

wir automatisieren Qualitätsprüfung



INSPECTION INNOVATION: MABRI.VISION

NEED?

IVAM 14.09.2022
Mid-Week Coffee Break - September

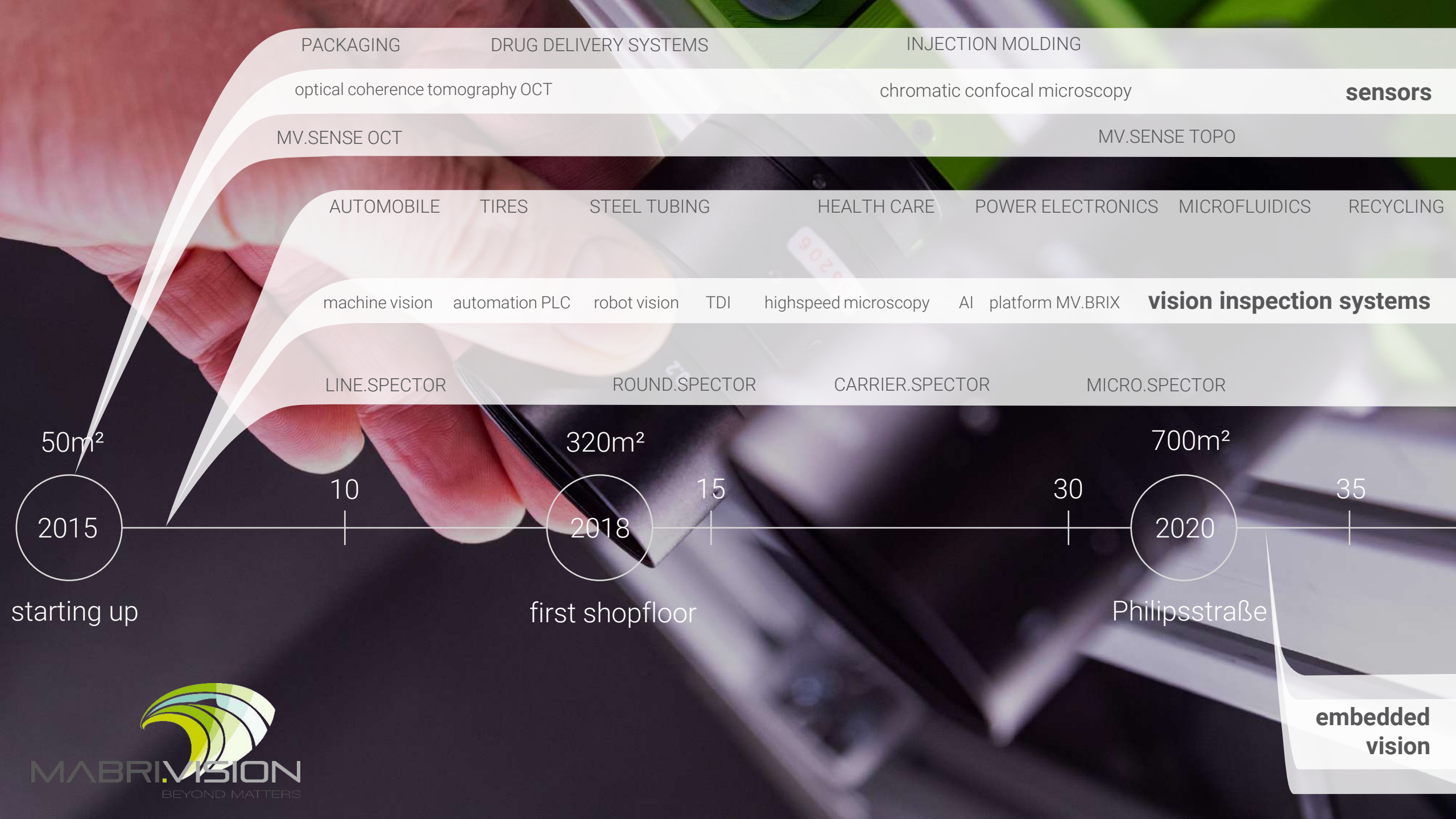
"We automate quality inspection - MABRI.VISION GmbH"

Dr. Ulrich Marx



www.mabri.vision

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info@mabri.vision



PACKAGING

DRUG DELIVERY SYSTEMS

INJECTION MOLDING

optical coherence tomography OCT

chromatic confocal microscopy

sensors

MV.SENSE OCT

MV.SENSE TOPO

AUTOMOBILE

TIRES

STEEL TUBING

HEALTH CARE

POWER ELECTRONICS

MICROFLUIDICS

RECYCLING

machine vision

automation PLC

robot vision

TDI

highspeed microscopy

AI platform MV.BRIX

vision inspection systems

LINE.SPECTOR

ROUND.SPECTOR

CARRIER.SPECTOR

MICRO.SPECTOR

50m²

10

320m²

15

30

700m²

35

2015

2018

2020

starting up

first shopfloor

Philipsstraße

**embedded
vision**



MABRIVISION
BEYOND MATTERS

WE AUTOMATE QUALITY INSPECTION



consulting

- planning & optimization of QC processes
- vision concepts
- feasibility studies

engineering

- designing vision systems
- mechanical and electrical engineering
- PLC and software engineering

process automation

- automation of QC processes
- stand alone and integrated solutions
- turn key solutions

Service and Maintenance

- on site support
- remote service
- availability packages

MABRI.VISION GmbH

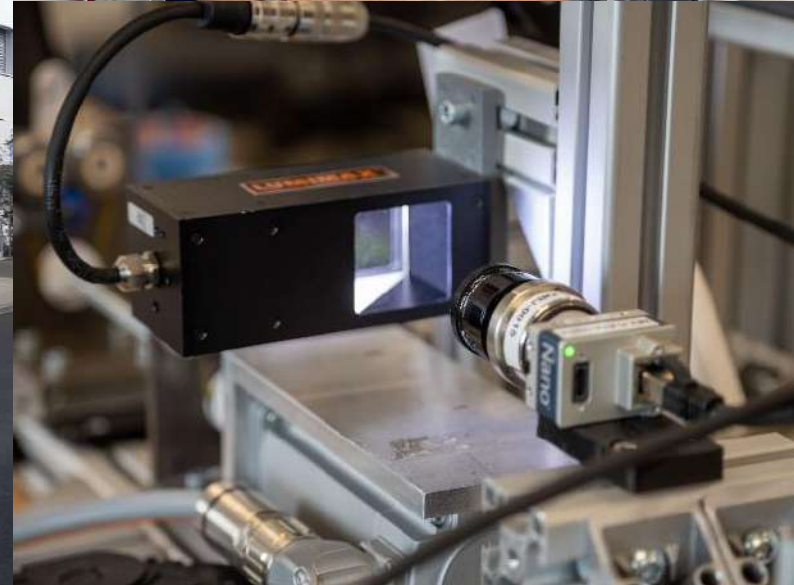
„Innovative technologies and smart software solutions are our key for efficient quality control automation.“



