



*That's automation.*

**Vollautomatisierte Präzision in der 3. Dimension**  
Fully automated precision in the 3<sup>rd</sup> dimension

André Bandowski

06<sup>th</sup> of May 2014

# Agenda

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1. **Short introduction into MID**
2. **Brief overview of company XENON**
  - XENON Facts & Figures
  - XENON Business fields
3. **Experience from the MID production**
  - General MID portfolio
  - Special MID solutions
4. **Precision assembly module**
  - SPACE 400
  - Exemplary modular scalable assembly line
5. **Contact Information**



# 3D MID



3D MID ... Molded Interconnected Devices  
*(assembled e.g. with resistances, condensers,  
diodes, LEDs, passive and active chips)*

## 3D MID

- Molded parts with integrated conductive pattern

## Technology

- Production of molded part
- Structuring
- Metallization
- Placement

## Advantages

- 3D Design Flexibility
- Economization
- Environmental Sustainability



# XENON Facts & Figures



## Facts and Figures

### Foundation

- 1990

### Employees / Turnover

- 168 / Euro 21.0 million (2013)

### Machines

- > 1.000 worldwide

### Business

- Planning, engineering and manufacturing of customized turn-key assembly lines for the automation of production processes

### Customer Parts

- Mechatronic systems, sensors, precision electro-mechanical components, metal-plastic hybrids, contact systems, connectors, solar cells and solar modules

### Locations

- Dresden (DE), Hong Kong (HK), Suzhou (CN)



# XENON Group | Production Plants



➤ XENON Automatisierungstechnik GmbH in Dresden / Germany



➤ XENON Automation Technology (Suzhou) Co., Ltd. / China



# XENON Business fields



➤ Sensors



➤ Mechatronics



➤ Connectors /  
Contact Systems



➤ 3D MID



➤ Membranes



➤ Metal-Plastic  
Hybrids



➤ Solar Cells /  
Solar Modules



➤ Medical  
Products



Assembly  
Lines



Inspection  
Lines



Injection Molding  
Automation

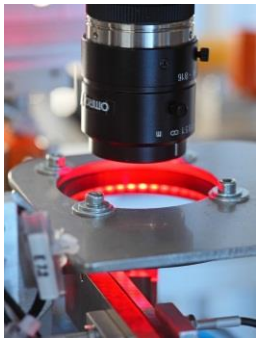


Packaging  
Technology

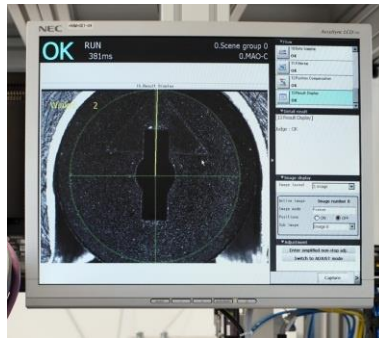


# Example for electronics assembly

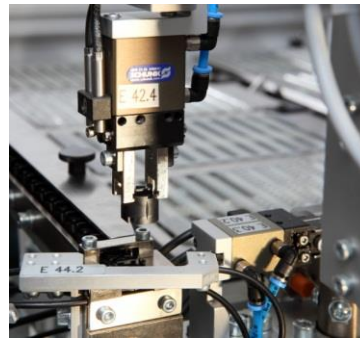
## Full automatic Production Line for Optical Sensors



Camera System



Position Identification



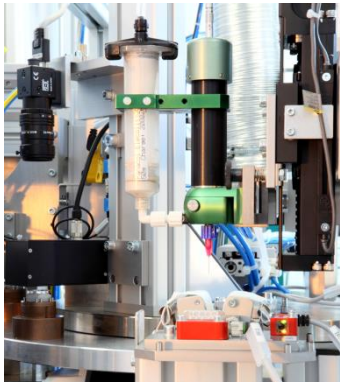
Precision Assembly

- Camera guided assembly on printed circuit boards
- Handling of optical elements
- Plastic laser welding
- Laser soldering



# Example for electronics assembly

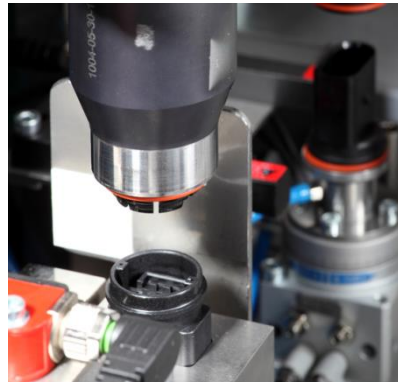
## Automatic Assembly and Inline Inspection of Pressure Sensors



