

Running Advanced Robotic Machine Tending with Laser Marking & Etching

FLEXXBOTICS

Tyler Bouchard, CEO & Co-founder
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Flexxbotics™



SPONSORS

FOBA®
Laser at your service

 **UNIVERSAL
ROBOTS**

Flexxbotics™

SMART FACTORY INCREASINGLY ROBOT-INTENSIVE



Reshoring

Productivity & Cost Pressures

Labor Shortages

Continuous Operations

Greater Capacity & Margins

Lights-Out Manufacturing

SMART FACTORY PRODUCTION ROBOTICS MATURITY MODEL

Conventional
Factory
Machining

Humans Manually Run
Machines

Traditional
Robot
Machine Tending

Robots Load/Unload
Machines

Robotic
Process
Enablement

Robots Incorporated
into Workcell Process

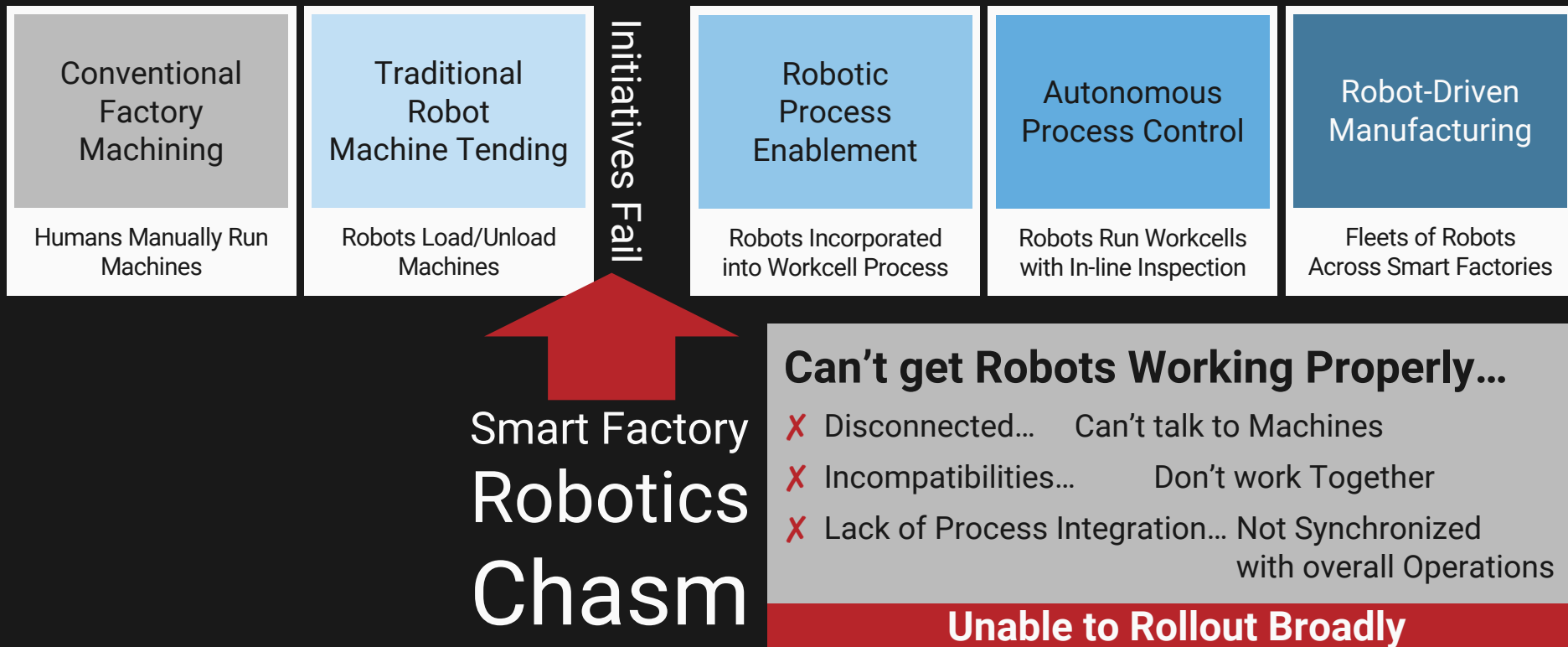
Autonomous
Process Control

Robots Run Workcells
with In-line Inspection

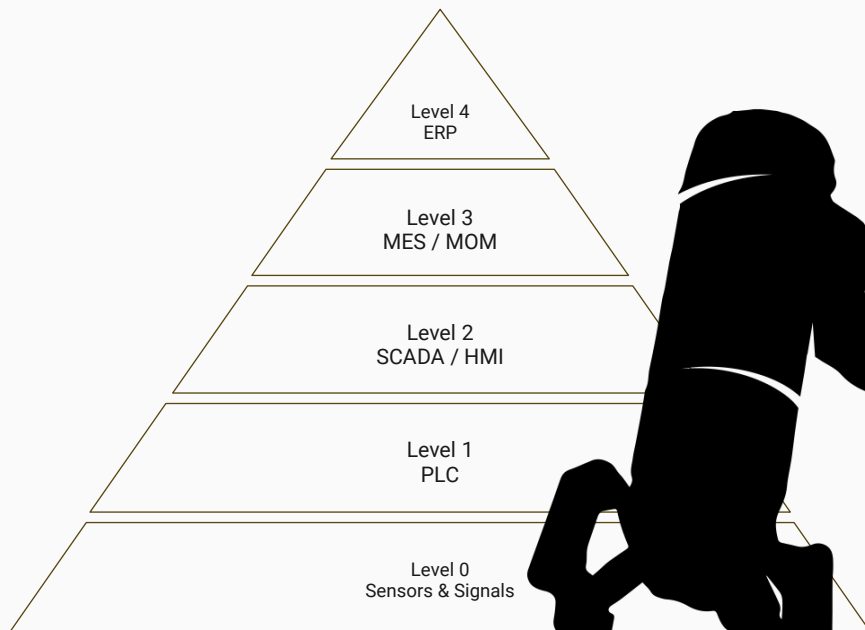
Robot-Driven
Manufacturing

Fleets of Robots
Across Smart Factories

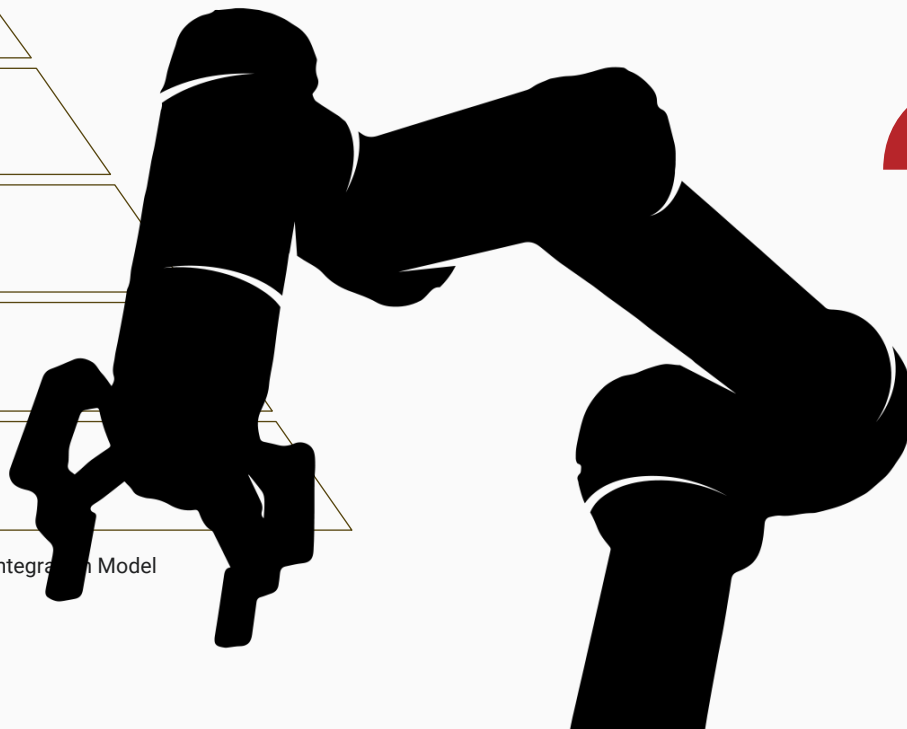