IMPRESSIONS



HEADQUARTER AACHEN



IMPRESSIONS



IN-HOUSE MANUFACTURING



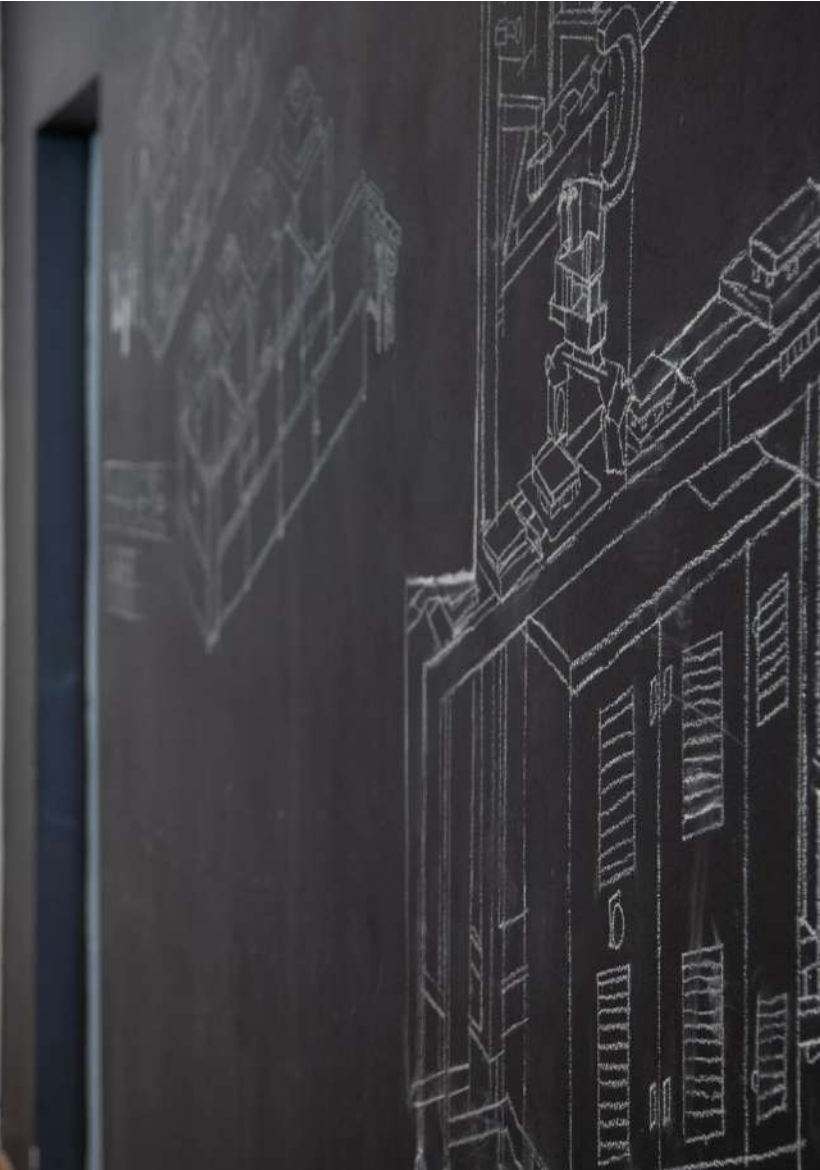
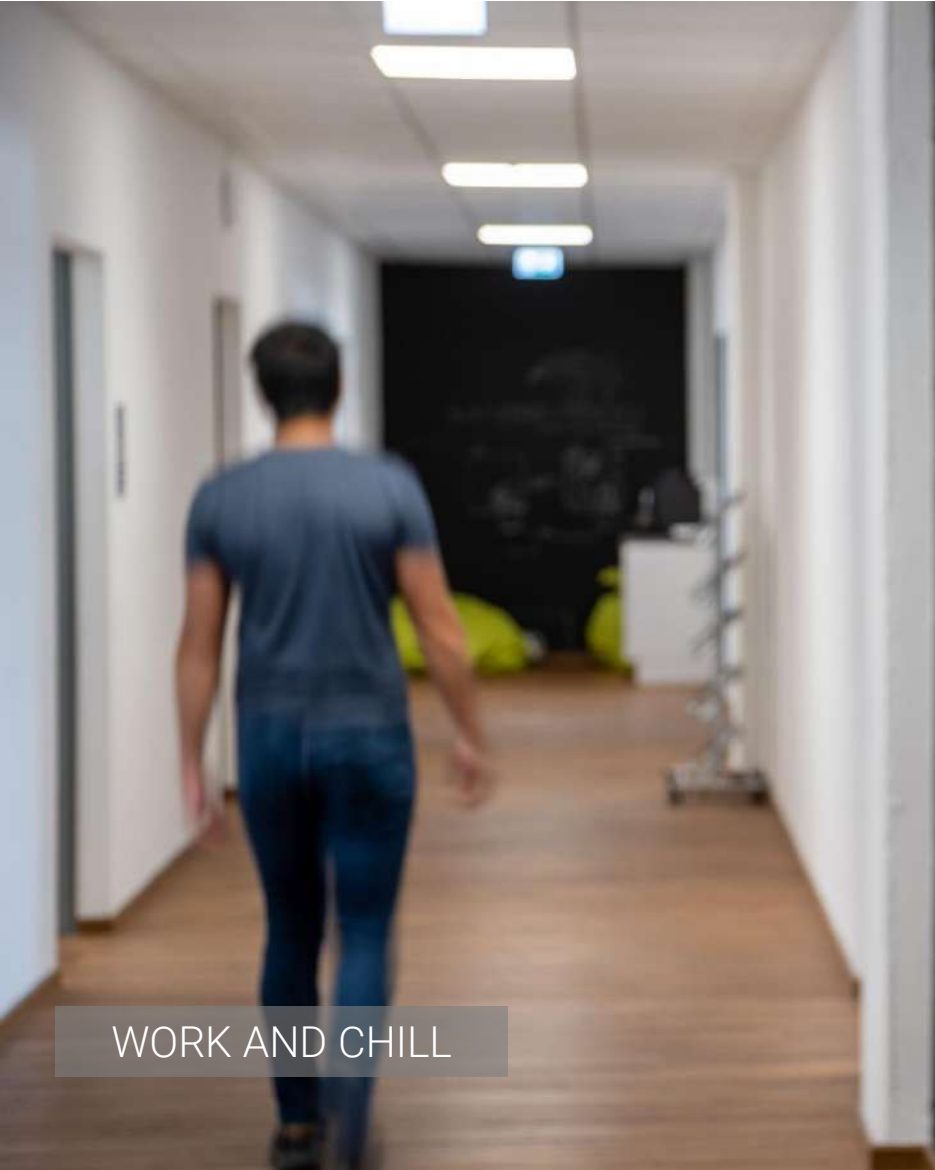
IMPRESSIONS



R&D DEPARTMENT



IMPRESSIONS



WORK AND CHILL

OUR CORE BUSINESS

since 2015 we automate
production quality inspection
processes with
innovative machine
vision solutions.



35
employees

9
IT specialists

8
vision experts

7
engineering

∞
AI

WHAT WE DO



consulting



engineering



machine vision
systems

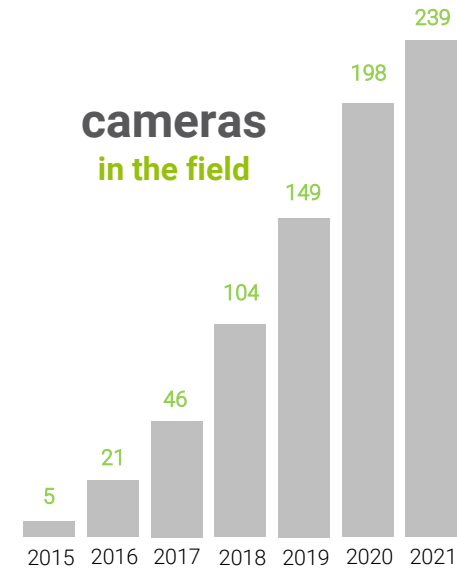


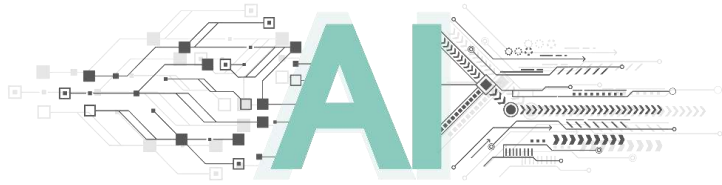
service

OUR GOALS

- **shape industry 4.0:** inspection concepts for a dynamic production environment
- **AI:** make deep learning and AI usable for production inspection
- **modular system:** inspection systems build by software and hardware modules: MV.BRIX
- **growth:** with our partners

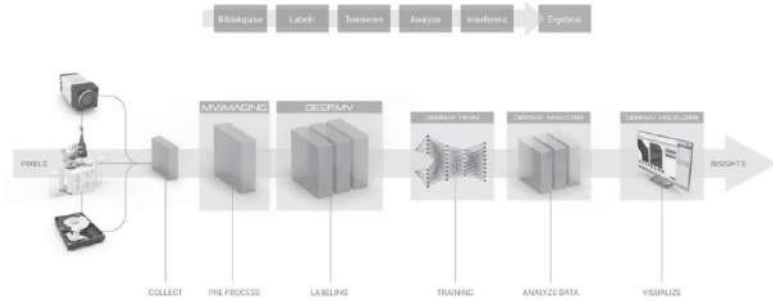
cameras in the field





KI für Industrie nutzbar machen - Fertigungstechnik optimieren

SOFTWAREPLATTFORM DEEP.MV End-to-End KI Lösungen für die Produktion



Standardisierung von Produktentwicklungsprozessen



manuelle Prüfung

Beratung &
Konzept

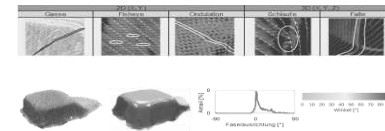
Tests &
Feasibility

Anlagenbau

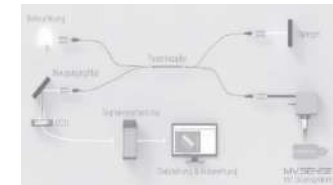
UNSERE PARTNER



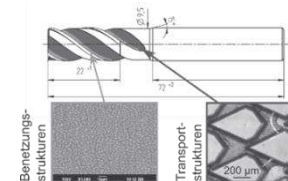
KIQS KI-basierte Defekterkennung von CFK-Strukturen



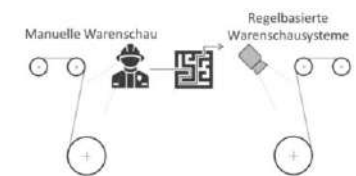
Dünnschicht-OCT OCT Entwicklung für Schichten <math><10 \mu\text{m}</math>



BIONICTOOLS Mikrostrukturierung von Fräswerkzeugen



SchauML automatisiertes Lernen von Fehlerbildern





technology

One step ahead



- sensors**
- We develop inhouse OCT sensors
 - Inspection of surfaces, thicknesses
 - High speed: 240.000 scans/s



- Line & matrix cameras**
- Machine vision inspection systems
 - Geometry inspection
 - Defect inspection



- TDI – high speed microscopy**
- Large scale inspection of microstures
 - Inspection of lab on a chip applications
 - Inspection of 1.000.000 features/s



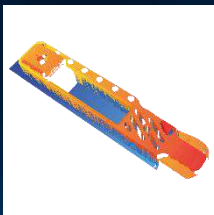
- 3D – triangulation**
- 3D – surface inspection
 - Fast wafer inspection
 - High resolution surface scans



- 3D – structured light imaging**
- 3D – presence detection
 - 3D – defect detection
 - Shape from shading

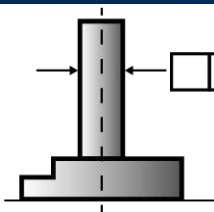


- Machine Vision with neuronal networks**
- AI based defect detection
 - OCR applications
 - MV.AI – software platform for machine learning



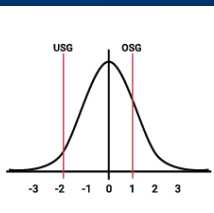
2D/3D signal and data processing

- AI-based data processing
- Neuronal networks
- Data visualisation



Geometric tolerances

- Determining tolerances based on ISO 1101
- Generation of automatic reports



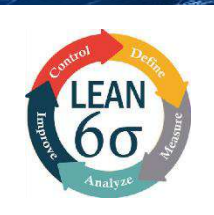
Process capability

- Generation of process capability reports
- Audit trail, change management
- Process optimisation

Measurement system	Control	Define	Analyze	Measure
...

