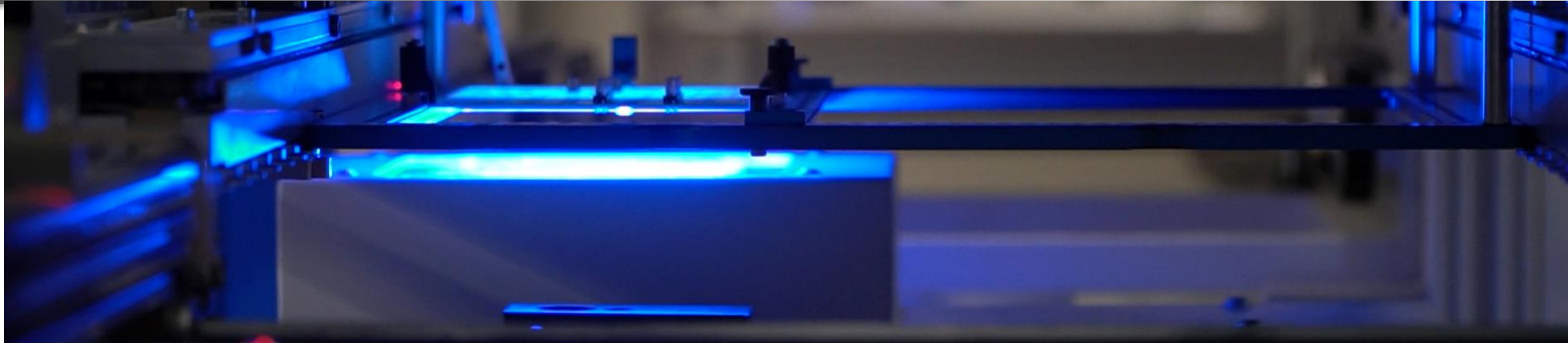




Controlled, Error-Free THT Results **SEHO Inspection Solutions**

Complete Solutions for Soldering Processes and Automated Production Lines



WHY THT-AOI

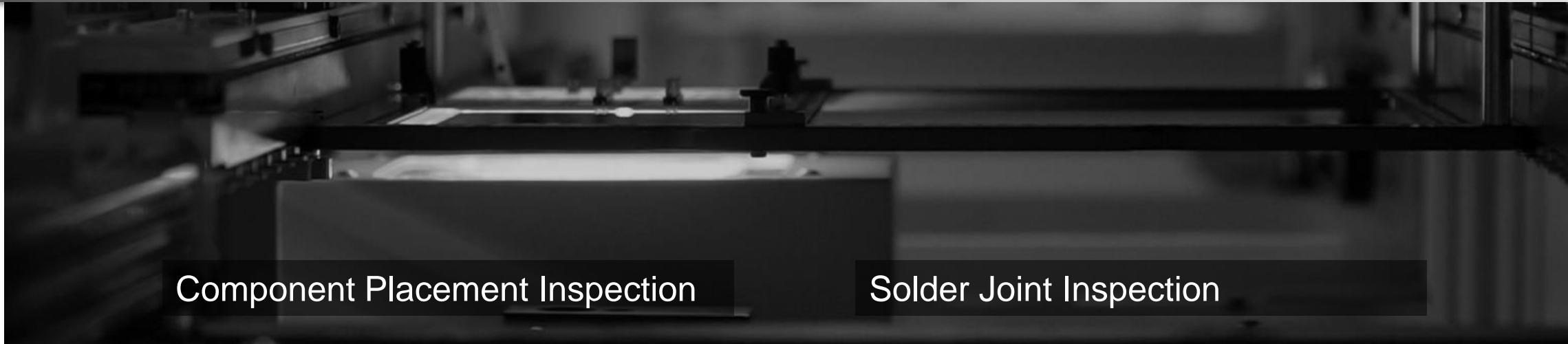
- 100% defect-free production process
- 100% documented process, independent from human biorhythm

REQUIREMENTS

- no non-detected defects at lowest possible pseudo defect rate
- cycle time
- enable cost-efficient rework
- flexible integration into the production process

THT Processes

Typical Inspection Tasks

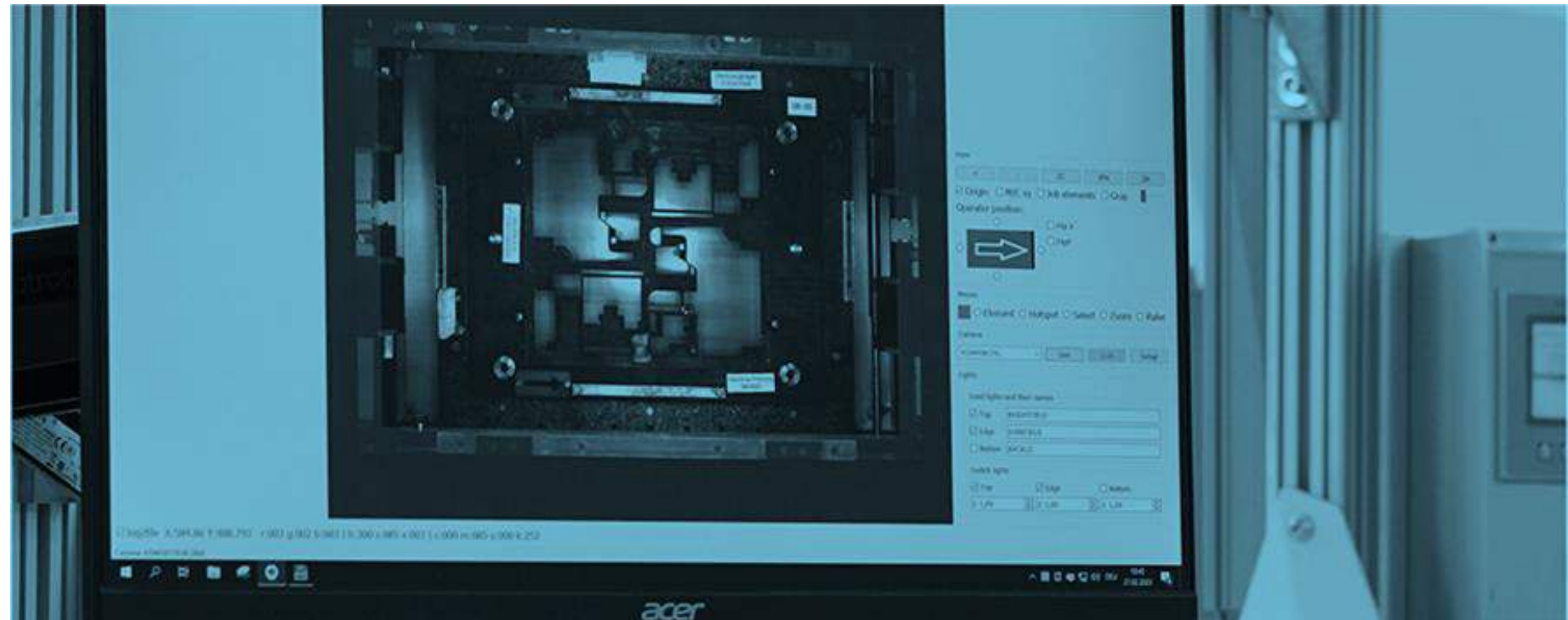


Component Placement Inspection

- presence of components
- completeness
- correct orientation / polarity
- OCV
- colour recognition and check
- reading of codes

