

Running Advanced Robotic Machine Tending with Laser Marking & Etching

FLEXXBOTICS

Tyler Bouchard, CEO & Co-founder
August 2024



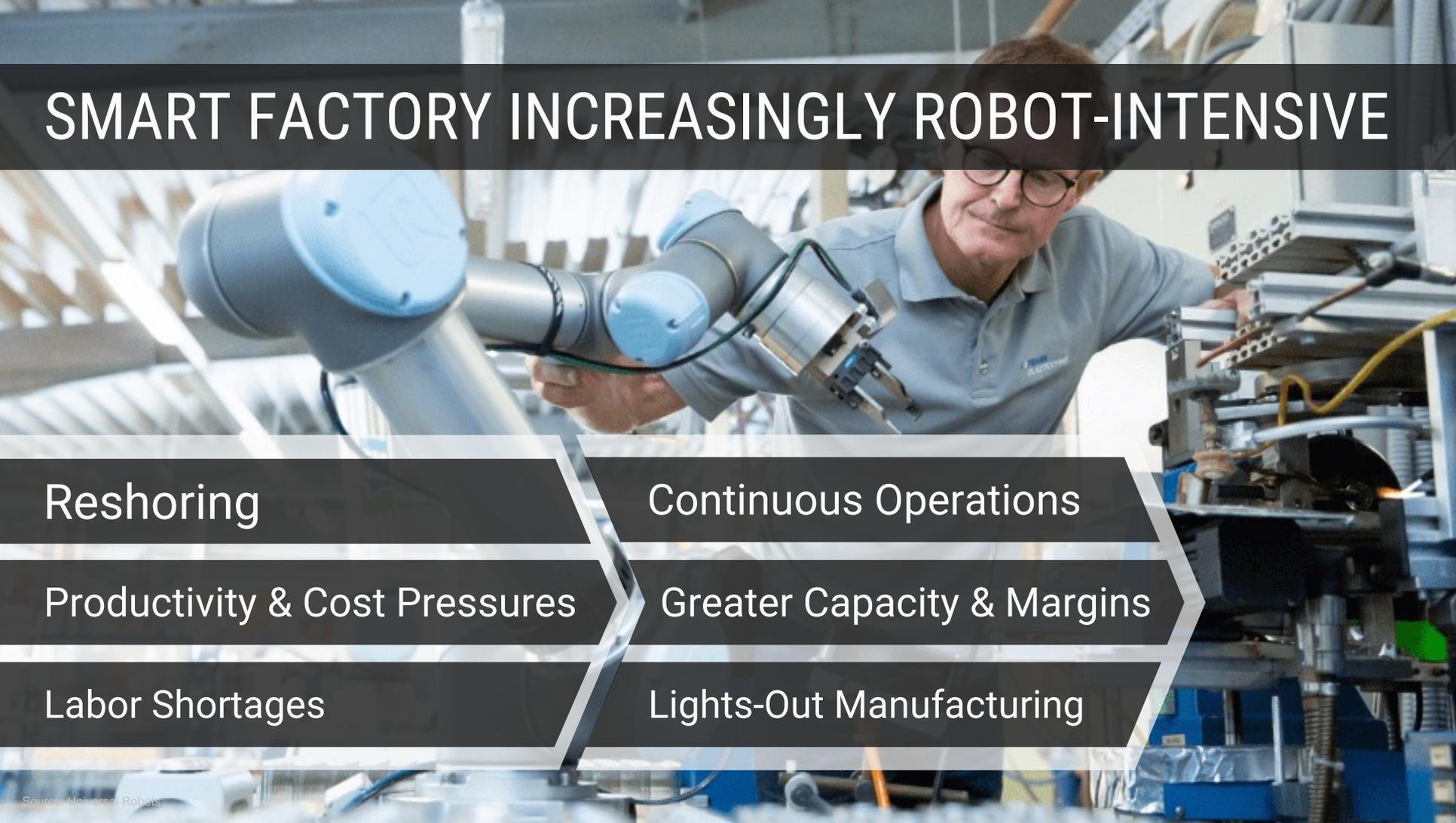
SPONSORS

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

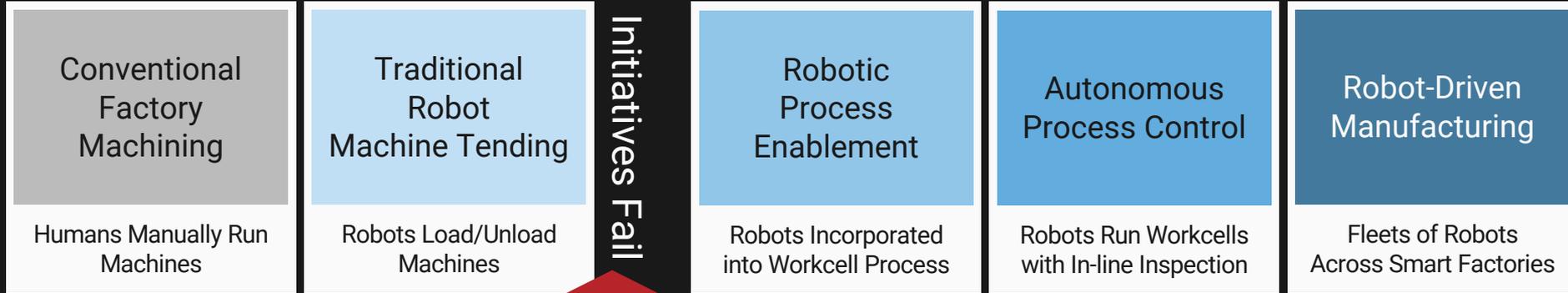
Autonomous