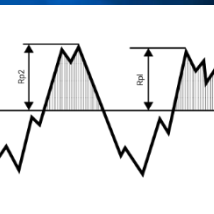
MSA Measurement system analysis

- Six Sigma processes
- Traceability calibration standards



Six Sigma tools

- Quality management tools
- Fault analysis tools
- Change management



Roughness inspection

- Determination of 2D roughness parameters via ISO 4287 & 13565
- Determination of 2D roughness parameters via ISO 25178



metrology

Our DNA

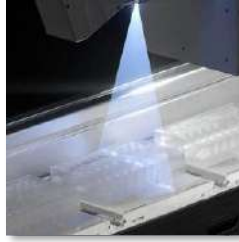
our markets: now & tomorrow

With machine vision QC inspection equipment and solutions, we aim to support the development of new industries and fast-growing sectors. We are already involved in many growth markets.



e-mobility

power electronics, tires, circuit boards



health care

microfluidics, implants, microsensors, disposables



semiconductor

microstructures, electronics



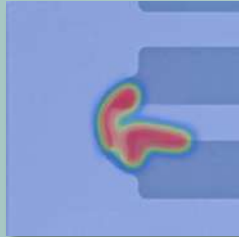
renewable energy

electronic components, power electronics



logistics

label detection, high content applications



embedded / ai vision

ML, deep learning, cross platform solutions



resources management

deposit systems, product recognition, recycling



sustainable global nutrition

packaging inspection, label inspection

INSPECTION SYSTEMS



MV.SENSE OCT
layers & thickness scanner



MV.SENSE TOPO
microscopic 3D inspection



INLINE.SECTOR
tube thickness inspection



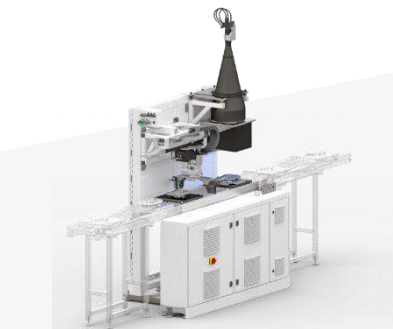
MV.EYE
camera, line, 3D, multi camera



LINE.SPECTOR
fast line scanning system, scan gate QR, DOT, DMC, barcode



ROBOT.SPECTOR
Universal: versatile in use



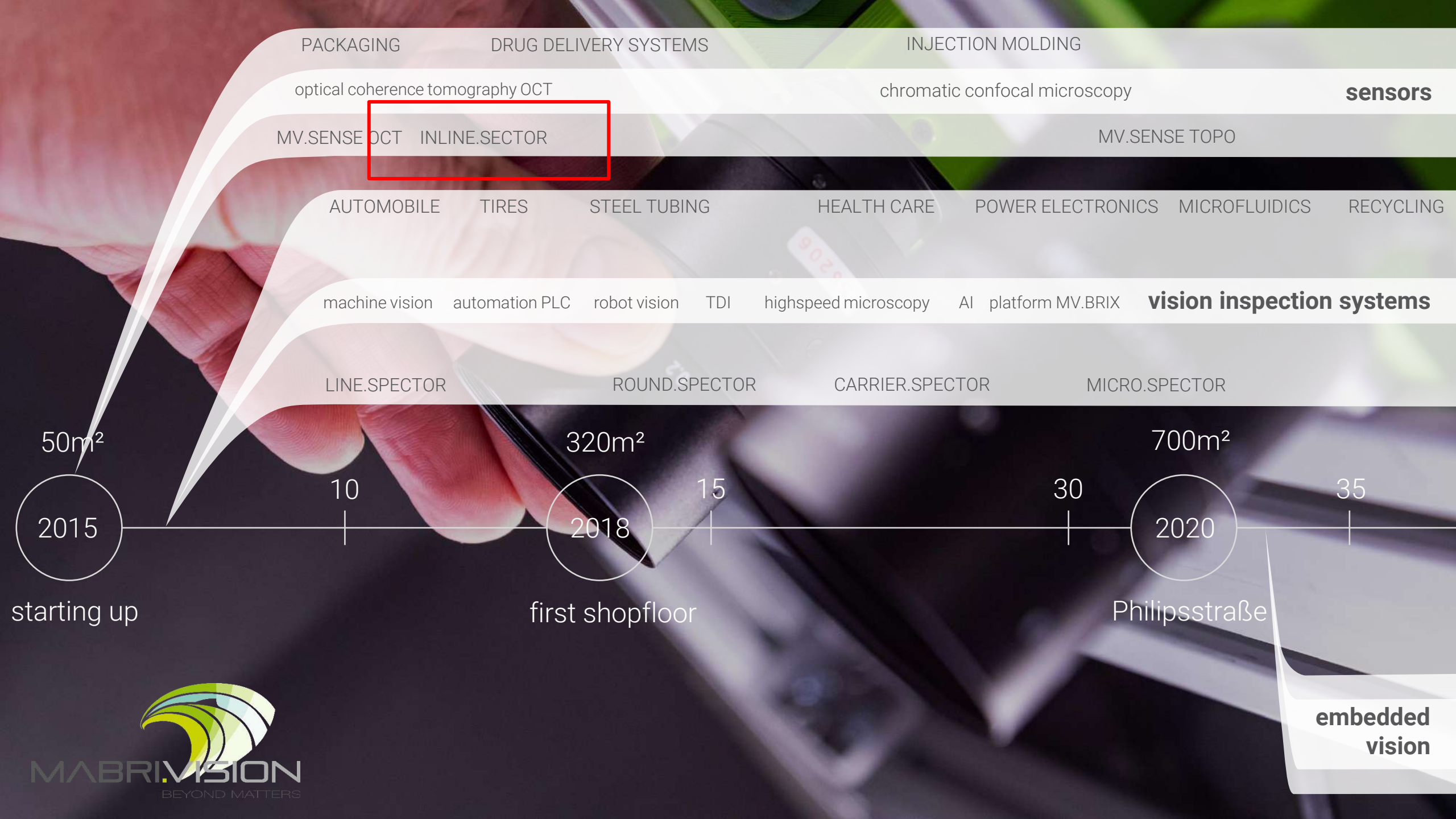
CARRIER.SPECTOR
2D/3D inspection for carriers



ROUND.SPECTOR
rotary inspection systems



MICRO.SPECTOR
Inline microscopic inspection



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**embedded
vision**

MEDICAL TUBING

WALL THICKNESS | SHAPE



SEMITRANSSPARENT TUBING

- › Wall thickness 0,1 mm - 4 mm
- › Tubing diameter 0,5 mm - 20 mm
- › Silicon, PVC, PMMA
- › Acromatic and colored
- › Assembly line speed up to 400 m/min

FEATURES

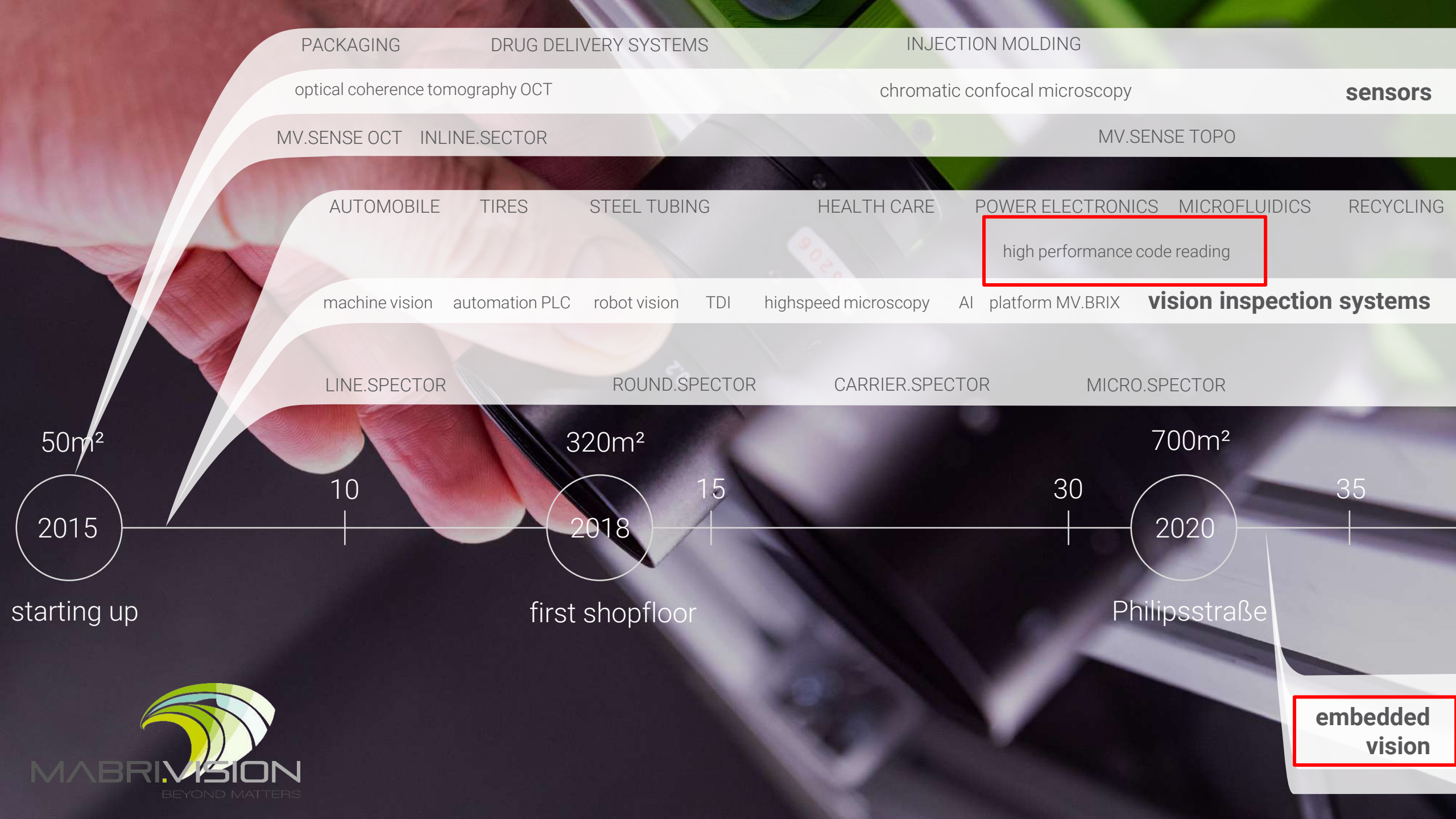
- › Outer diameter
- › Inner diameter
- › Eccentricity & ovality
- › Wall thickness on 8 Positions



ANALYSIS

- › Daten-Visualization and -Analysis
- › Fully automatic inline inspection





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high performance code reading

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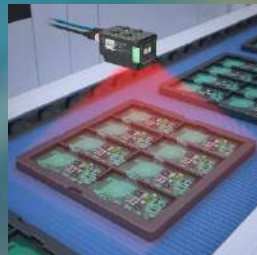
embedded vision

Code Reader Lösungen

- ✓ Embedded System
- ✓ Kosteneffizient
- ✓ Plug and Play



Mehrere Codes auf Motorblock



Codelesen auf Platinen



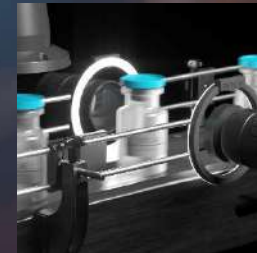
Zuordnung und Tracking von Trays



Erfassung von Codes in der Bewegung

High Performance Lösungen

- ✓ High Content Architektur
- ✓ für Anspruchsvolle Anwendung
- ✓ Vollwertiges BV SYSTEM



Gelaserte Codes in der Medizintechnik



2D-Datacode Erkennung auf Reifen



Codeverarbeitung im B2C



High content Prüfung am Band

Highspeed Komplettlösungen für Codes



1D-Codes

Lesung und Verifikation
sämtlicher 1D-Datacode
Formate.