Solder Joint Inspection

- bridges
- solder balls
- open solder joints
- insufficient wetting
- missing pin
- missing meniscus
- washed-off SMD's
- reading of product ID's



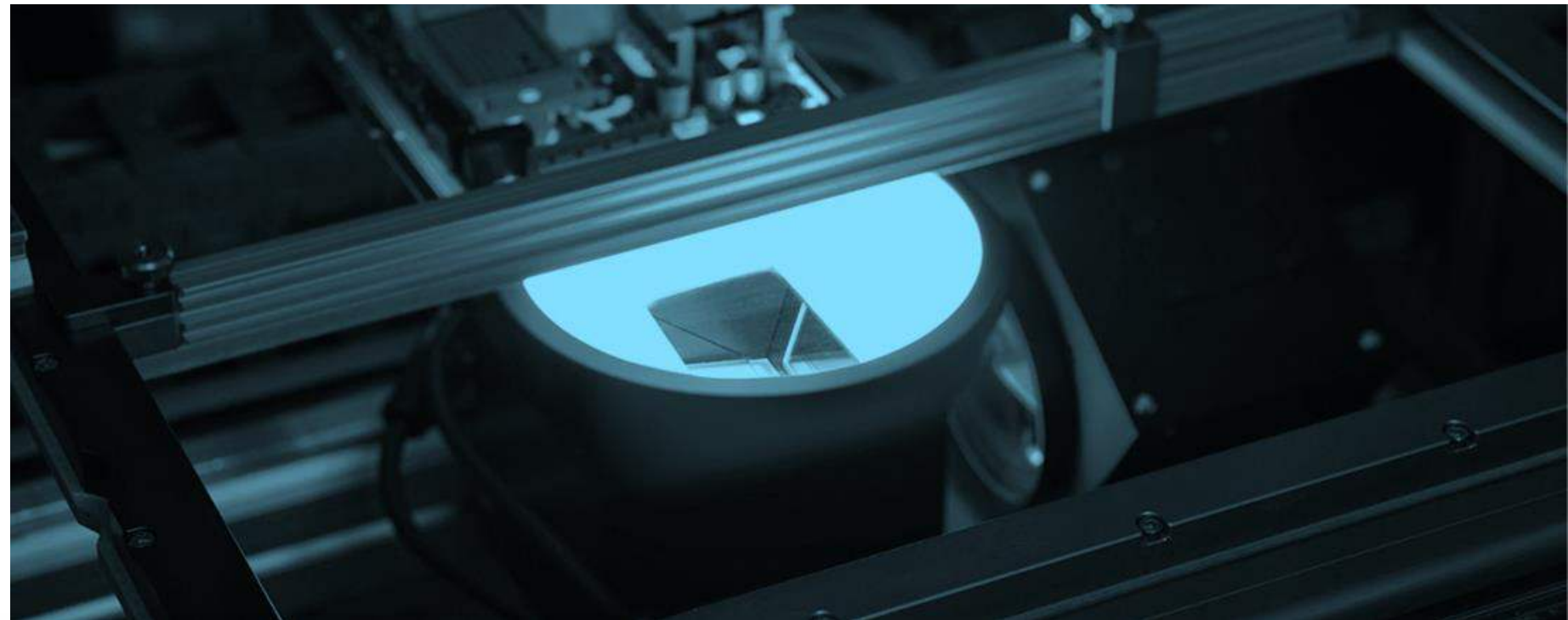
AssemblyCheck: Component Placement Inspection

SEHO AssemblyCheck Component Placement Inspection at the Workplace

Immediate feedback, whether all components are assembled correctly.

- ✓ eliminates possible errors
- ✓ significant increase in quality and yield





PowerVision: THT-AOI

PowerVision

Integrated in a SEHO Selective Soldering System

ADVANTAGES

- assemblies with defects automatically can be removed from the production line
- no additional space required
- cost-efficient: the entire handling of the assembly is made by the soldering system

Available for almost all Selective Soldering
Systems made by SEHO



SEHO PowerVision

Integrated in SEHO PowerSelective



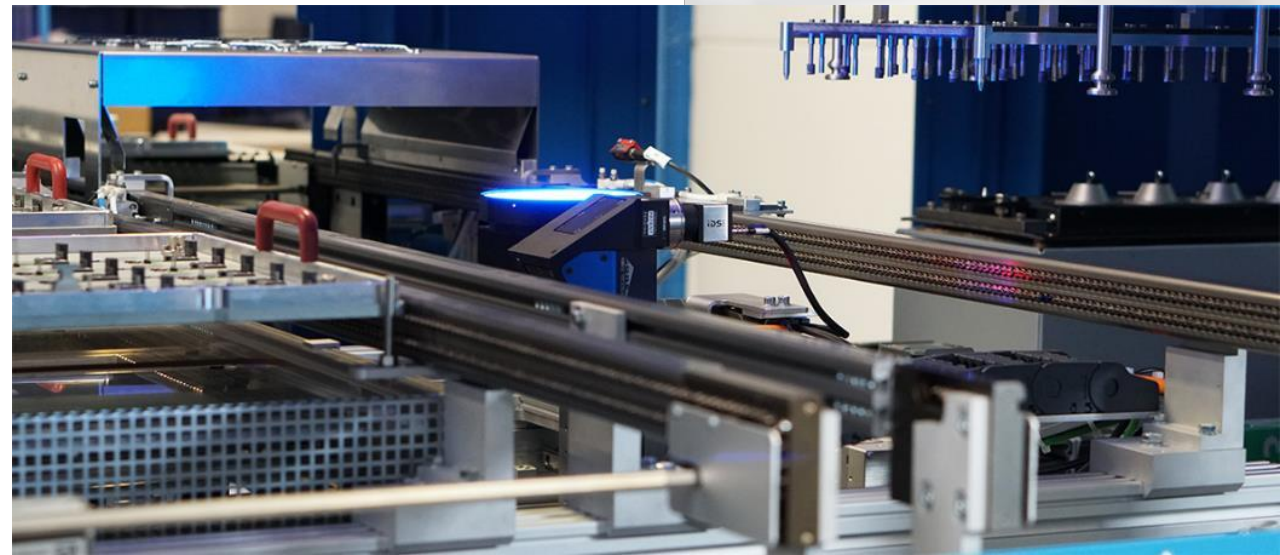
**mounted stationary
in the production cell**