Dosing



Bonding

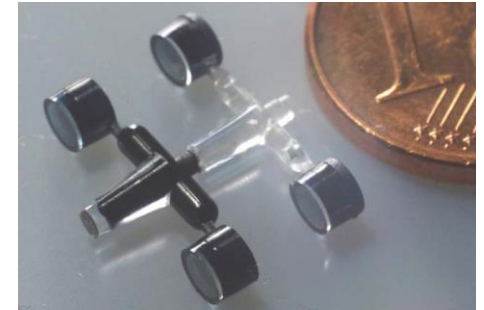
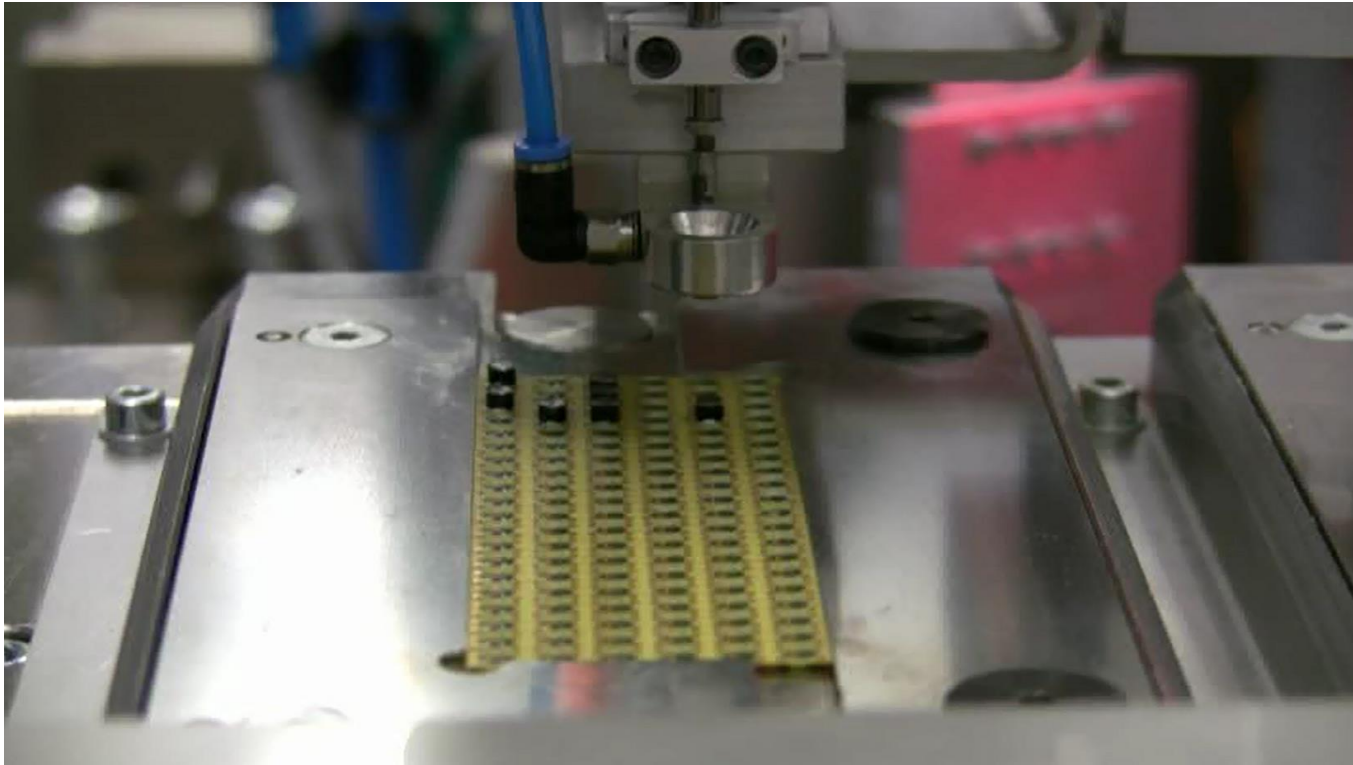