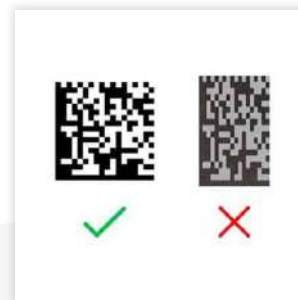
2D-Codes

Lesung und Verifikation
sämtlicher 2D-Datacode
Formate.



OCR-Lösungen

Mit unserem KI-Modul für
OCR-Anwendungen bieten wir
maßgeschneiderte Lösungen
zum Lesen von schwer
lesbaren Codes



Qualitätsmerkmale

Ausgabe sämtlicher
Qualitätsmerkmale.
Gemäß den Normen
ISO/IEC 15415 / 15416 und
ISO/IEC TR 29158



komplexe Oberflächen

Unser System eignet sich
sowohl für den klassischen
und farbigen Code-Druck als
auch für DOT-Codes,
gelaserte Codes und
verschiedene Oberflächen
wie beispielsweise Metall.



Flexible Anzahl & Bildfelder

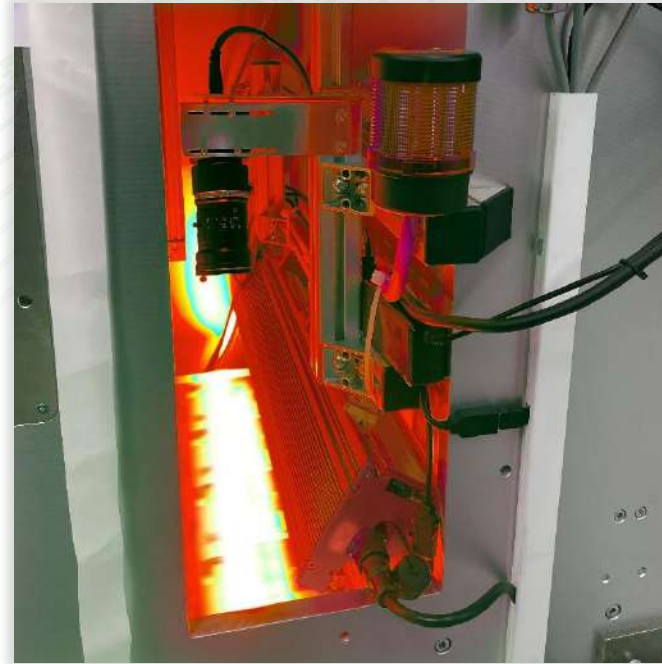
Modular anpassbare Bildfelder
ermöglichen die Identifikation
mehrerer Codes in einem
Schritt.

Was prüfen wir?

Highspeed Komplettlösungen für 1D- und 2D-Datacodes



2D-Code lesen auf Reifen

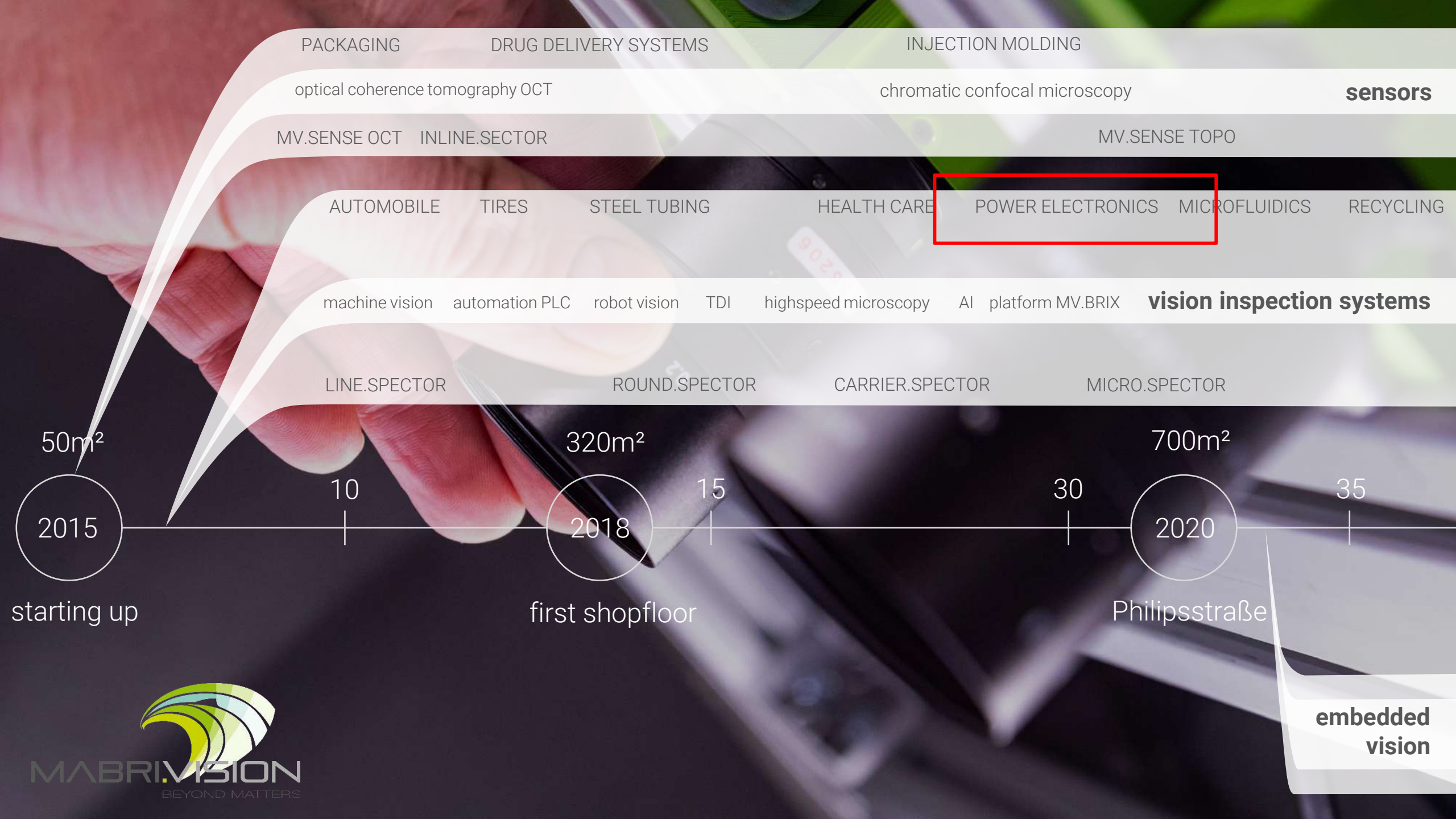


2D-Code lesen von Druckerzeugnissen



Codes auf Endverbraucherprodukten

Andwendungen



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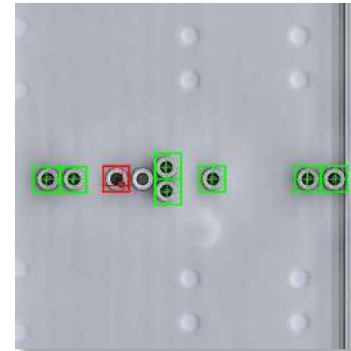
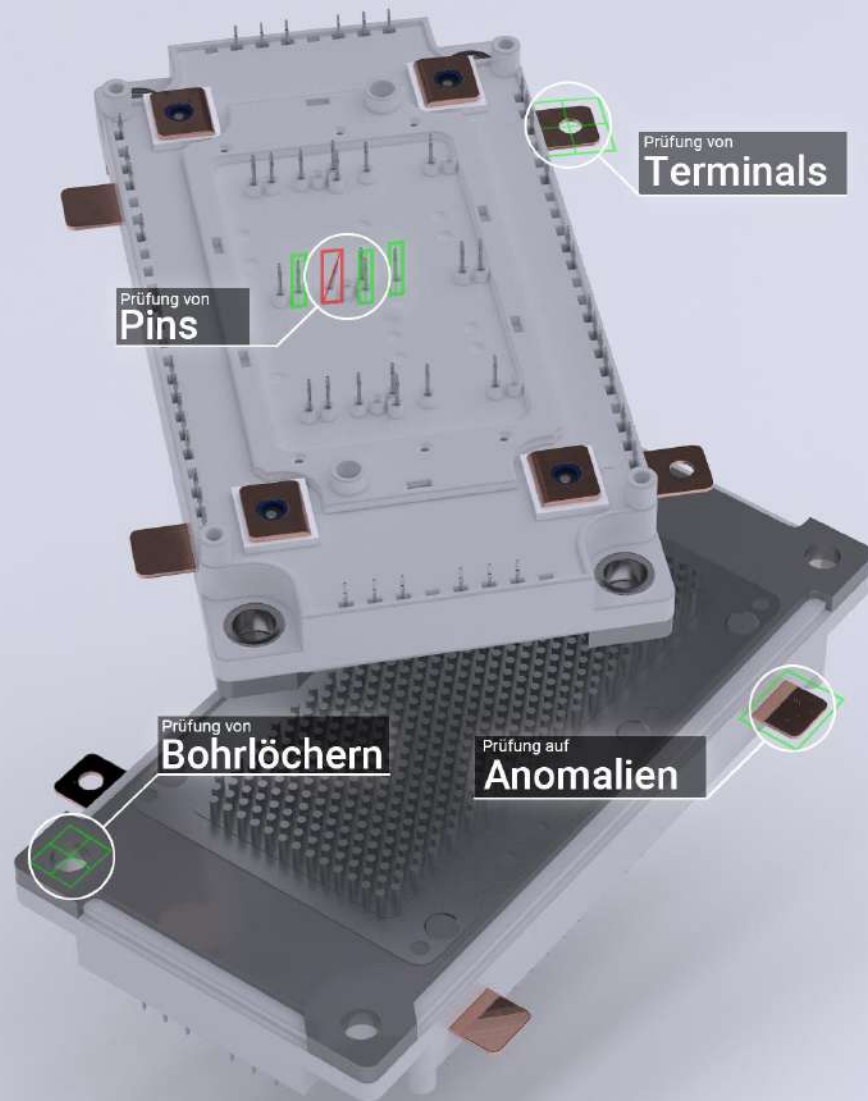
first shopfloor