for applications that are
not critical in terms of
cycle times

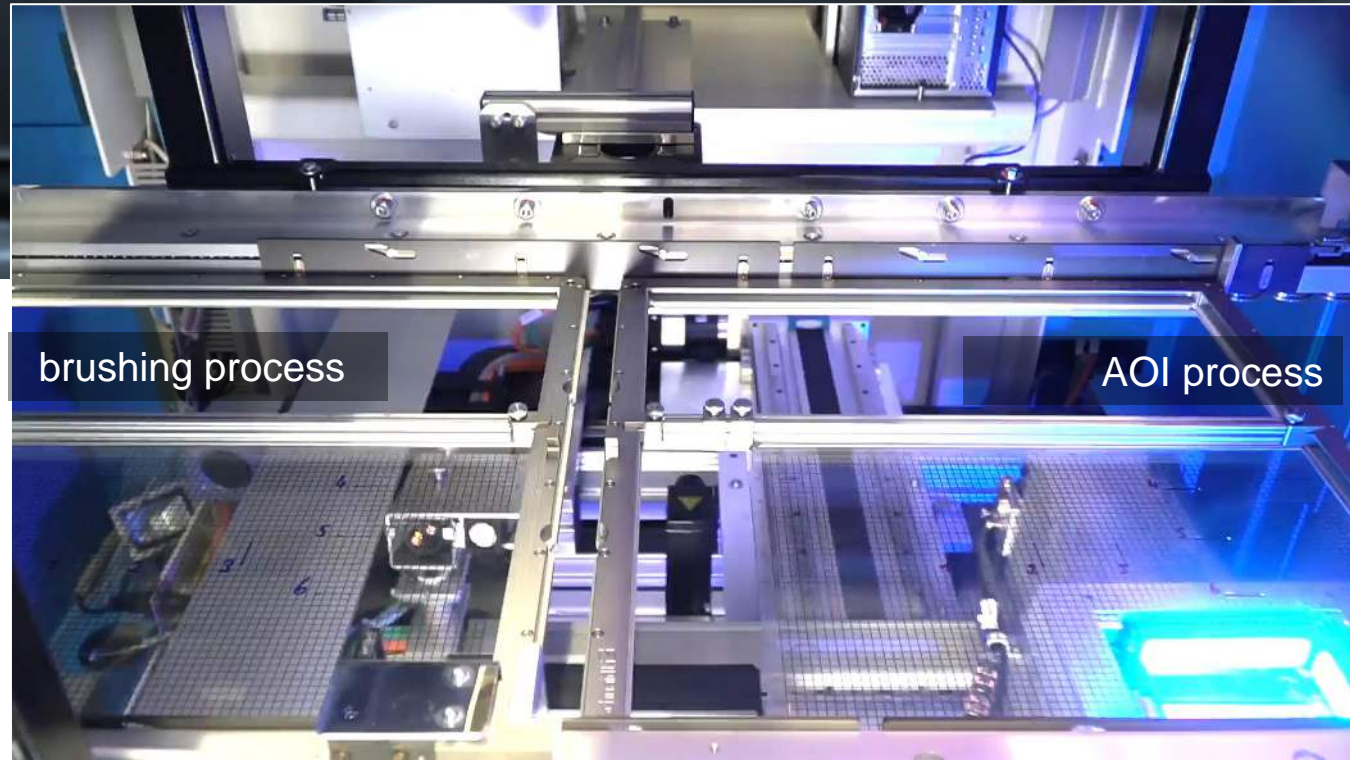


installed on separate axis system

parallel process, no influence on
cycle time



SEHO PowerVision Integrated in SEHO SelectLine

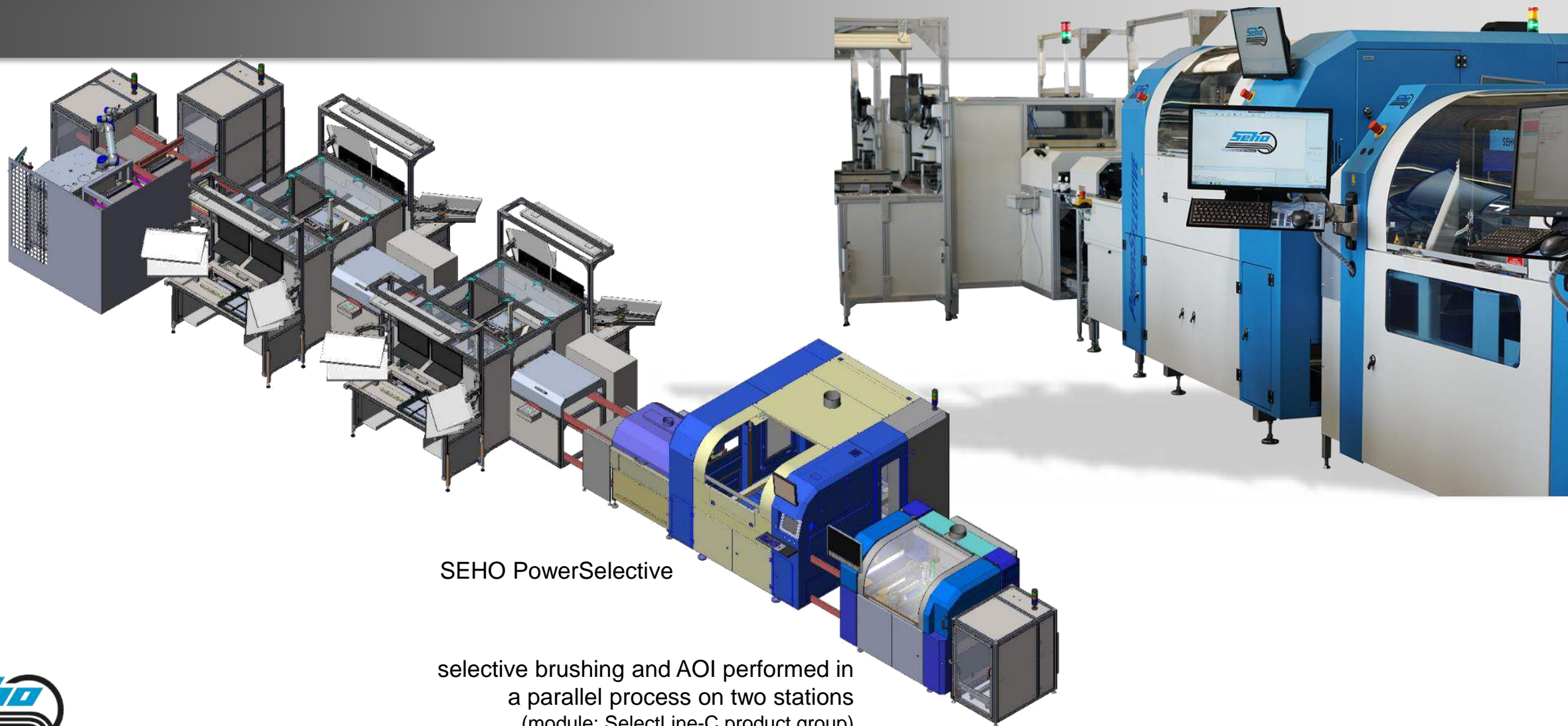


**integrated in any
SelectLine module**

- after soldering process
- after brushing process

SEHO PowerVision

Integrated in SEHO SelectLine Example



SEHO PowerSelective

selective brushing and AOI performed in a parallel process on two stations
(module: SelectLine-C product group)