O-Ring Assembling

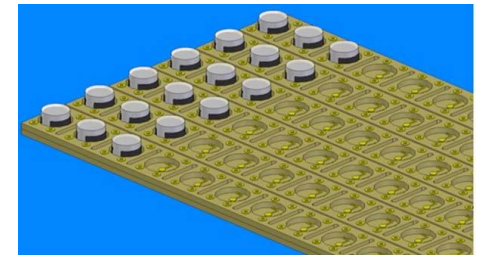
- Dispensing, Bonding
- Force displacement monitoring joining
- Read/description of ASICS



# Example for micro mold and assembly



Injection molded part



2D Substrate array

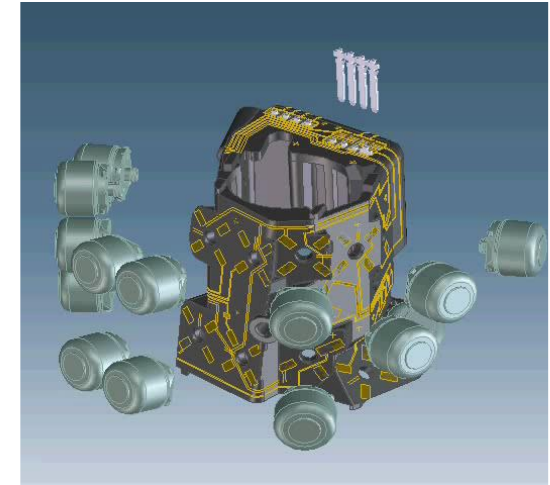


# Reference – MID assembly line



Production line for 3D-MID combi switches

- 6 different products / 50 versions, universal upgradeable
- New transfer system with manipulable work piece carriers
- 6-axis-industrial robots controlled by 3D vision systems
- Software based change over by host computer, one-piece-flow functionality
- Product data logging with part-tracking (DMX-Code)



Versions of combi switches



# General MID portfolio



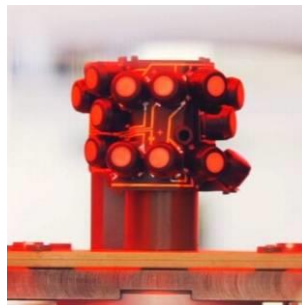
- Quality check of incoming parts (check of the metallization)



- Placement of SMD and special components



- Insertion of contact pins (integrated connector)



- AOI of soldered MID parts
- Check presence of components



- Dispensing of soldering paste with subsequent optical inspection



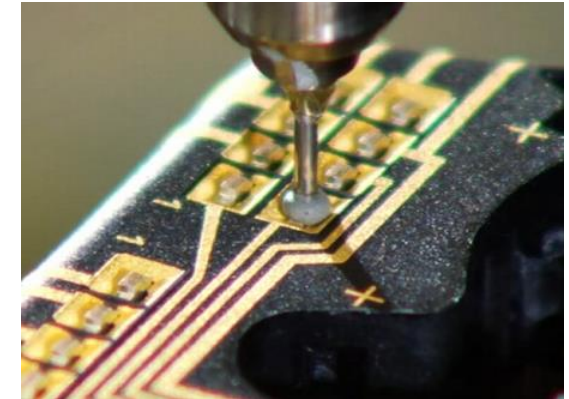
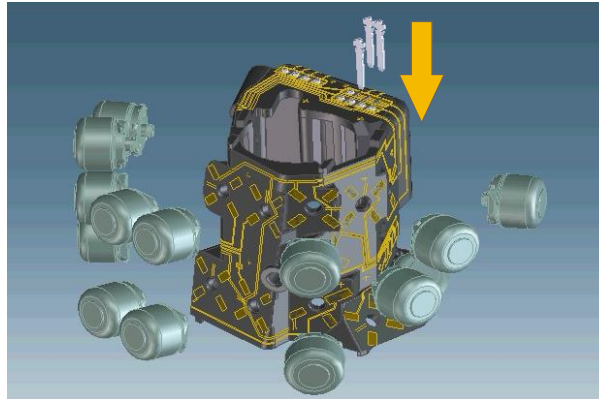
- Electrical final test
- Mechanical final test



## Special MID solutions – Contacting of MID



Module for insertion of contact pins



### Insertion of contact pins (integrated connector)

- Feeding of contact pins from bulk material or stamping strip
- Insertion of contact pins via cam driven high performance insertion head (flexible insertion of  $\geq 2$  pins/sec)
- Dispensing of solder paste onto contact pins and subsequent soldering for proper connection to MID