Philipsstraße

**embedded
vision**

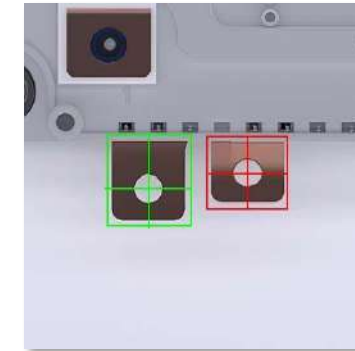
Automatische optische Prüfung von IGBT-Leistungsmodulen

Automobil, E-Mobilität, Energie



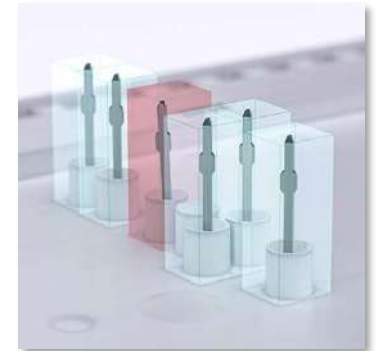
Pins

- Verbiegung von Pins
- Pin-Position (X,Y)
- Pin-höhe (Z)
- Taumelkreis



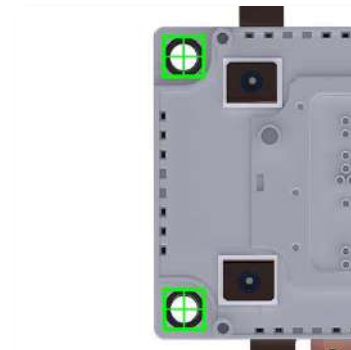
Terminals

- Verbiegung von Kontakten
- Durchmesser
- Position (X,Y)
- Höhe (Z)



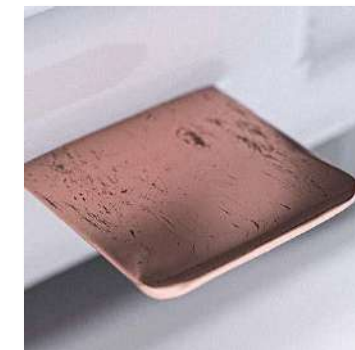
Alignment Pins und Kontakte

- Defekte
- Durchmesser
- Position (X,Y)
- Höhe (Z)



Bodenplattenbohrungen

- Defekte
- Durchmesser
- Position (X,Y)
- Höhe (Z)



Defekte und Anomalien

- Kratzer
- Verschmutzung
- Fehlbilder
- Verfärbungen



Schriftbilder und Druck

- OCR, Texterkennung
- Fehlende Schrift
- DMC / QR-Codes

CARRIER.SPECTOR

2D/3D end of line inspection system

The CARRIER.SPECTOR inspection system is built for fast inline processes. The inspection is performed on carriers. This allows high precision and high throughput at the same time.



Combine 2D and 3D

We combine 2D and 3D results based on triangulation and telecentric measurements.

Data fusion

We combine data from 3 metrology instruments to extract 2D and 3D features.



Clean room

All hardware and software components are designed for clean room applications



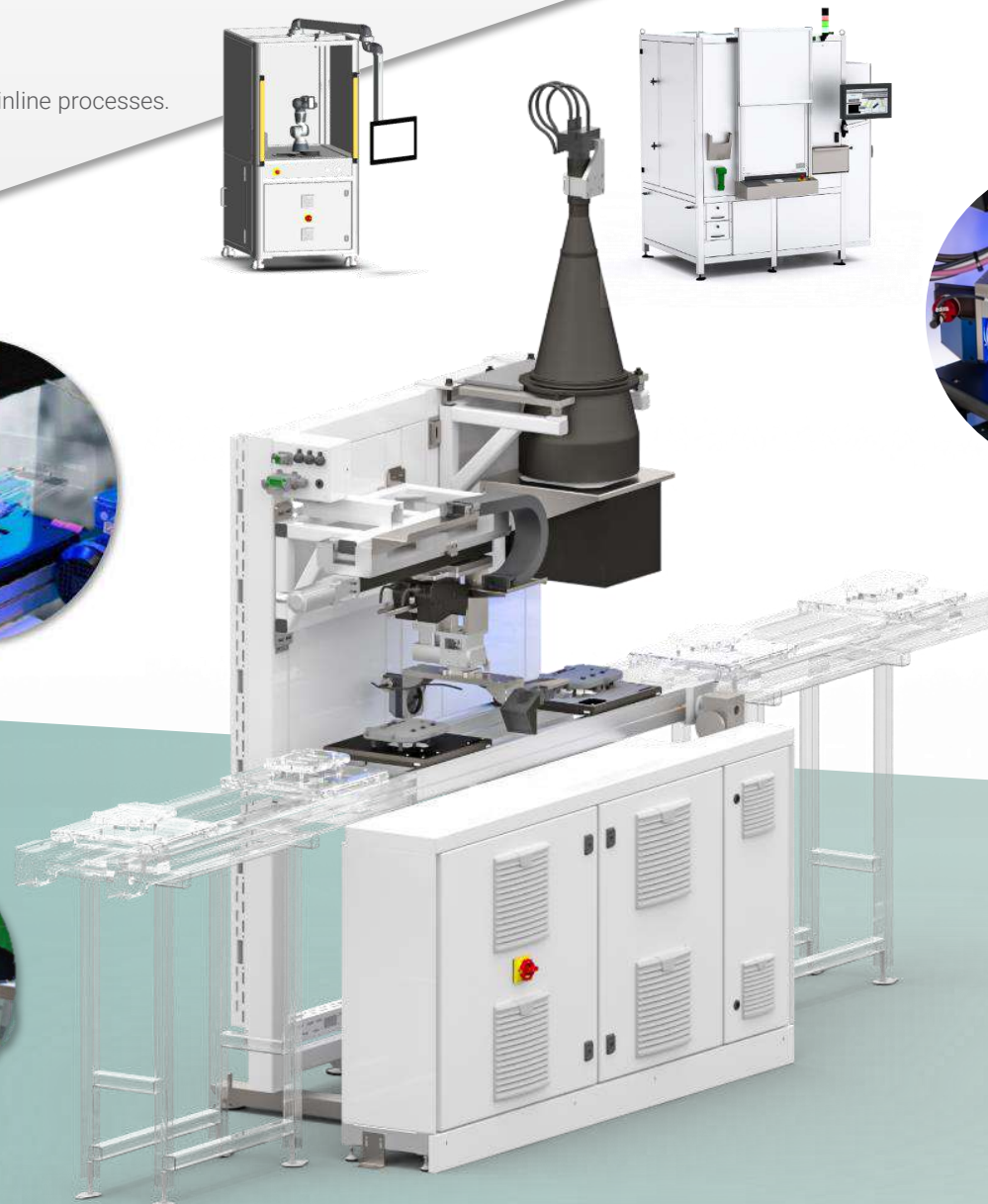
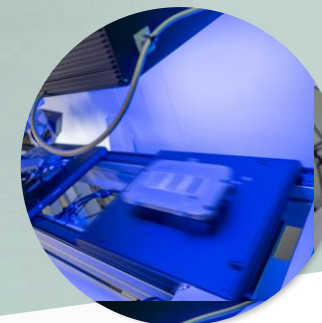
Precise