SEHO AssemblyCheck | SEHO PowerVision

Integration into any THT Production Line (Wave or Selective)



Stand-Alone Module

solder joint inspection **inline** after any wave or selective soldering machine



SEHO AssemblyCheck | SEHO PowerVision

Integration into any THT Production Line (Wave or Selective)



installed in front of any wave or selective soldering system

SEHO AssemblyCheck – placement inspection at [assembly conveyor level](#)

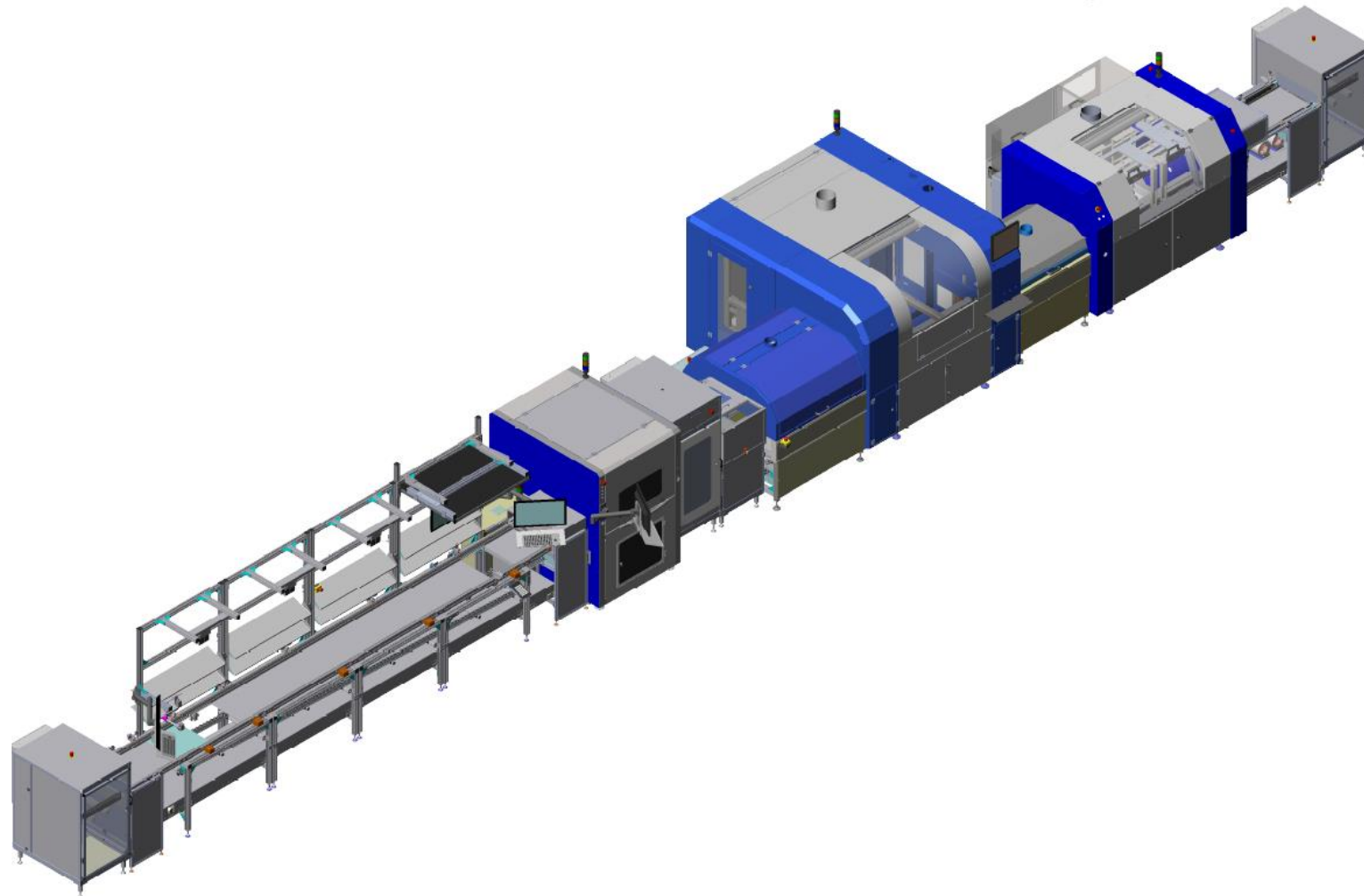
SEHO PowerVision – solder joint inspection at [return conveyor level](#)