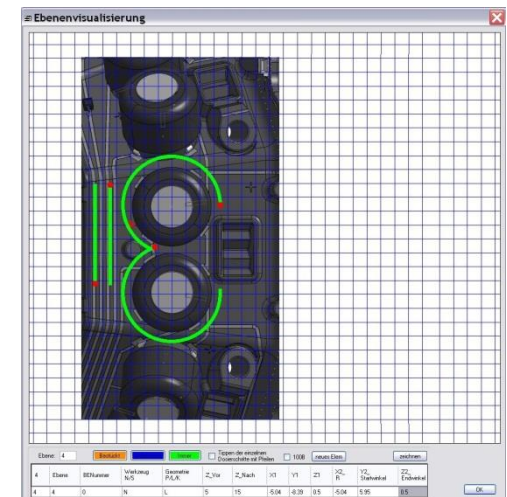
# Special MID solutions – Protection of MID surface



Module for application of protective paint

## Coat application of protective paint

- Volumetric dispensing
- 3D work piece handling
- Curing of protective paint via heat, infrared or UV curing
- Graphical programmable interface



Programmable interface



## Special MID solutions – Product tracking



DMC for product tracking

### Product tracking via DMC

- DMC applied during metallization of the surface  
→ DMC directly connected to laser structured version of MID
- Version of MID is defined before the MID enters the assembly line and can be used for identification within every process step
- Process modules able to adjust according identified version of MID
- DMC allows one piece flow within production line instead of batch production



# SPACE 400 – Precision assembly module



SPACE 400 module

## Basic module

- Flexible configurable in-line-module
- 4-axes-portalsystem (linear direct drives)
- Workpiece manipulator for full-3D-applications
- 3D workpiece referencing
- 2 process axes with standard interface

## Integrable processes

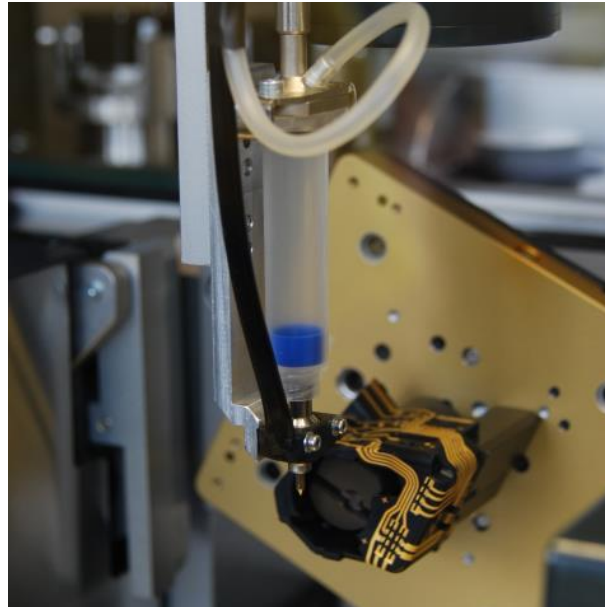
- Precision assembly  
e.g. sensor elements, optic elements
- Placement  
e.g. resistors, diodes, LEDs, chips, odd forms
- Micro dispensing  
e.g. solder paste, conductive adhesives,  
micro encapsulation