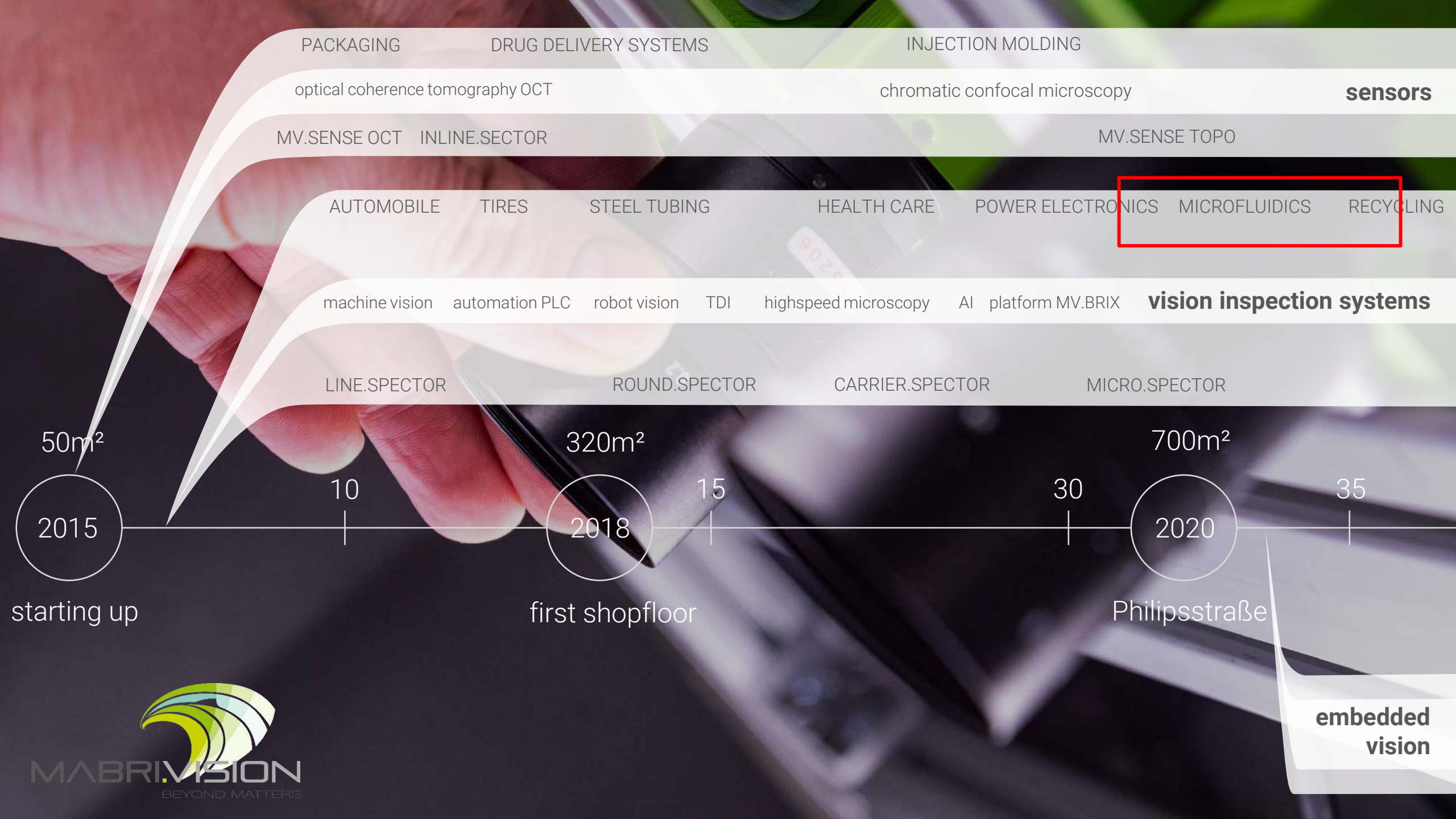
We provide calibration standards based on ISO 10012. This allows highest quality for inspection systems.



Speed and cycle time

All processes and processing times are optimized for fast cycle times.





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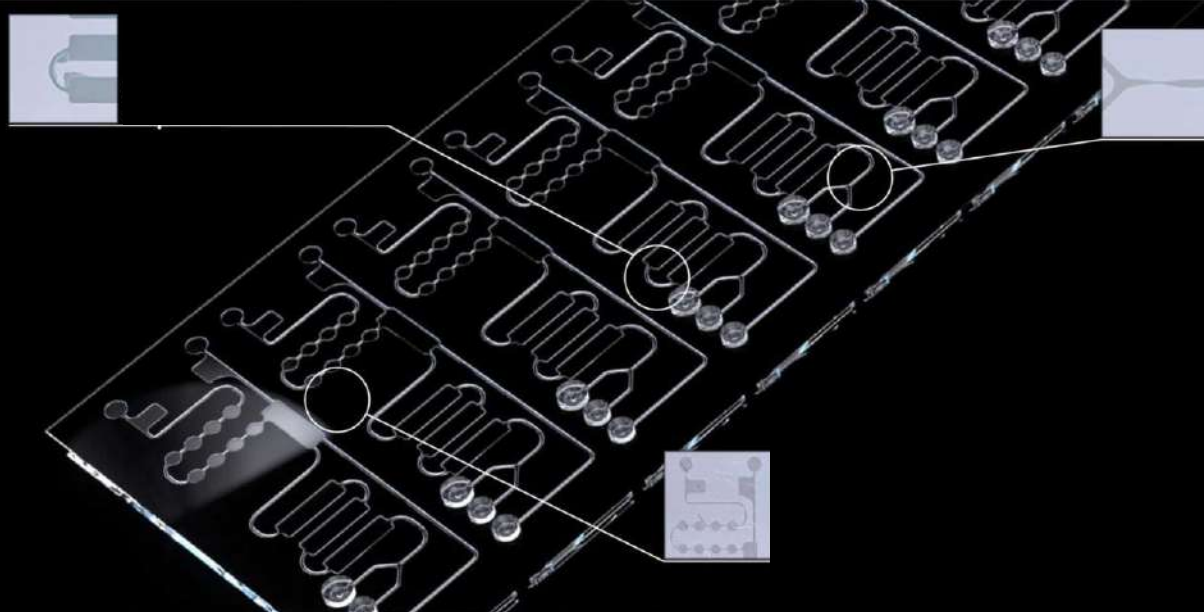
35

starting up

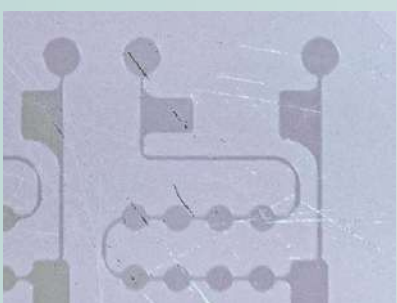
first shopfloor

Philipsstraße

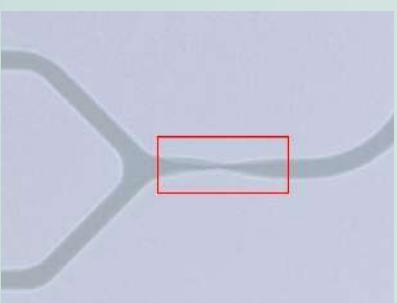
**embedded
vision**



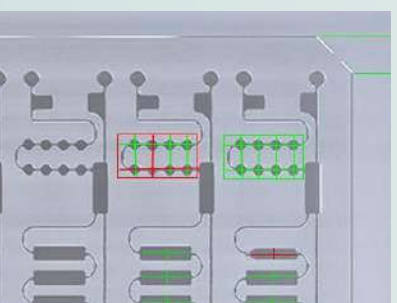
automated inspection of microfluidic devices



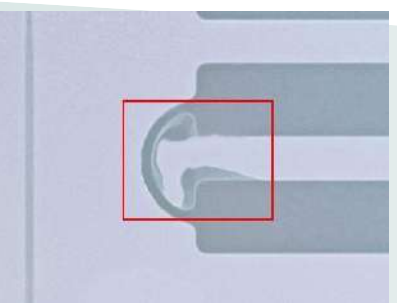
scratches & particles



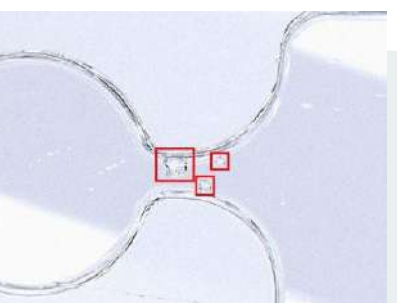
thin spots & lamination issues



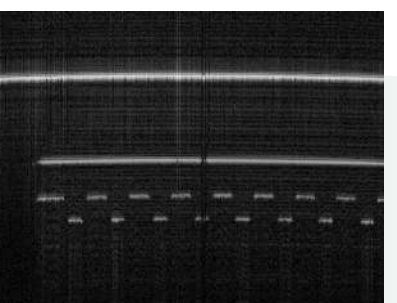
dimensional accuracy & tolerances



molding defects



particles, inclusions, air bubbles



layers, thickness, shape

QC-technologies for high precision injection molding

MABRI.VISION provides a unique set of QC-technologies and systems to improve quality of high precision injection molding processes.

From automatic scans of molds to 100% inline QC-vision systems – we detect, check and inspect.



100% product inspection

- highspeed microscopic inspection
- defect detection
- inspection of tolerances



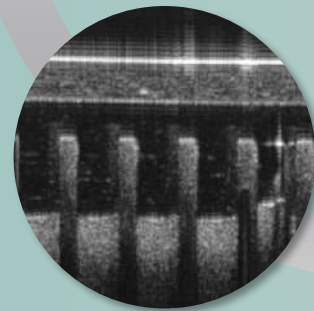
Mold manufacturing

- wafer and electroform microscopic inspection
- 3D surface inspection
- detection of defects and tolerances



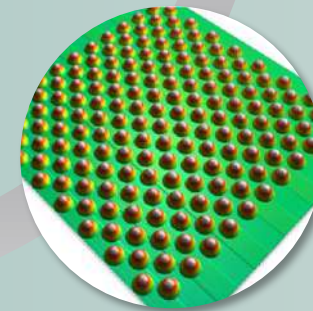
Mold inspection

- automatic microscopic inspection
- detection of defects
- detection of contamination



sample inspection of layers

- 3D layer inspection
- OCT based inspection



sample inspection surface shape

- Chromatic confocal inspection
- 3D Shape inspection
- inspection under stress

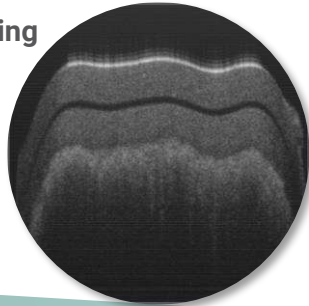
MV.SENSE OCT

tomographic layers & thickness scanner

With the non-destructive cross-sectional imaging technology, our MV.SENSE OCT imaging system is built for 3D-profiling of microstructures, layer thickness measurements and defect detection. We are specialized on developing OCT solutions for production applications.