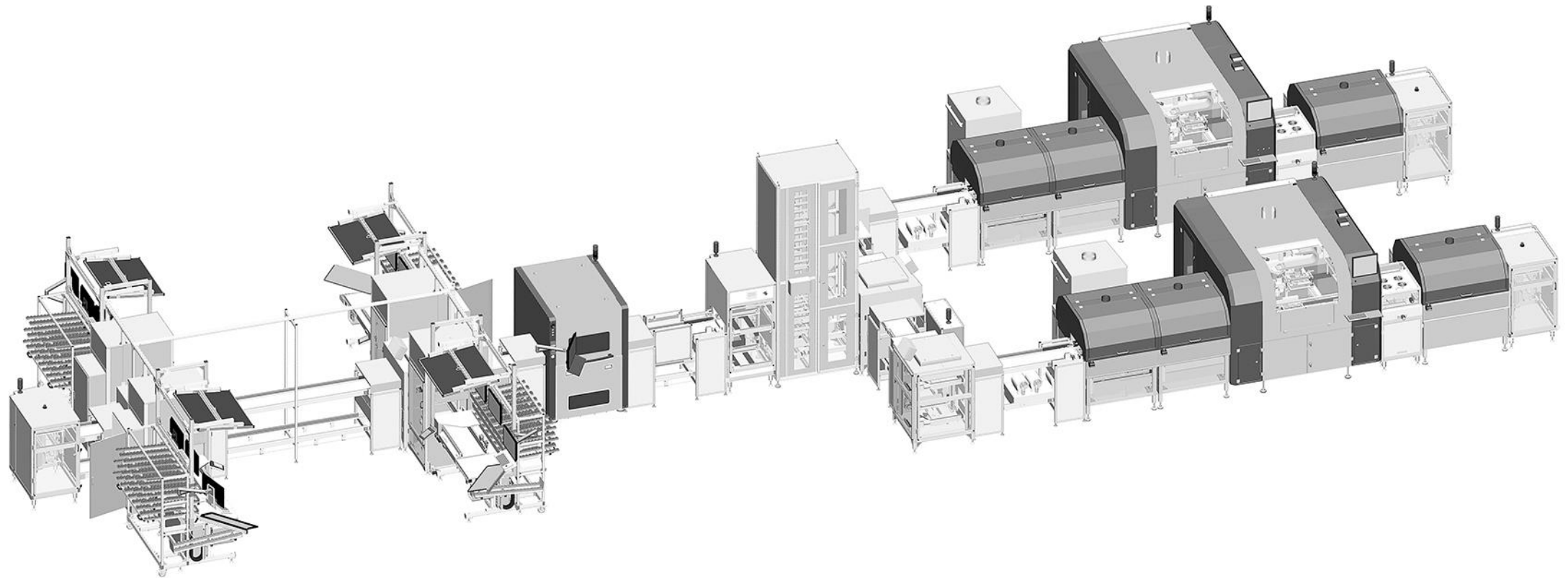
Stand-Alone Module

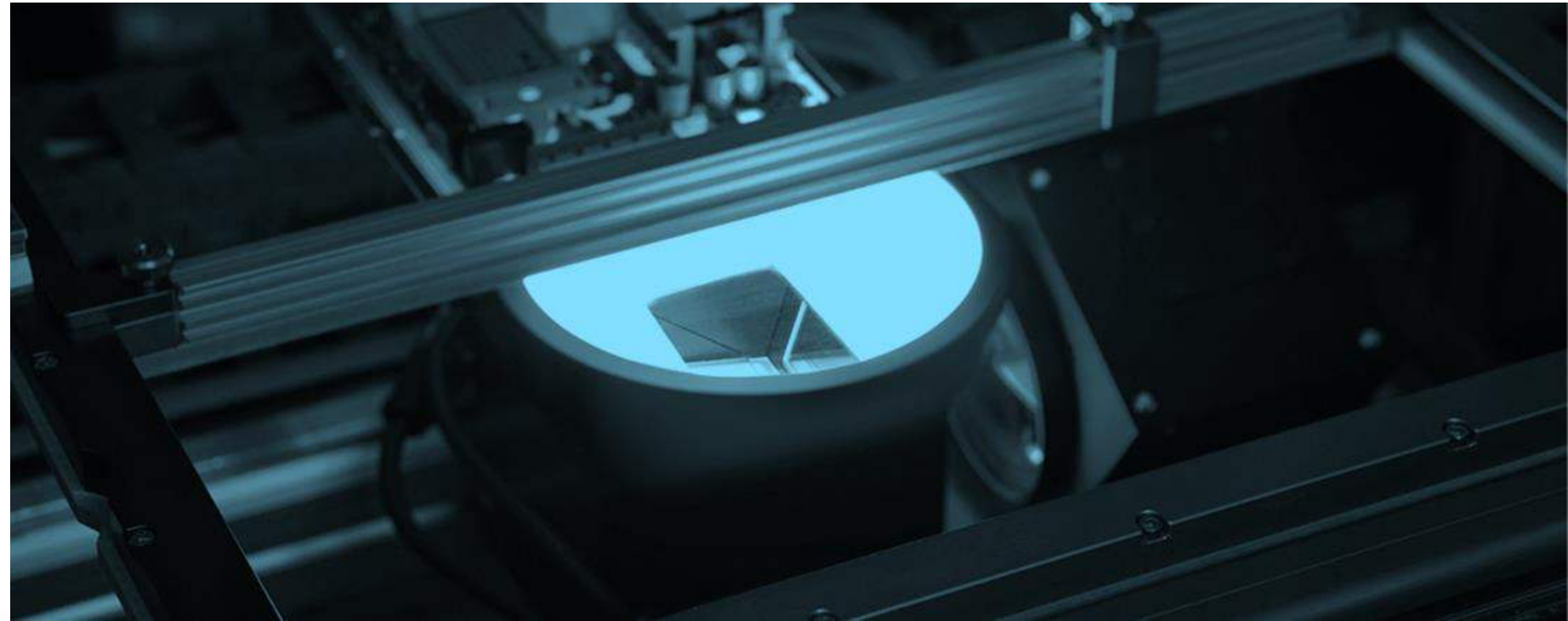
- ✓ cost saving solution
- ✓ minimal space requirements

SEHO AssemblyCheck | SEHO PowerVision Example



SEHO AssemblyCheck | SEHO PowerVision Example





Programming: Simple and Efficient

SEHO PowerVision

Programming: Simple and Efficient

- easy programming with **SEHO Offline Teach Program**: just create an additional layer for inspection
- automatic inspection search
- comprehensive component library, individually expandable

The screenshot displays the SEHO PowerVision software interface. The main window shows a PCB layout with various components and inspection points. A dialog box titled "comprehensive component library" is open, showing a grid of component shapes and their names. The interface includes a top menu bar, a right-hand control panel with various inspection settings, and a bottom status bar with a table of elements.

No.	Type	Name	Panel	Inspector type	Size A	Size B	Dir
1	Point	INSPECT_P331	Main	AOI_Messe_4	0	0	0
2	Point	INSPECT_P332	Main	AOI_Messe_4	0	0	0
3	Point	INSPECT_P333	Main	AOI_Messe_4	0	0	0
4	Point	INSPECT_P334	Main	AOI_Messe_4	0	0	0
5	Point	INSPECT_P335	Main	AOI_Messe_4	0	0	0
6	Point	INSPECT_P336	Main	AOI_Messe_4	0	0	0
7	Point	INSPECT_P337	Main	AOI_Messe_4	0	0	0
8	Point	INSPECT_P338	Main	AOI_Messe_4	0	0	0
9	Point	INSPECT_P339	Main	AOI_Messe_4	0	0	0
10	Point	INSPECT_P340	Main	AOI_Messe_4	0	0	0