Process Control

Robots Run Workcells
with In-line Inspection

Robot-Driven
Manufacturing

Fleets of Robots
Across Smart Factories

SMART FACTORY PRODUCTION ROBOTICS CHASM



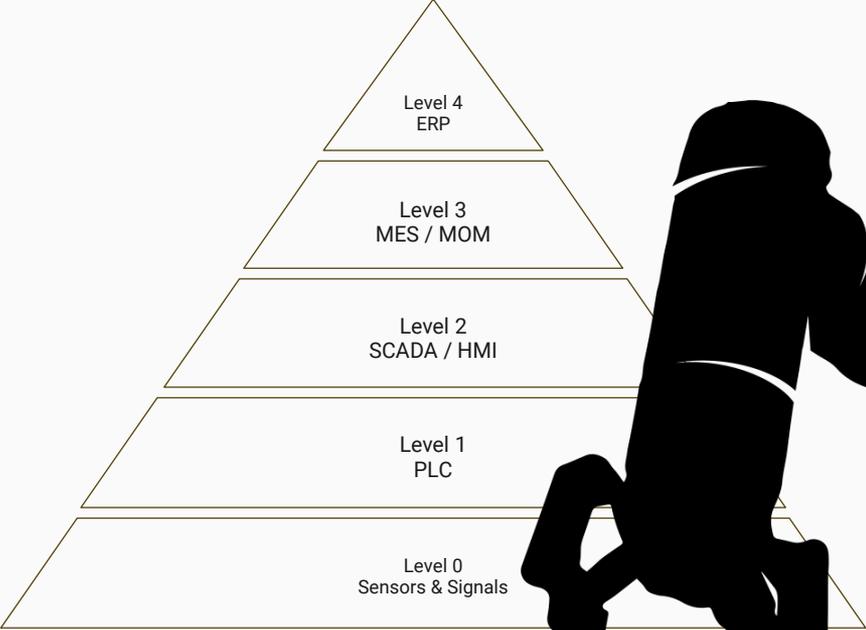
Smart Factory
Robotics
Chasm

Can't get Robots Working Properly...