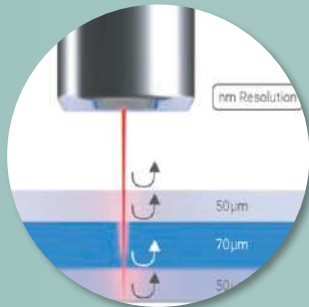
non-destructive cross section imaging

OCT generates cross sectional images like ultrasound based on light up to 240.000 scans/s



profile, layer & thickness

scan microstructure profiles and layer thicknesses of semitransparent material starting at 10µm



technology features



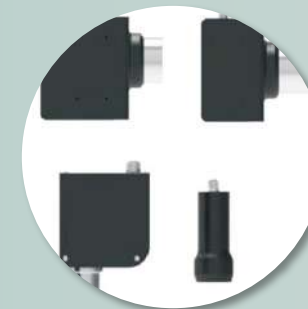
high resolution

our high resolution OCT-systems achieve 1µm z-resolution, perfect for microstructure inspection



flexible scanning optics

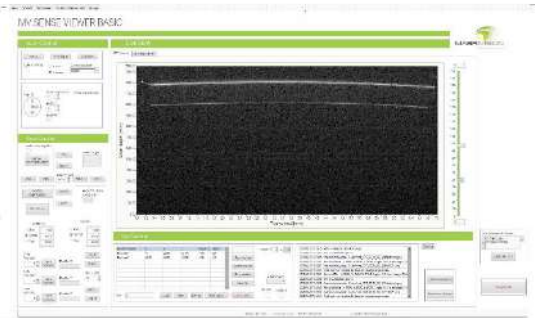
scan with point, line (flying spot) or large scanning (range up to 300mm) optics



MV.SENSE OCT

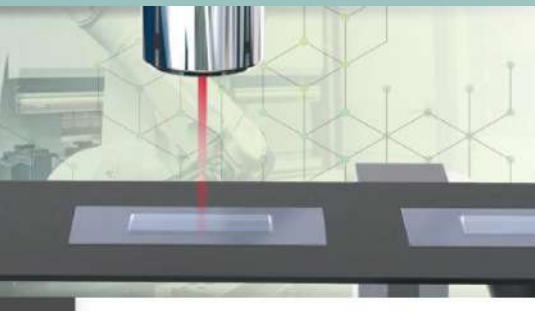
tomographic layers & thickness scanner

With the non-destructive cross-sectional imaging technology, our MV.SENSE OCT imaging system is built for 3D-profiling of micro-structures, layer thickness measurements and defect detection. We are specialized on developing OCT solutions for production applications.



lab solutions

our stand-alone lab OCT-system is perfect of lab-QC applications and hands-on OCT inspections



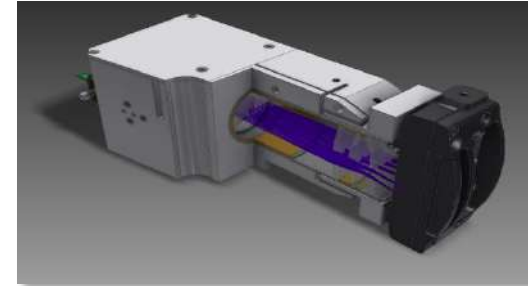
production solutions

our OCT are build for the integration in production applications in packaging, health care and more

our advantages

inhouse OCT and optics development

we develop OCT from the scratch
– optics, electronics, software



End-to-end solution builder

we are provider of end-to-end OCT-projects: consulting, development, integration, service



open platform /SDK

we provide an SDK for the integration of our OCT systems



MV.SENSE TOPO

highspeed 3D surface inspection system

Our MV.SENSE TOPO inspection system is built for high speed 3D scanning of microstructured products. We provide solutions for product handling and clamping, automation and data processing to provide end-to-end QC-solutions to your needs.

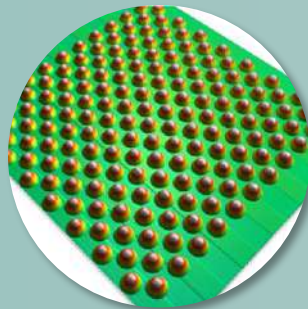
high precision

surface scan with a resolution up to 20nm, lateral 2µm

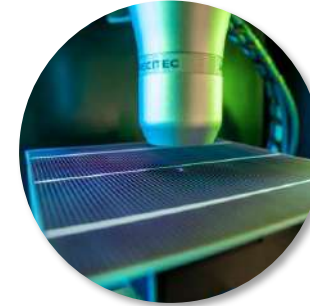
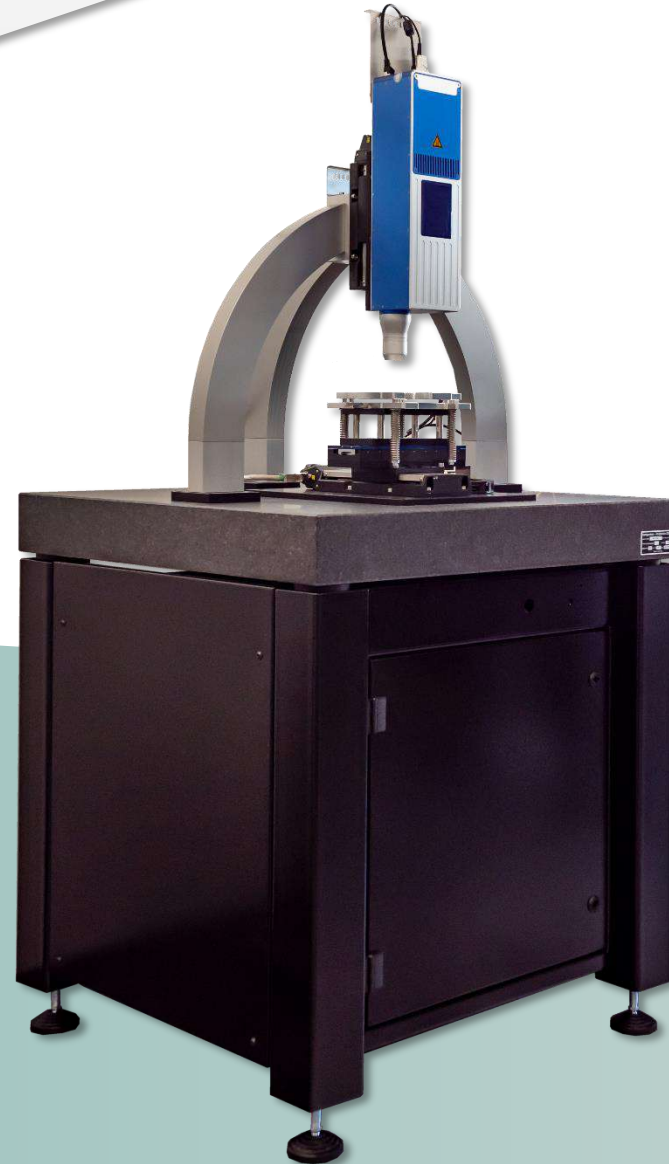


3D surface scanning

High point rate allows the inspection of microstructures like micro lenses or fluidic channels.

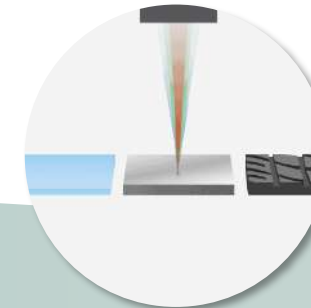


technology features



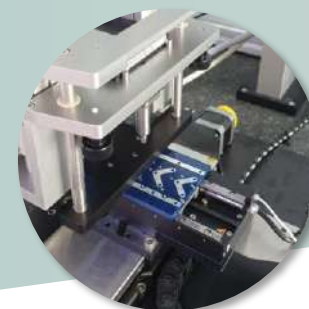
Hightspeed Inspection

Confocal sensor with up to 192 parallel lines. Up to 1.152.000 scans/s.



robust sensor technology

chromatic confocal sensors work on many materials: transparent, black, glossy, diffuse



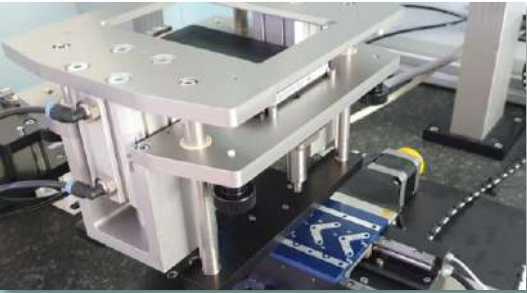
scanning of large areas

with fast scanning speeds it is possible to scan large areas, such as MTP-formats

MV.SENSE TOPO

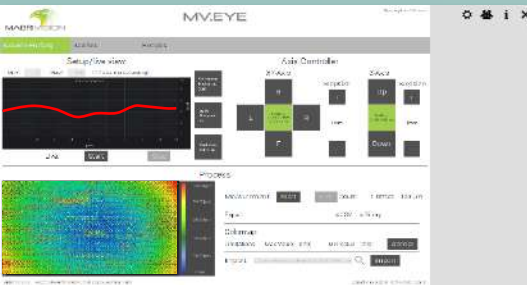
highspeed 3D surface inspection system

Our MV.SENSE TOPO inspection system is built for high speed 3D scanning of microstructured products. We provide solutions for product handling and clamping, automation and data processing to provide end-to-end QC-solutions to your needs.



custom device layout

with our platform based approach, we build QC systems to your needs



processing

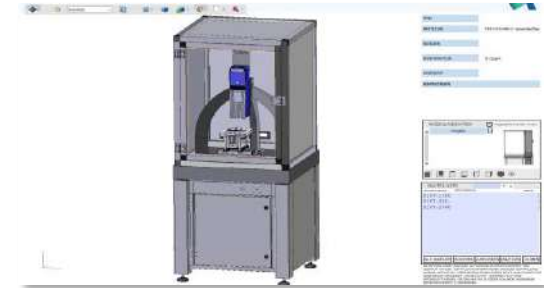
if needed, we provide software modules for custom data processing and machine vision solutions

our advantages



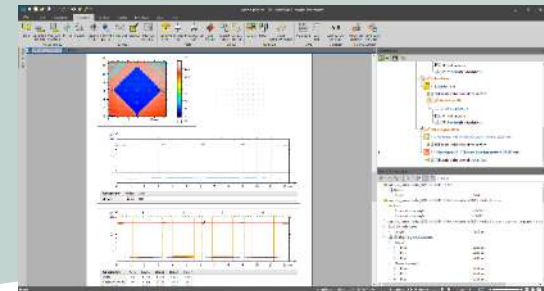
automation

we develop stand-alone solutions and systems for automatic in-process QC



interfacing & QC-reports

all data is stored in standard formats, this makes QC-reporting easy in surface analysis software as MountainsMap



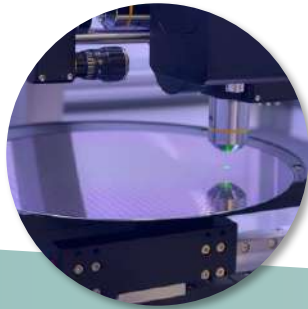
MICRO.SPECTOR W11

High precision surface inspection system

Our MICRO.SPECTOR W11 inspection system is built for a high resolution inspection of surfaces and microstructures. With our AI based anomaly detection software, we detect smallest defects and particles. The system is set up for clean room operation.