SEHO PowerVision

SEHOvision Analyzing Software

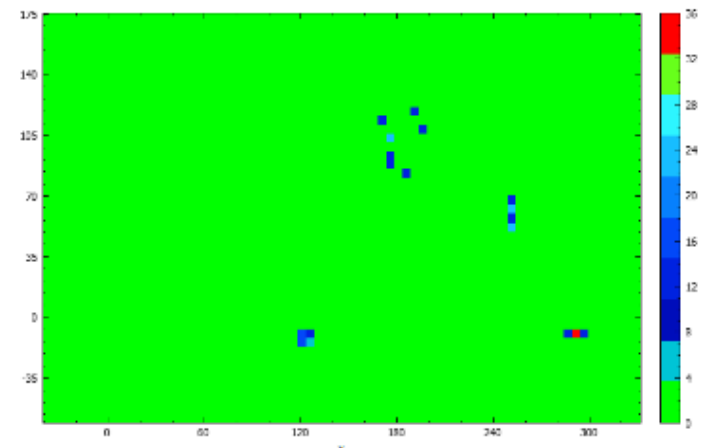


Effective Process Control

Jidoka – proactive error prevention

Trend Indicator – fast optimization of the test plan

Heatmap – fast process optimization



SEHO PowerVision

SEHOspc – Statistical Tools for Process Optimization



Data filter

User: _____

AOI program: _____

Period

From: 7/25/2014

To: 8/25/2016

Whole day
 Shift
 Time slot

Refresh Analyze

Statistical key figures

Basical key figures

Good inspections:	160
Total inspections:	1081

Key figures

False calls per million opportunities:	16443
Defects per million opportunities:	79194.6
First time pass:	14.8 %

Error classes - total

Number of errors

Error class	Number of errors
offene Loetstelle	127
[SEHO] Pseudo-Fehler	68
[SEHO] Lochwerk	66
Kurzschluss	36
Lochlugel an Pr-Ausbildung	35
Pseudo Fehler	2
[SEHO] Lochlugel an Pr-Ausbildung	1
Loch-Mensius nicht ausgebildet	1
[SEHO] Lochlugel an Pr-Ausbildung	1
Loch-Mensius nicht ausgebildet	1

defect type

Error class - offene Loetstelle

Number of errors

AOI program	Number of errors
SEHO9191EBL_1panel	34
EBHO_AOI_8	20
EBHO_AOI_4	20
EBHO_AOI_8	20
EBHO_AOI_4	20
EBHO_AOI_2	15
EBHO_AOI_5	10
EBHO_AOI_5	10
EBHO_AOI_2	10
EBHO_AOI_6	10
EBHO_AOI_5	10
EBHO_AOI_2	10
EBHO_AOI_6	10
EBHO_AOI_5	10
EBHO_AOI_2	10
EBHO_AOI_5	10
EBHO_AOI_2	6
EBHO_AOI_3	2

analysis per assembly type

Statistical key figures

statistical key figures

heat map

SIEMENSWIEN_1panel - offene Loetstelle

heatmap

heatmap

Error classes at position x=-27.1975 and y=-29.8295

Number of errors

Error class	Number of errors
Kurzschluss	2

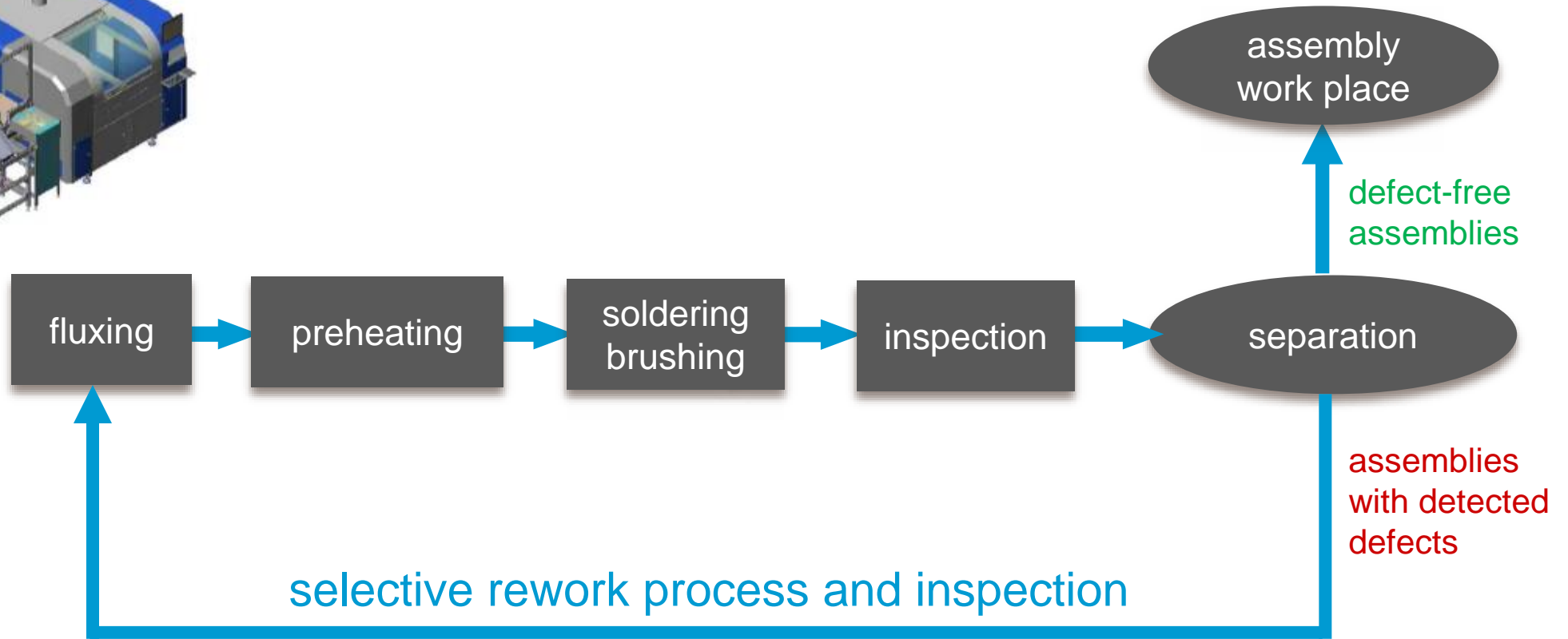
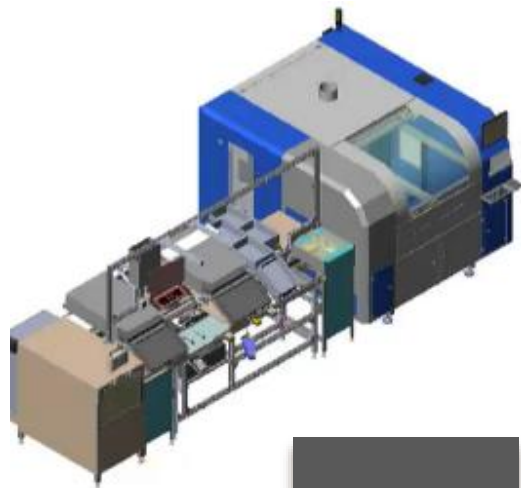
Error classes