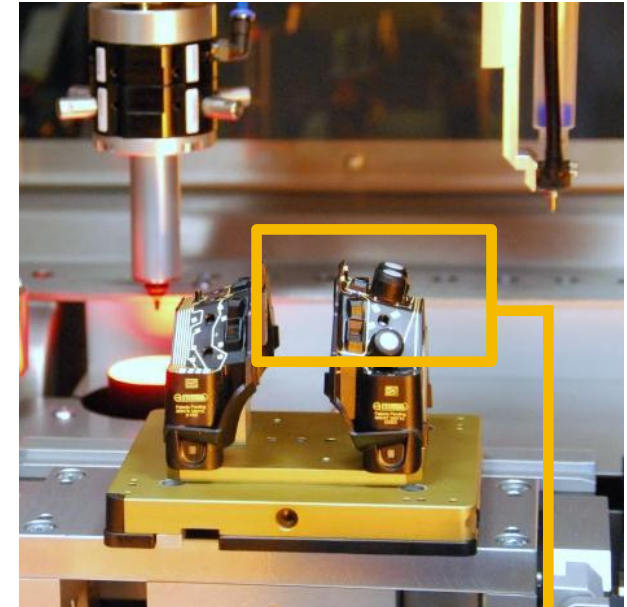
# SPACE 400 – Precision assembly module



2 process axes  
e.g. dispensing/placement



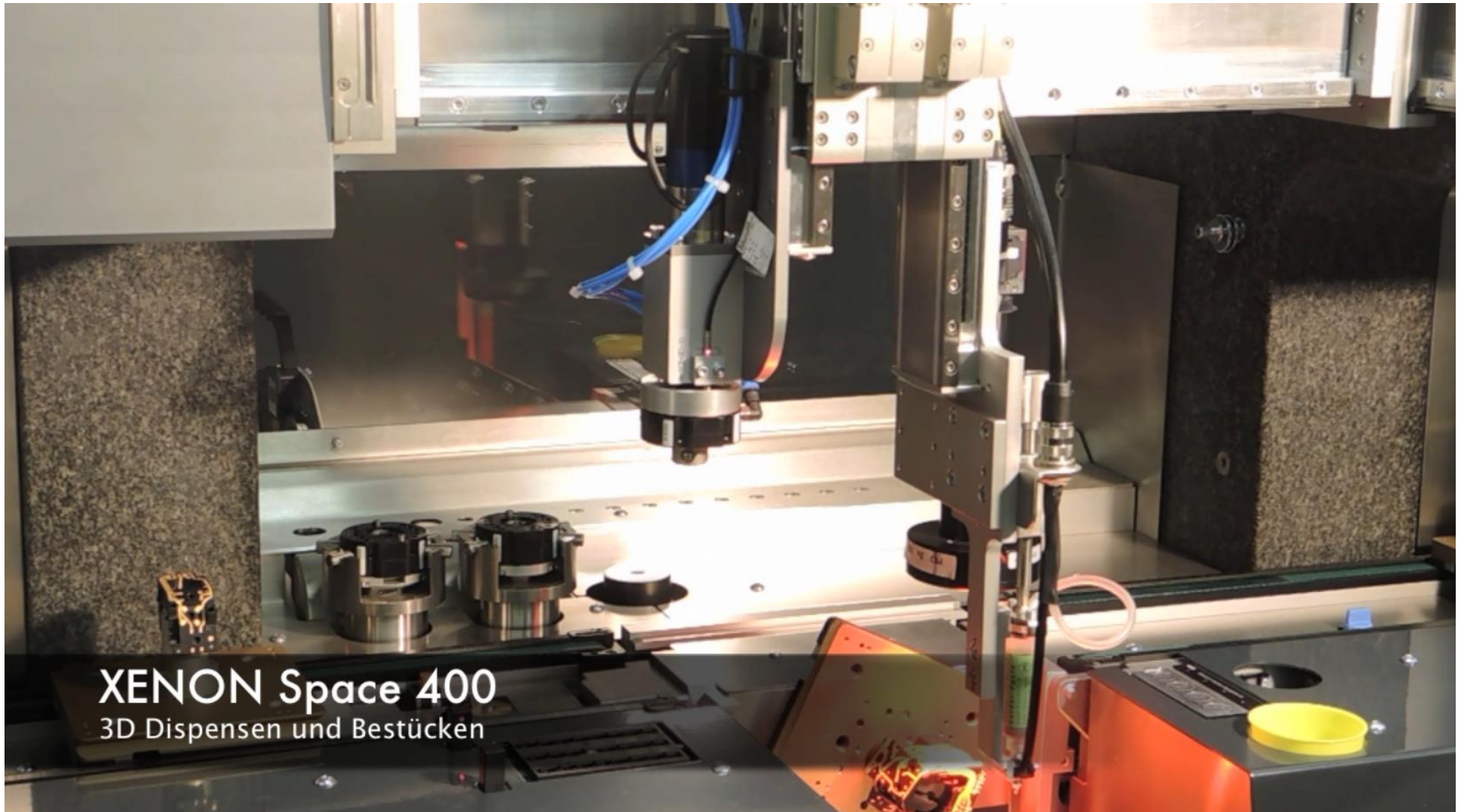
3D micro dispensing  
e.g. solder paste



3D-placement  
e.g. odd forms



# SPACE 400 – Precision assembly module



# Exemplary modular scalable assembly line

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➤ Dispensing or Placement