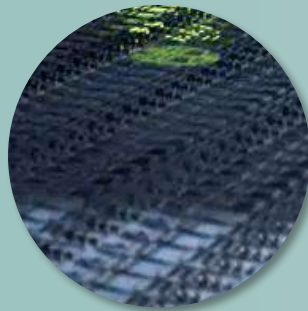
high resolution

with our standard 10x microscopic lens we achieve a pixel resolution of 0,48µm



multi layer surface imaging

the system is set up to inspect multiple layers, like top and bottom layers in microfluidics

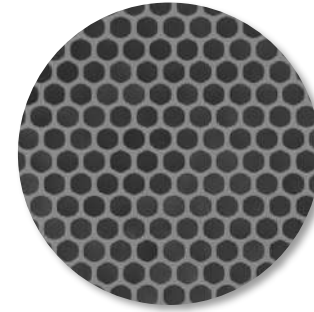


technology features



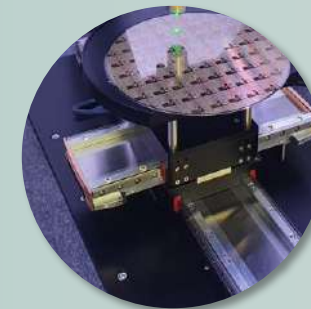
auto focus algorithm

to overcome the challenges with a very small focal depth in microscopy, we implemented an auto focus algorithm



scanning of large areas

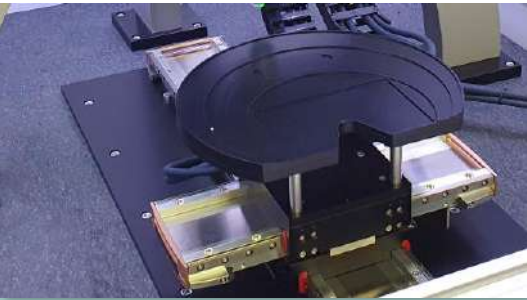
with our MV.SENSE xyz-platform it is possible to perform microscopic imaging and inspection of large surfaces



MICRO.SPECTOR W11

High precision surface inspection system

Our MICRO.SPECTOR W11 inspection system is built for a high resolution inspection of surfaces und microstructures. With our AI based anomaly detection software, we detect smallest defects and particles. The system is set up for clean room operation.



modular platform

with our platform based approach, we build QC systems to your needs



inspection software

if needed, we provide software modules for custom data processing and machine vision solutions and handle large images sizes.



our advantages

automation

we automate the data acquisition, data processing and product handling



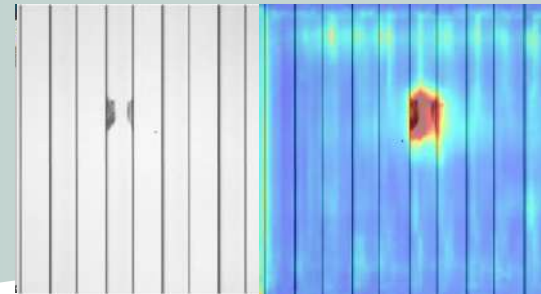
integration

the MICRO.SPECTOR is set up for clean room integration. We provide all common industrial communication standards



AI-based anomaly detection

all data is stored in standard formats, this makes QC-reporting easy in surface analysis software as MountainsMap



MICRO.SPECTOR MI1

Highspeed microstructure inspection

The MICRO.SPECTOR MI1 inspection systems is built of fast inspection of microstructures parts for semiconductor and diagnostics applications. The automation system is scalable And provides fast throughputs.

technology features



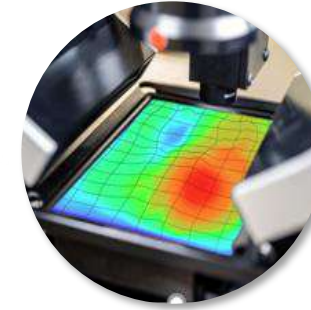
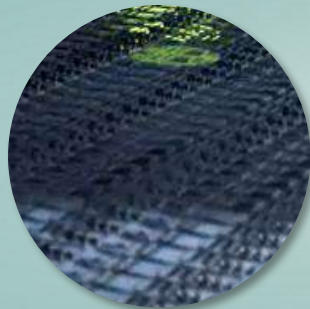
fast imaging technology

we integrated the TDI line scanning camera to maximize the imaging speed on a microscopic scale



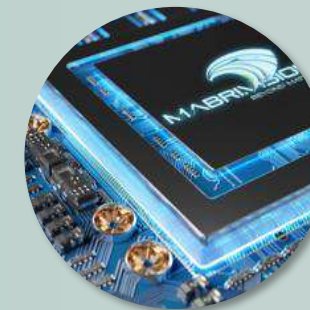
high resolution

most common lens setup reaches 0,75 $\mu\text{m}/\text{px}$ with 17.824 px line



on the fly auto focus

integrated surface sensor for surface shape detection



Neuronal networks

To process the high quantity of data we use GPU computing and neuronal networks.

MICRO.SPECTOR M11

High precision surface inspection system

Our MICRO.SPECTOR W11 inspection system is built for a high resolution inspection of surfaces und microstructures. With our AI based anomaly detection software, we detect smallest defects and particles. The system is set up for clean room operation.

our advantages



end-to-end solution

we are the right partner, when it comes to the implementation of innovative inspection technologies – from the idea to the upscaling



QC-solutions

storing of data, results, audit trail, change log,..



automation

the system is designed for automatic inspection on the large scale 100k+ parts/year



inspection software

for defect detection we integratedd a powerful AI anomaly detection tool. Our software platform MV.IMAGING is signed as a modular toolbox



IN PRODUCTION HIGHSPEED INSPECTION OF MICROSTRUCTURES

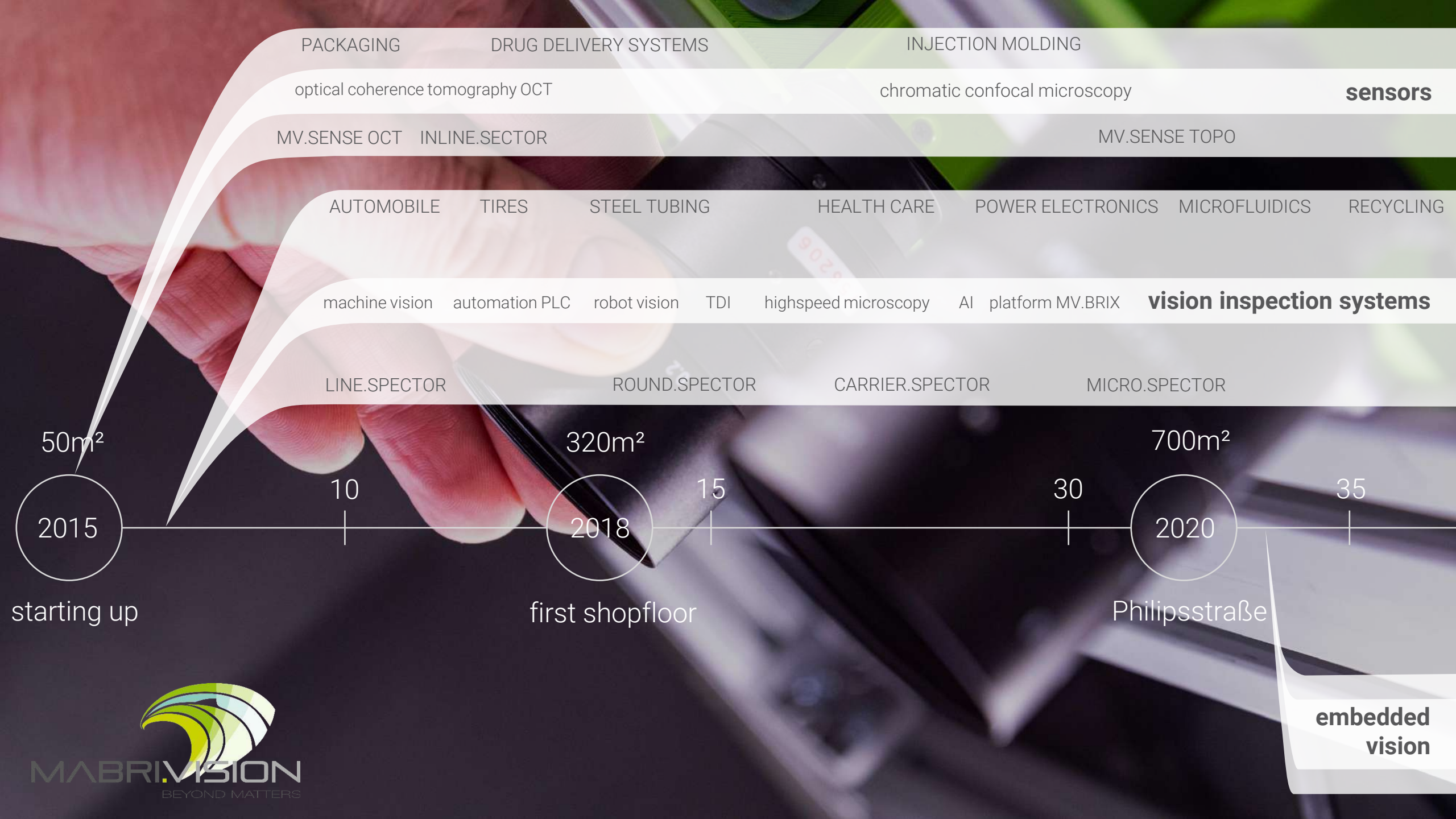


MICRO.SPECTOR M11



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robot vision

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vision inspection systems

LINE.SPECTOR

ROUND.SPECTOR

CARRIER.SPECTOR

MICRO.SPECTOR

50m²

2015

10

320m²

2018

15

30

700m²

2020

35

starting up

first shopfloor

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