Zero Defect Manufacturing Concepts

SEHO PowerVision

Zero Defect Manufacturing Concepts



SEHO PowerVision

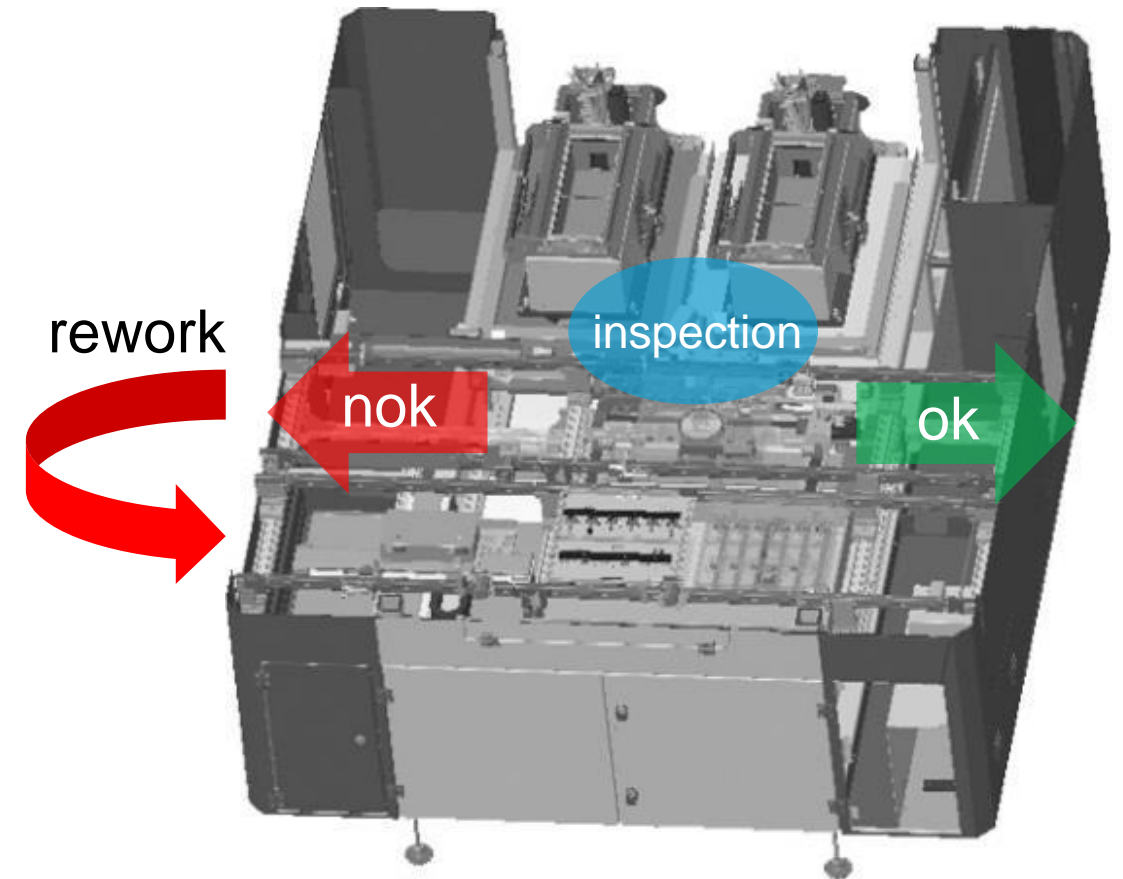
Zero Defect Manufacturing Concepts

typical production sequence

- multiwave soldering process
- inspection system in delivery position
- good parts will be transported to the right

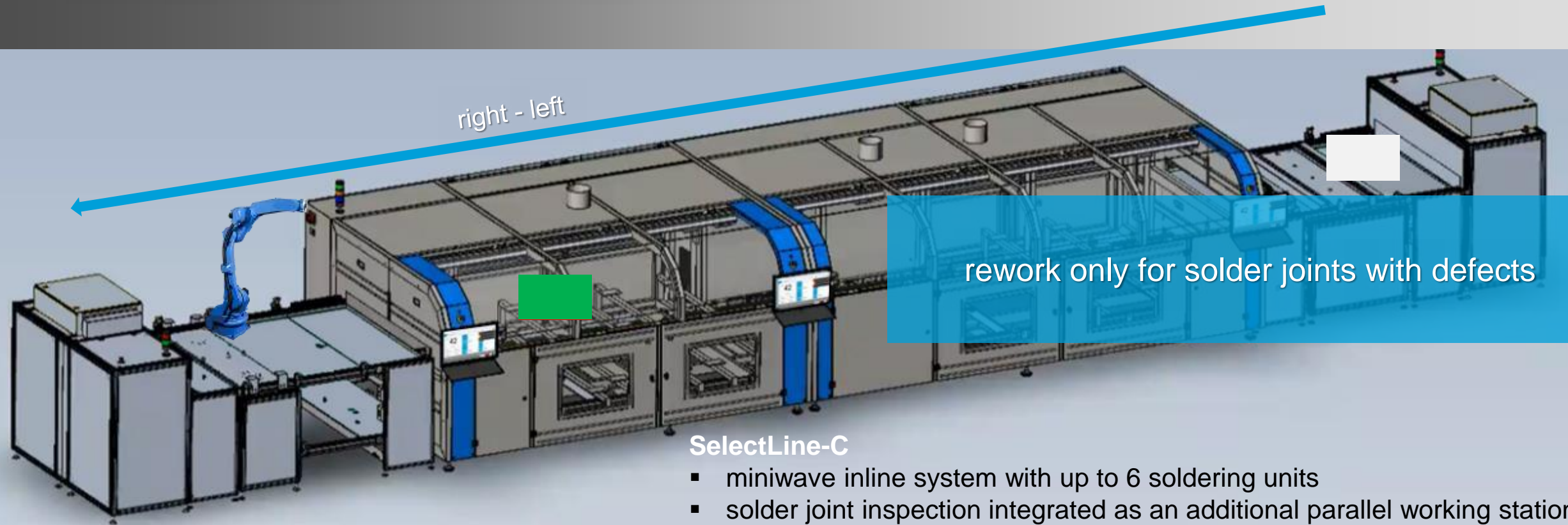
second run for parts with defects

- bad parts will be transported to the left
- software automatically creates a rework job - no verify required
- selective rework with **miniwave**
- inspection