SMART FACTORY PRODUCTION ROBOTICS CHASM



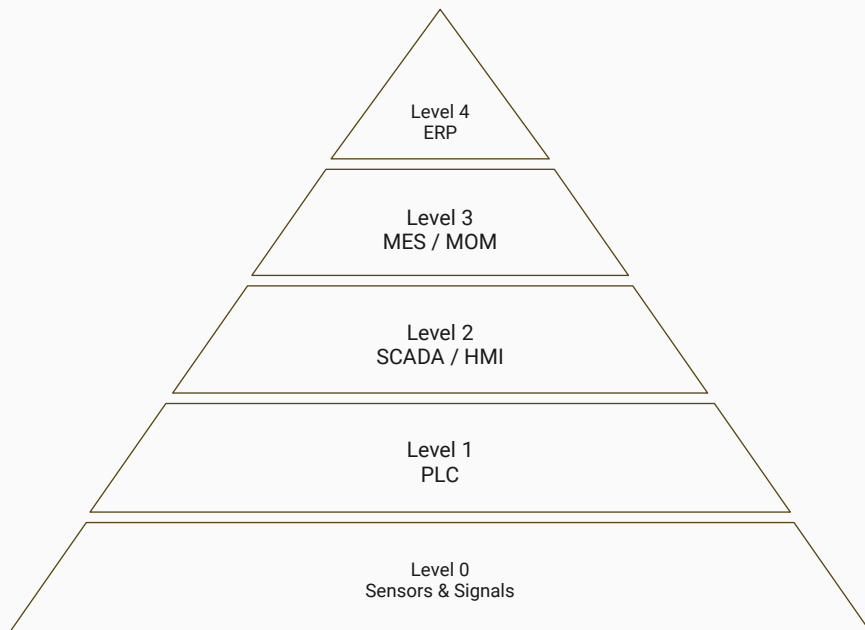
CURRENT MANUFACTURING TECHNOLOGY STACK



ISA-95 Enterprise-Control System Integration Model



CURRENT MANUFACTURING TECHNOLOGY STACK

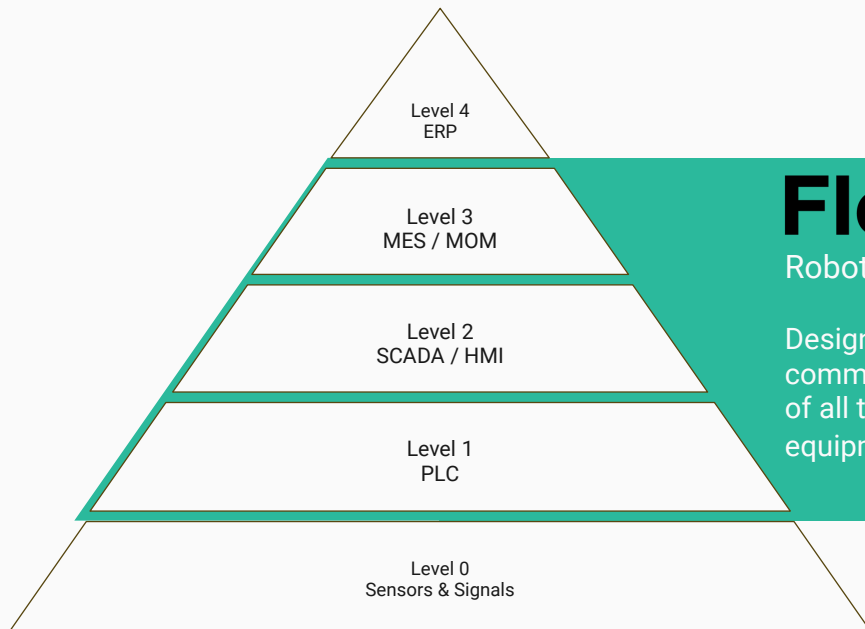


ISA-95 Enterprise-Control System Integration Model

Numerous Open & Proprietary Protocols

OPC/UA
MTConnect
Modbus-TCP
TCP/IP
Ethernet/IP
DeviceNet
MELSEC
Profibus/Profinet
other proprietary controllers
and interfacing protocols