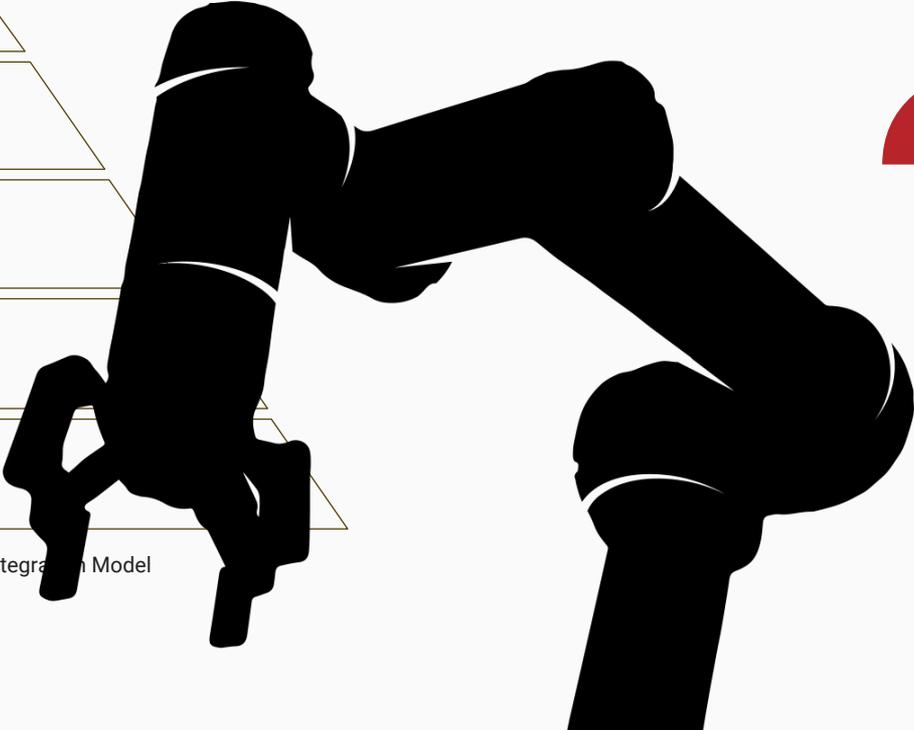
- X Disconnected... Can't talk to Machines
- X Incompatibilities... Don't work Together
- X Lack of Process Integration... Not Synchronized with overall Operations