➤ Single module for laboratory production



# Exemplary modular scalable assembly line

➤ Dispensing and Placement



➤ Single module for laboratory production



# Exemplary modular scalable assembly line

- Manual Loading / Unloading
  - Dispensing / Placement / Inspection

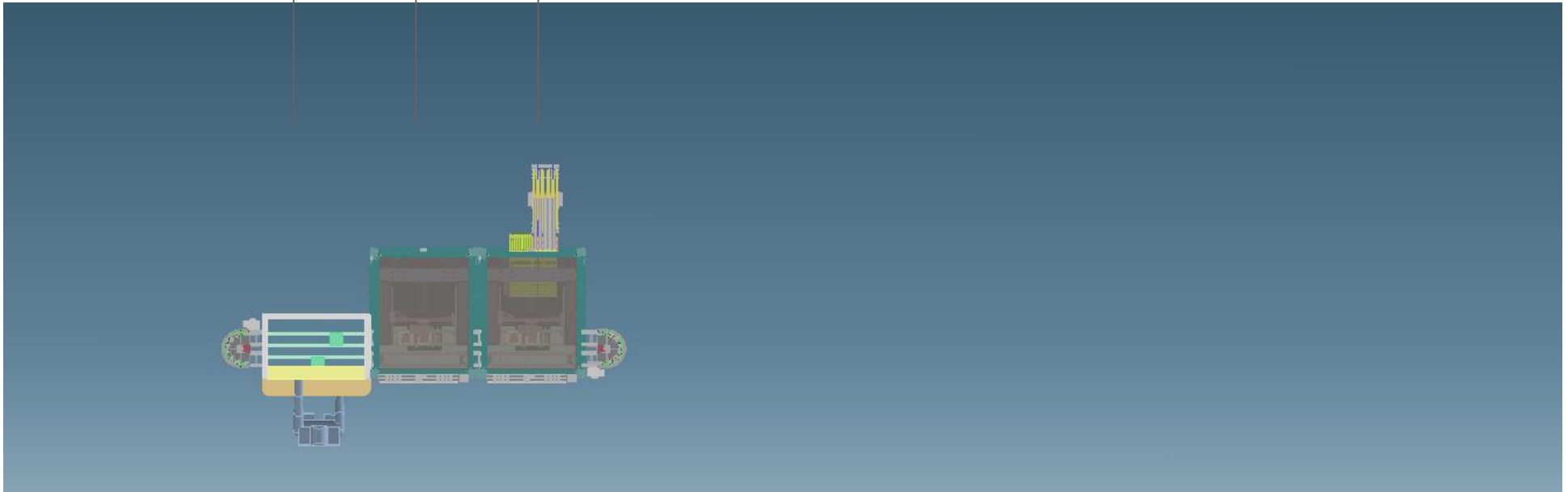


➤ Semi-automated single module for small quantities