INTRODUCING FLEXXBOTICS



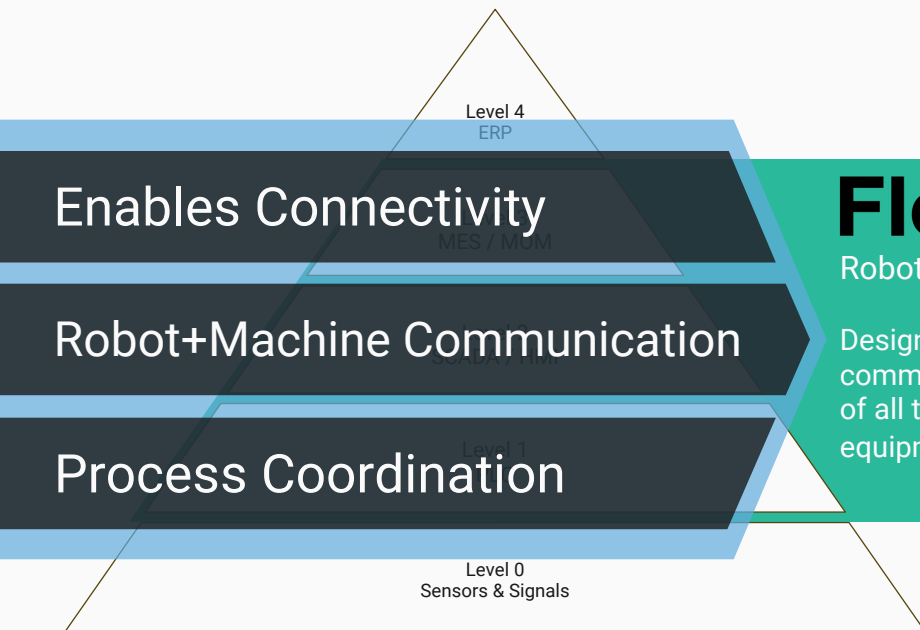
ISA-95 Enterprise-Control System Integration Model

Flexxbotics™

Robot-integrated solution

Designed for robotic control,
communication, and orchestration
of all types of automation machinery,
equipment and systems

BREAKTHROUGH INNOVATION



ISA-95 Enterprise-Control System Integration Model

Flexxbotics™

Robot-integrated solution

Designed for robotic control, communication, and orchestration of all types of automation machinery, equipment and systems

22x Faster
connector creation

FlexxCORE™

Unique FlexxCORE™ technology, connects openly robots & equipment

for seamless interoperability to enable autonomous process control

Low-code environment for composing Connectors that includes a highly secure, high-performance runtime framework for data pipelines with protocols, class structures, method sets, and data models to enable bi-directional communication, coordination, and interoperability with closed-loop programmatic adjustments in real-time

FLEXXBOTICS SOLUTION

CONNECT
COMMUNICATE

COORDINATE

COMMAND

CONTROL



0110 0111 0001 1011 0100 1100 0100

0111 0001



Flexxbotics™

FLEXXBOTICS COBOT XXXX

LASER MARKING & ETCHING



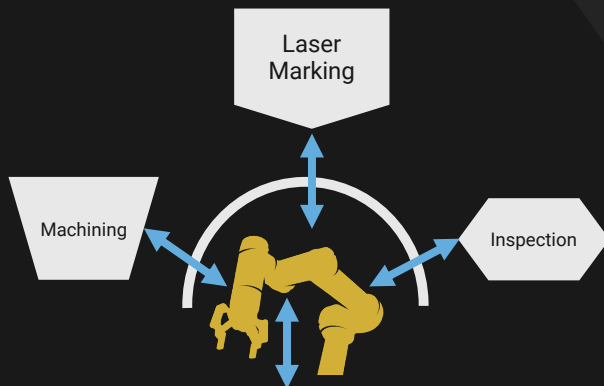
COBOT-ENABLING LASER MARKING CONSIDERATIONS

- Identify Goals & Business Outcomes
- Job/SKU Management & Changeovers
- Part Geometries
- In/Out-Feed Part Presentation
- Workholding Design
- Grippers & Finger Tips
- Cobot-to-Laser Marker / Machine Interfacing
- Inspection & QC
- Safety & Risk Assessments
- Business Systems Connectivity

HOW FLEXXBOTICS WORKS

Workcell Robot/Machine Automation

- ✓ Program Loading
 - ✓ Robot
 - ✓ CNC
 - ✓ Secondary Operation Machines
 - ✓ Inspection Equipment
- ✓ Cycle Start
- ✓ End-Cycle Detection
- ✓ Peripheral I/O Control
- ✓ In-line QC



Process Control

- ✓ Machine+Robot Program Read/Write
- ✓ Automated Variable / Parameter Setting
- ✓ Closed-loop Program Adjustment
 - ✓ Pre-Runtime SPC-based Macro Writing
 - ✓ Real-Time Runtime SPC-based Macro Writing

Real-Time Data Monitoring

- ✓ Machine Monitoring
 - ✓ Status & Downtime
 - ✓ Part Count
 - ✓ Cycle Time
 - ✓ Alerts & Escalations
 - ✓ Failure Count
 - ✓ Failure Reasons
- ✓ Robot-Machine Fault Detection
- ✓ Industrial Fieldbus Interface

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Machine/Robot/Inspection File Management