Unable to Rollout Broadly

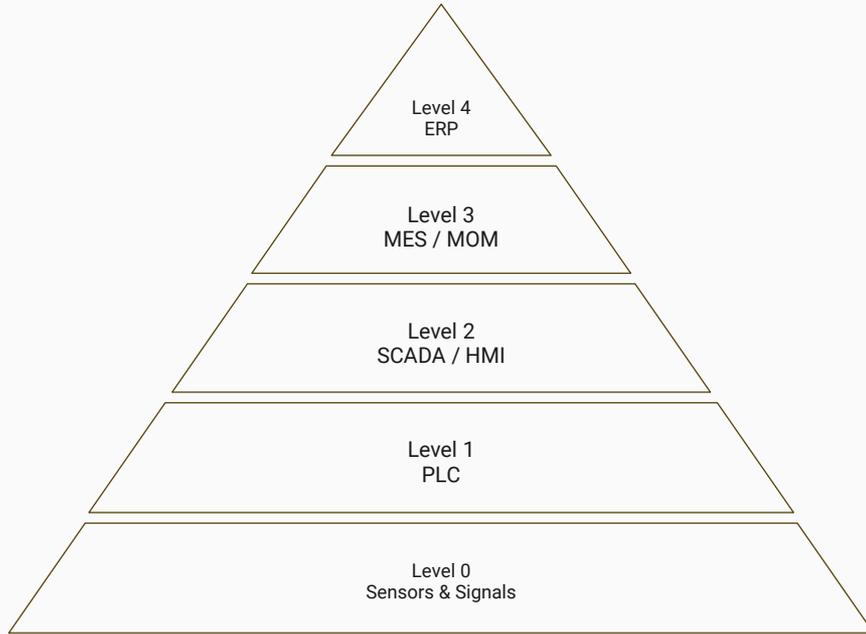
CURRENT MANUFACTURING TECHNOLOGY STACK



ISA-95 Enterprise-Control System Integration Model



CURRENT MANUFACTURING TECHNOLOGY STACK

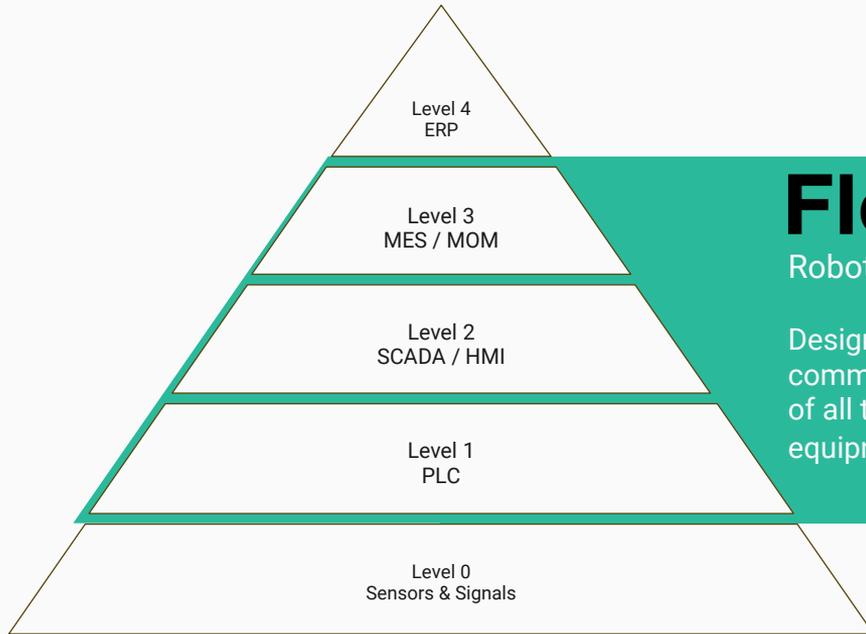


ISA-95 Enterprise-Control System Integration Model

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



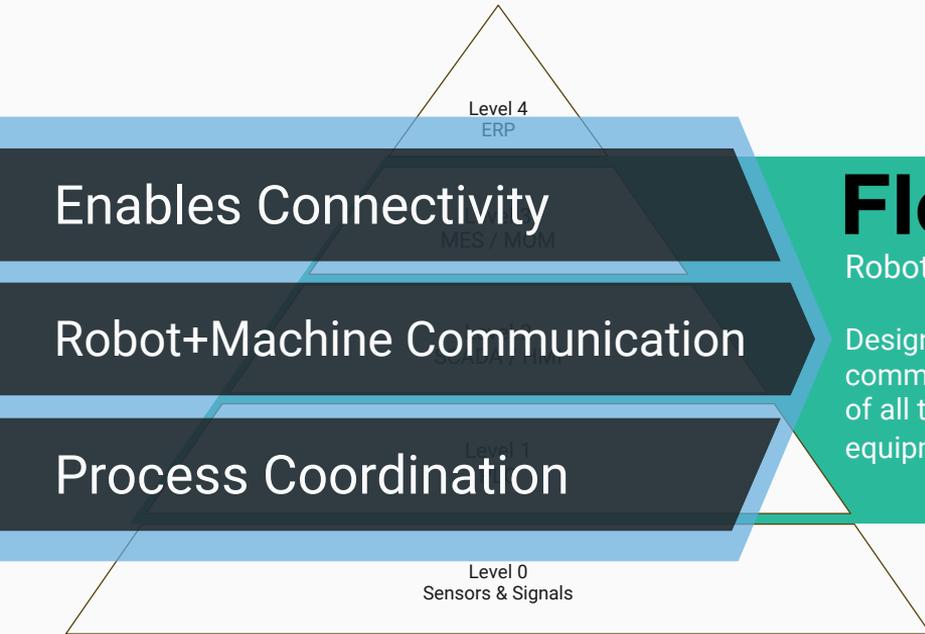
ISA-95 Enterprise-Control System Integration Model

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

22x Faster
connector creation

Flexxbotics™

Robot-integrated solution

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

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



Flexxbotics™

FLEXXBOTICS COBOT XXXX

LASER MARKING & ETCHING



ADDITIVE



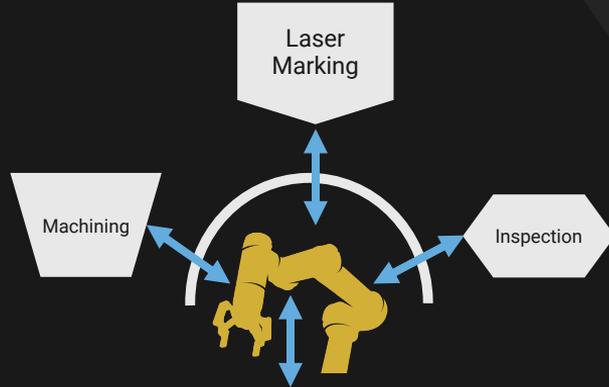
COBOT-ENABLING LASER MARKING CONSIDERATIONS