# Exemplary modular scalable assembly line

- Manual Loading / Unloading
- Dispensing / Inspection
- Placement / Inspection

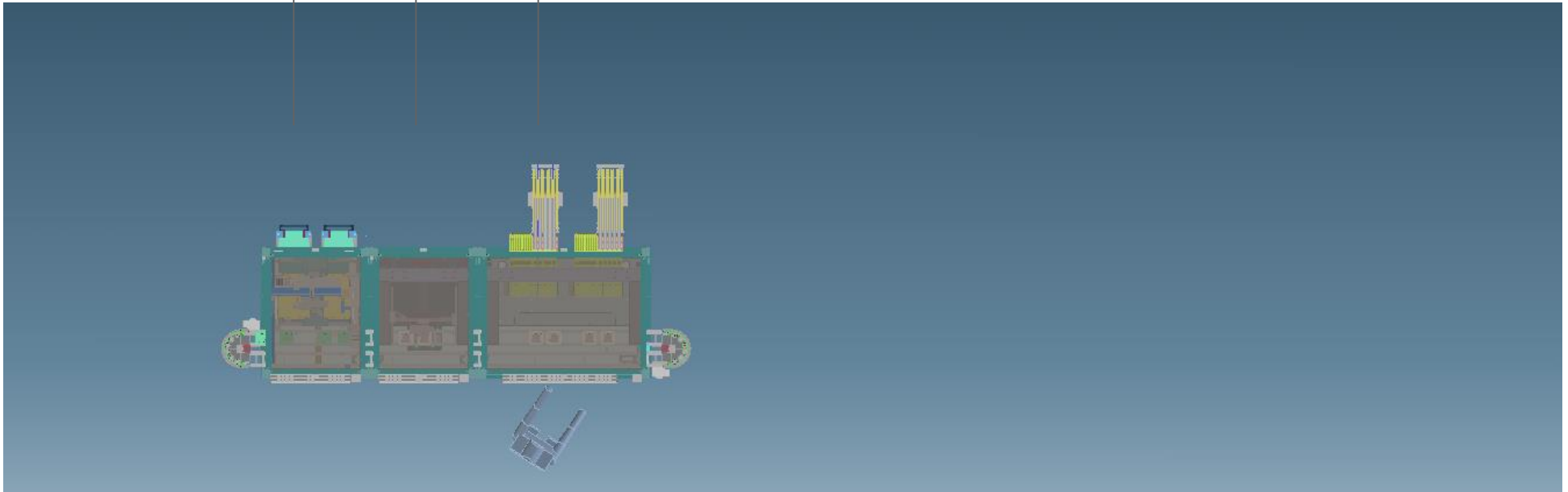


➤ Semi-automated production line for small quantities



# Exemplary modular scalable assembly line

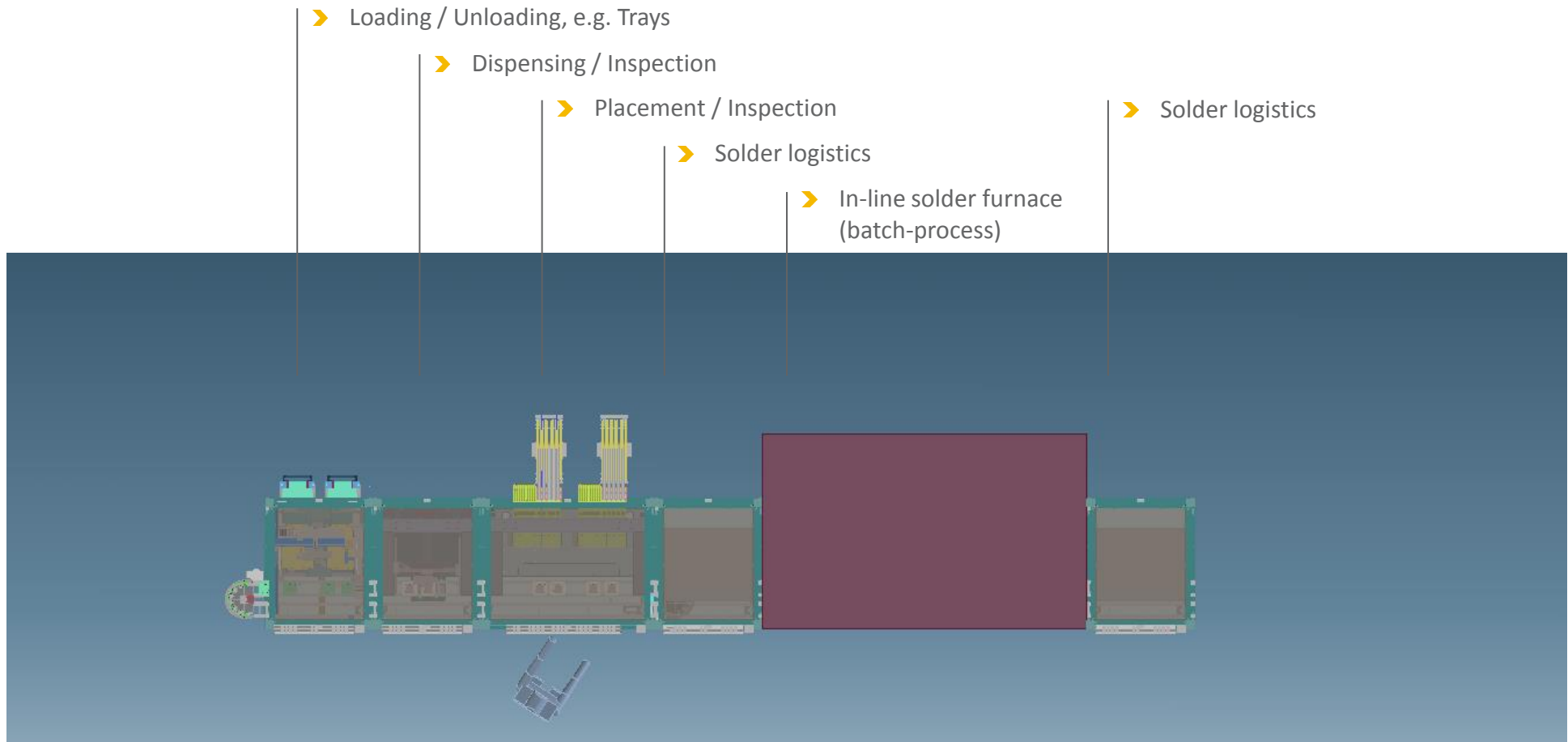
- Loading / Unloading, e.g. Trays
- Dispensing / Inspection
- Placement / Inspection