- ✓ Program Transfer to Equipment
- ✓ Revision Control
- ✓ Program Backup
- ✓ Auto-Program Purging

Analytics

- ✓ Utilization
- ✓ Downtime Reasons
- ✓ Part Throughput
- ✓ Cycle Performance
- ✓ Yield
- ✓ Failure Reasons
- ✓ OEE
- ✓ Custom Dashboards & Analytics
- ✓ REST API for AI/ML/BI

FLEXXBOTICS BENEFITS

Operational Benefits

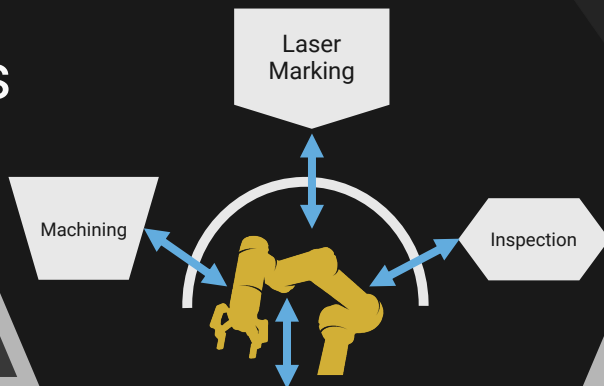
Faster Set-up

Unattended Operation

Closed-loop Quality

Quicker Change-over

Less Downtime



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Business Benefits

Greater Throughput

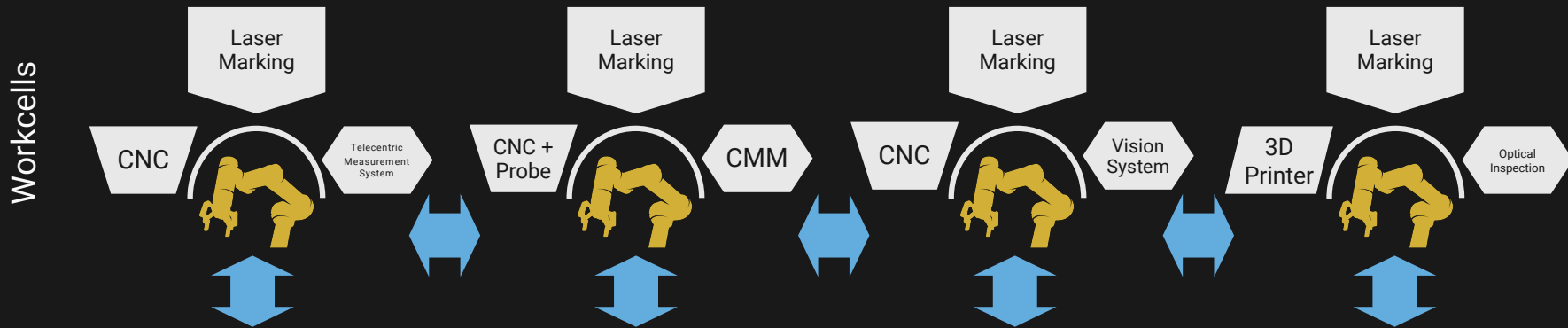
Higher Yields

More Capacity

Lower Processing Cost

Increased Profit per Part

SCALE ACROSS FACTORY | WORKS WITH EXISTING SYSTEMS



Flexxbotics™

Existing
Systems

ERP/MRP

CAD/CAM

MES/QMS

SCADA/IIoT

Custom

FLEXXBOTICS IN ACTION

HK HECKLER & KOCH



RESULTS

- 82% Cell Utilization
- 52% Scrap Reduction

SpiTrex
Orthopedics



RESULTS

- 83% Faster Changeovers
- 20% Lead Time Reduction

RULAND 



RESULTS

- 25.49% Increase in Utilization
- 40% Increase in Capacity

“Rolling out Flexxbotics across all FOBA laser marking workcells results in a 10:1 machine-to-man ratio which enables continuous operation allowing us to ship more high quality parts even with labor shortage challenges making it a game-changer for our business.”