- 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

Flexxbotics™

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

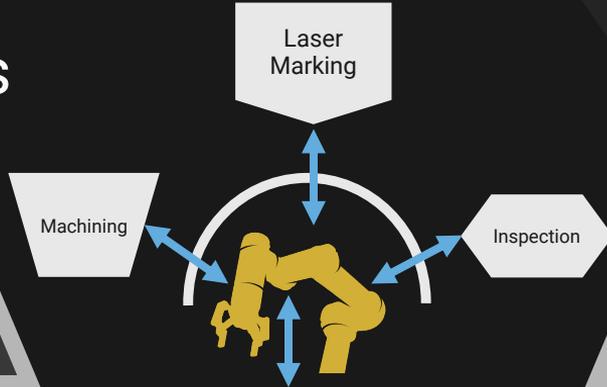
Faster Set-up

Unattended Operation

Closed-loop Quality

Quicker Change-over

Less Downtime



Flexxbotics™

Business Benefits

Greater Throughput

Higher Yields

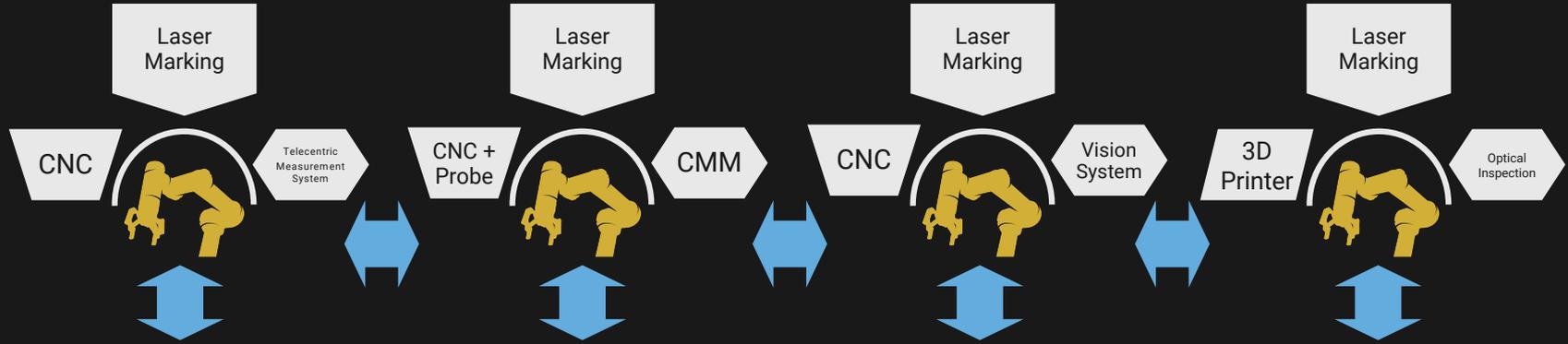
More Capacity

Lower Processing Cost

Increased Profit per Part

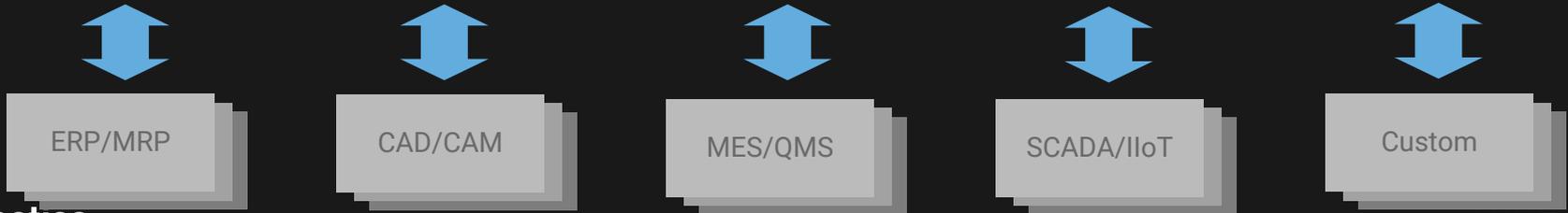
SCALE ACROSS FACTORY | WORKS WITH EXISTING SYSTEMS