➤ Automated production line for medium quantities



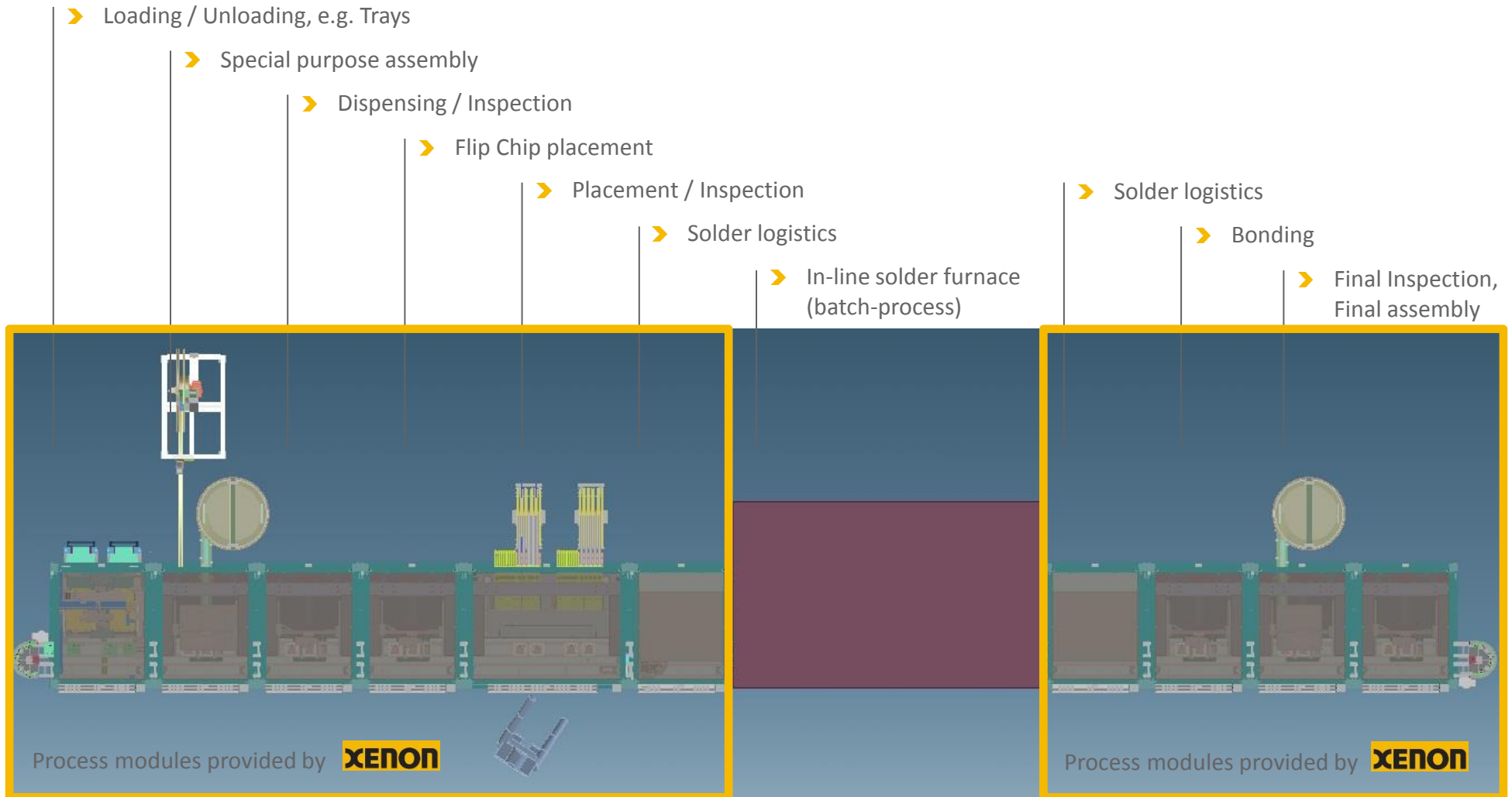
# Exemplary modular scalable assembly line



➤ Automated complete production line for high quantities



# Exemplary modular scalable assembly line



➤ Automated complex production line for high quantities



## Contact Information

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Please visit us on  
booth **7-603**.

Thank you for your interest  
in our solutions.

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