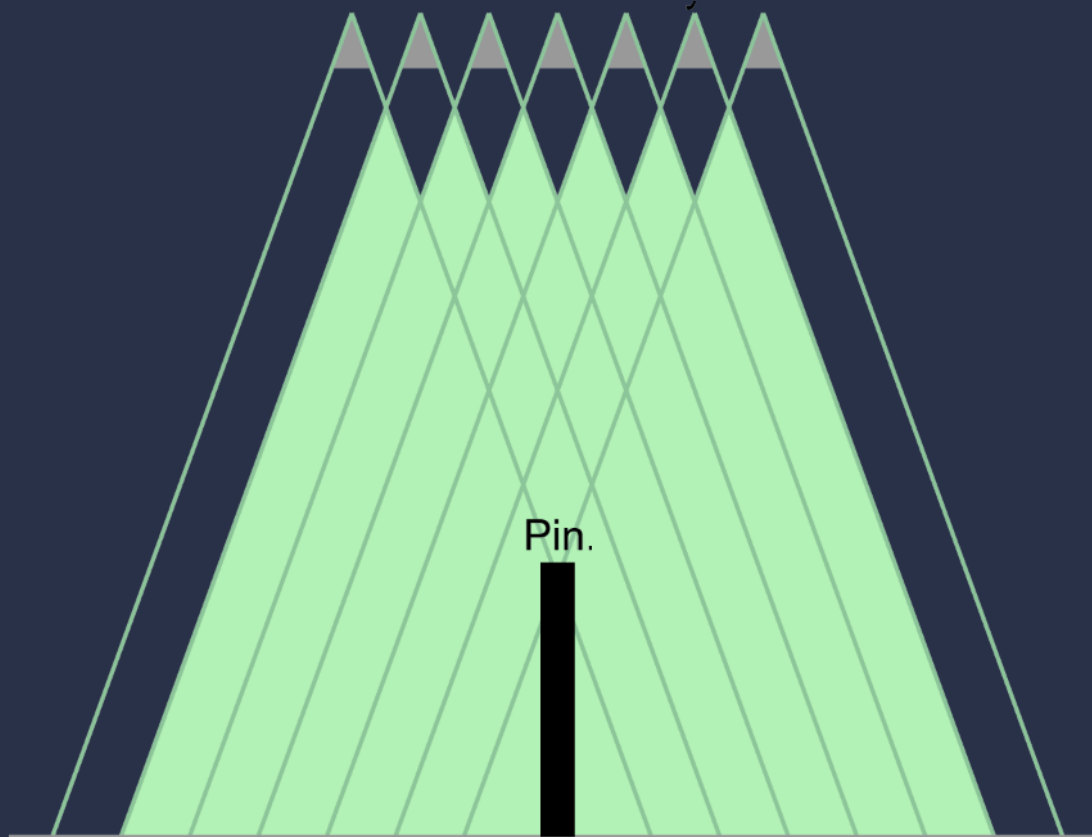


# Occlusion

Stereo Camera



Lightfield Camera



# High-Speed 3D in Industry





TECAN.

TECAN.

TECAN.



96pc natural 500µl

TECAN.

4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47



# DeckCheck™ Market Launch 2022



Products

Applications

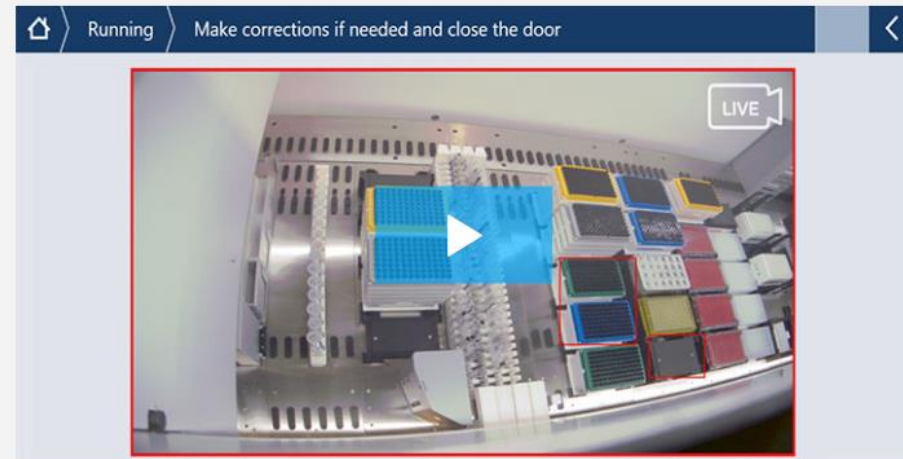
Resources



## DeckCheck™

- Cameras mounted inside the instrument to watch out for problems before they occur
- Highlights discrepancies and allows manual corrections in real time during instrument loading and worktable set-up

[- Show less](#)



### Live deck imaging during set-up

- Built-in cameras provide a live picture of the Dynamic Deck
- Advanced software algorithm compares live picture to a reference image
- Touchscreen displays discrepancies for manual correction
- Real images are easy to understand, enabling fast correction

### Set up for success

- Avoids loading oversights that might lead to errors during the run
- Increases number of successful runs
- Saves money and maintains productivity
- Increases user confidence for all applications



# csenm