Workcells



Flexxbotics™

Existing Systems



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

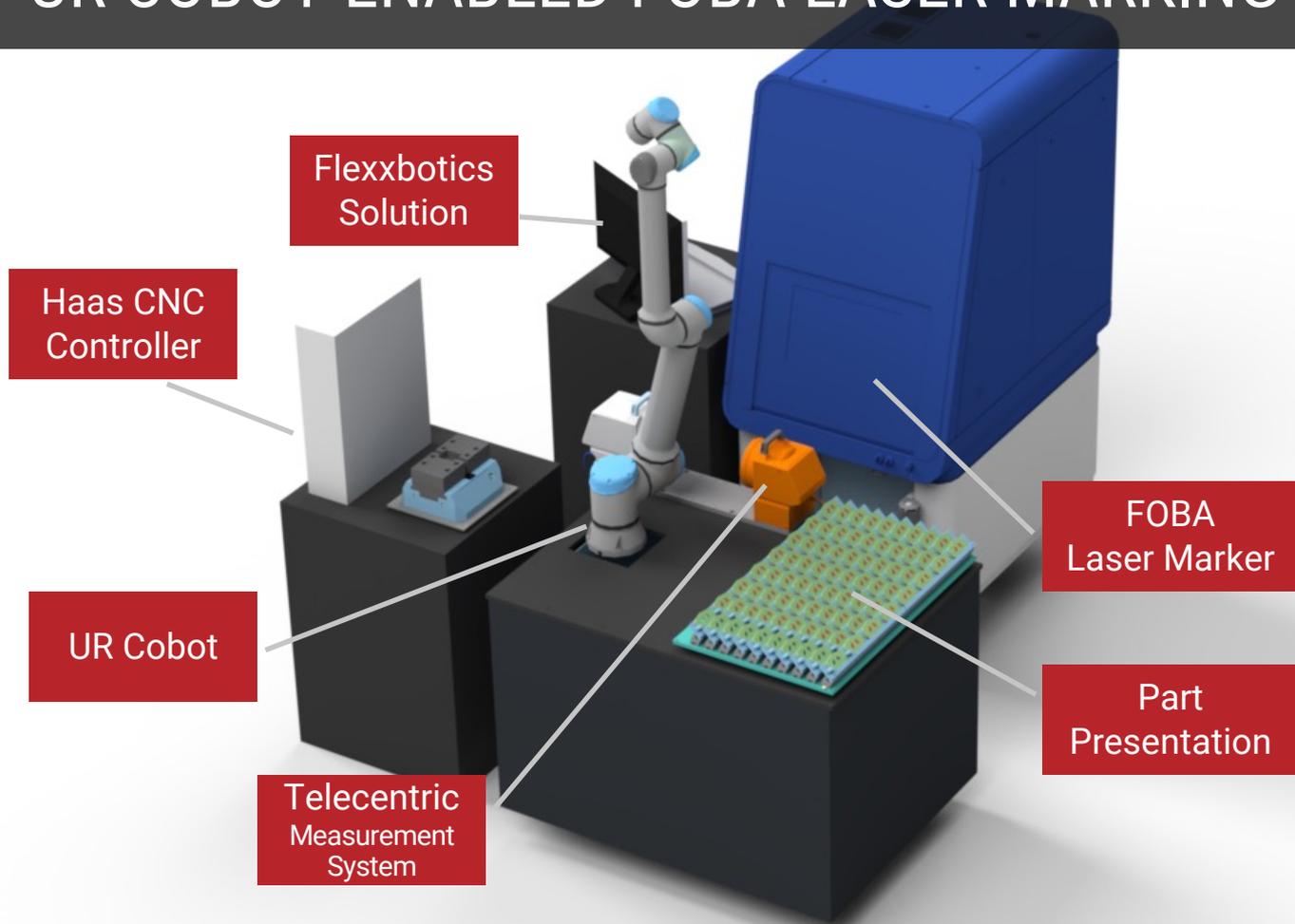
Turnkey Robotic Machine Tending Implementation

Complete project capabilities for successful deployment

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



UR COBOT-ENABLED FOBA LASER MARKING WORKCELL



Flexxbotics
Solution

Haas CNC
Controller

UR Cobot

Telecentric
Measurement
System

FOBA
Laser Marker

Part
Presentation

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?

Tyler Bouchard, CEO & Co-founder

tylermb@flexxbotics.com

Flexxbotics™



SPONSORS

FOBA®
Laser at your service

 **UNIVERSAL
ROBOTS**

Flexxbotics™