FLEXXBOTICS IMPLEMENTATION SERVICES

DESIGN & DEPLOY

VALIDATE & OPTIMIZE

OPERATE & MAINTAIN

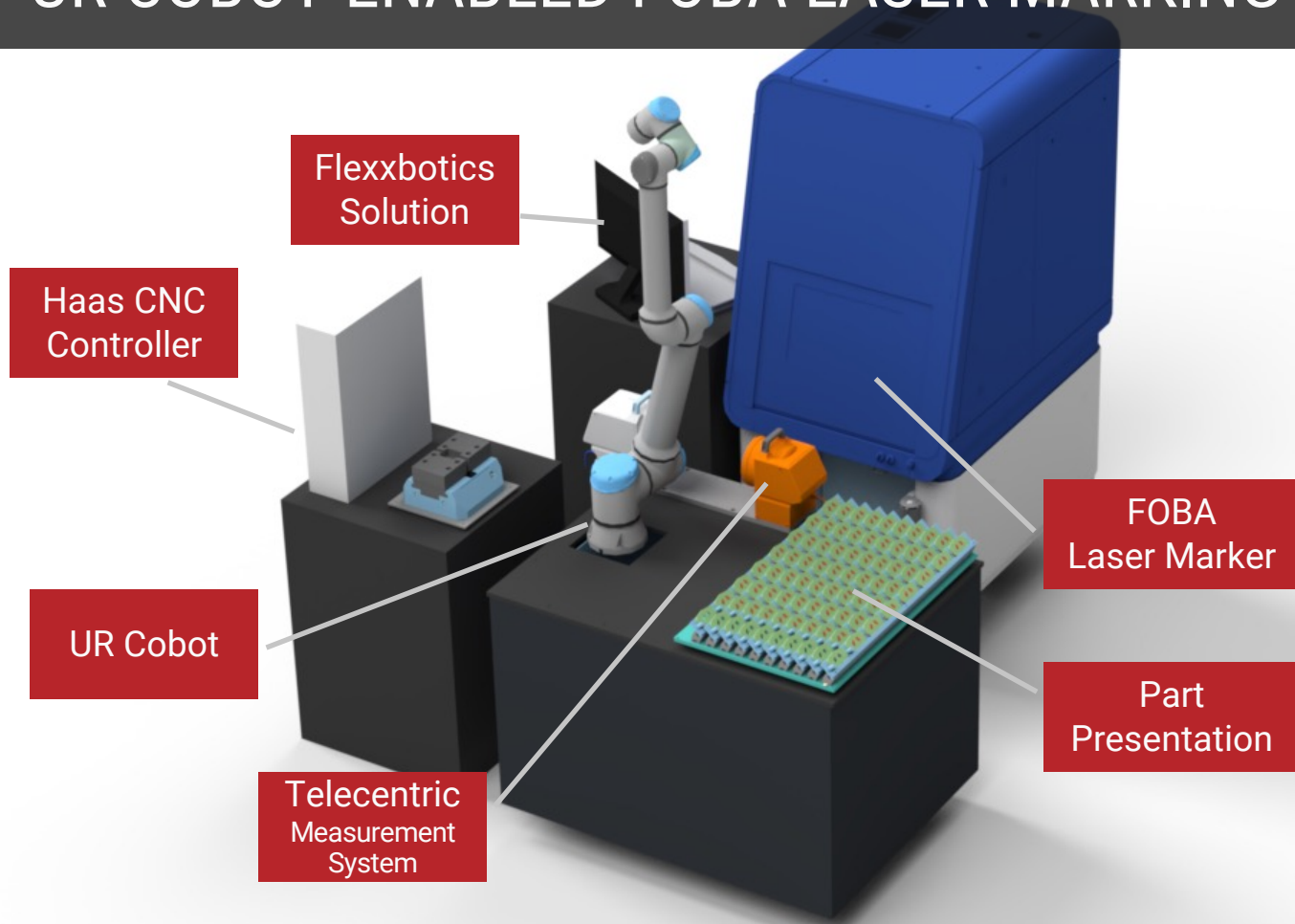
Turnkey Robotic Machine Tending Implementation

Complete project capabilities for successful deployment

- | | |
|----------------------|-----------------------------------|
| ✓ Universal robot | ✓ Custom engineering design |
| ✓ Mobile cart | ✓ Integration & robot programming |
| ✓ Gripper & fingers | ✓ Standardized machine interface |
| ✓ Part presentation | ✓ Safety & risk assessments |
| ✓ Blowoff system | ✓ Factory acceptance testing |
| ✓ Auto-door | ✓ Comprehensive training |
| ✓ Workholding design | ✓ Remote & on-site support |



UR COBOT-ENABLED FOBA LASER MARKING WORKCELL



LIVE DEMONSTRATION

See UR Cobot tending
FOBA M-Series Laser Marker
enabled by Flexxbotics Solution

2 different precision part types
and geometries

Simulated CNC Machining

In-Line Inspection

Part Changeover

QUESTIONS?

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