SEHO PowerVision

Zero Defect Manufacturing Concepts

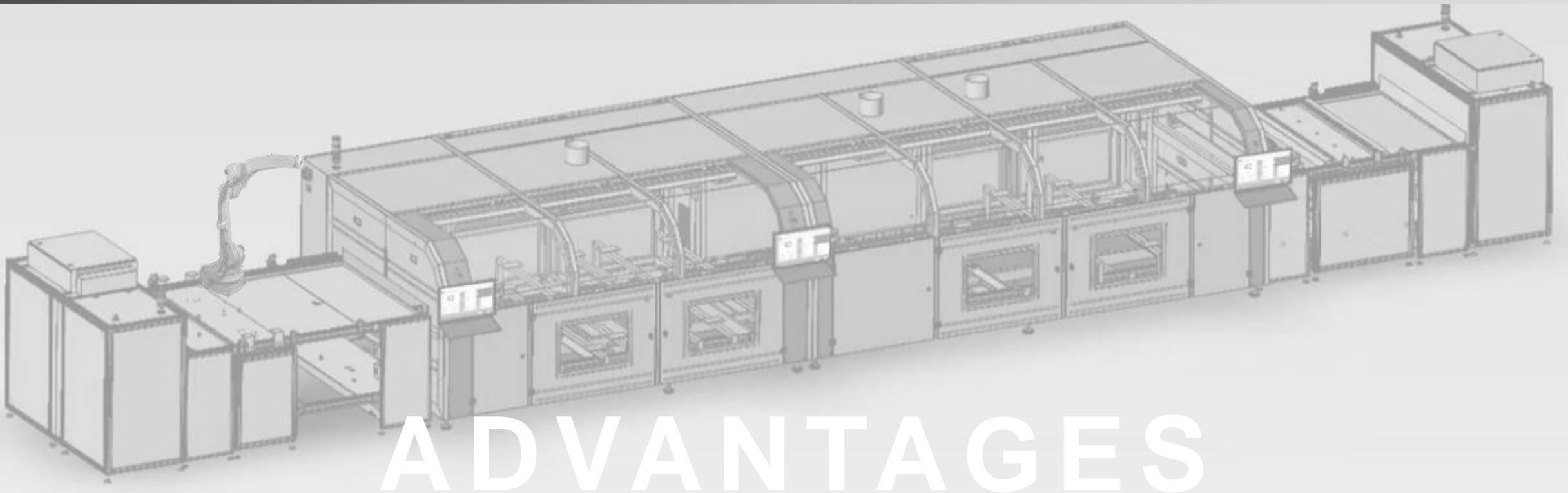


SelectLine-C

- miniwave inline system with up to 6 soldering units
 - solder joint inspection integrated as an additional parallel working station
-
- carriers with good parts:
automatically unloaded and loaded with new PCB
 - carriers with bad parts:
returned to the inlet for a second run

SEHO PowerVision

Zero Defect Manufacturing Concepts



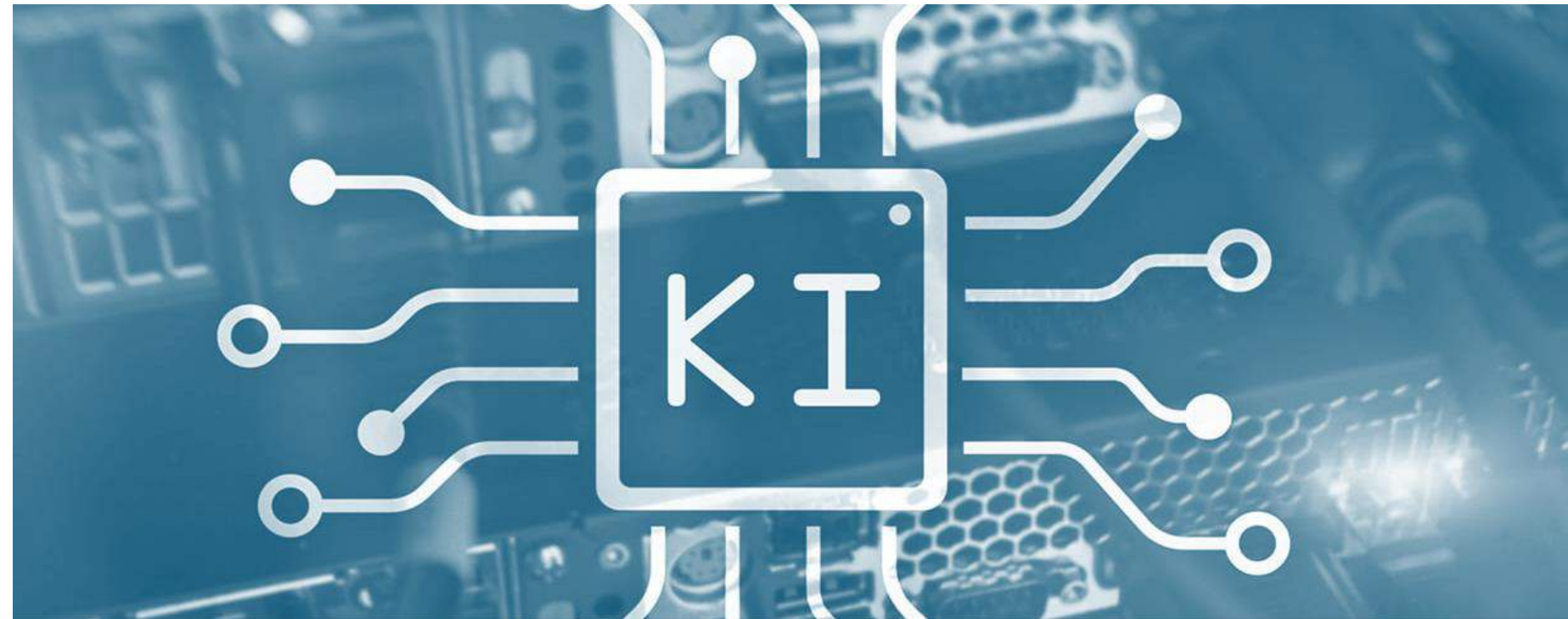
ADVANTAGES

- consistently high product quality
- optimized production costs
- no IPC-trained personnel required
- higher production speed
- complete traceability and documentation
- optimized use of resources
- scalability





Quelle: <https://gfu.de/tech-guides/geraete-mit-ki-funktionen/>



There's more to come: Roadmap

There's more to come: Roadmap Inspection Solutions

D-LEAP Distributive Machine Learning in Electronics Production

Summary

- Use of machine learning methods (ML) in the area of electronics production.
 - > ML as a key technology for artificial intelligence (AI).
- improving machines/processes through ML-based controls.
- ML allows the creation of models for complex non-linear relationships from data.



Quelle: <https://www.it-daily.net/it-sicherheit/cloud-security/ki-einsatz-in-der-it-security-ja-aber>

The overall goal of the D-LEAP project is therefore the continuous monitoring and optimization of electronics production systems and processes using ML methods.

Goal for the systems from SEHO: Software tool that independently carries out verifications.

Distributed Machine Learning in Electronics Production | D-LEAP

AI Project / AI Verify



Further Steps

- a prototype software tool for carrying out an „AI Verify“ is currently still being created
- independent verifications, with some additional information (e.g. safety value)
- testing in production: comparison between manual verify and AI verify
- **if successful: real integration**



Wave Soldering



Reflow Soldering



Selective Soldering



THT-AOI



Automation



Know How

Thank You!

We look forward to getting in touch with you.