

## CASE STUDY



**Flexxbotics**

# ROBOT-DRIVEN MANUFACTURING ACHIEVES AUTONOMY IN MEDICAL DEVICES

**SpireTrex**  
Orthopedics

**FOBA®**

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## COMPANY OVERVIEW

SpiTrex Orthopedics (SpiTrex) is a global medical device contract manufacturer with a specific focus on complex orthopedic implants for the Spine, Trauma, and Extremity markets (Spi.Tr.Ex.). Typical implants include; spinal rods, hooks, cross connectors, and a variety of screws, plates and nails. The company has a multi-site manufacturing footprint across North America and Europe.

For more visit [www.spitrexorthopedics.com](http://www.spitrexorthopedics.com)





**Enabling  
Flexxbotics  
robot-driven  
manufacturing  
in our FOBA  
workcells with  
closed-loop  
quality is a  
game-changer.”**

**Brett Gopal**

SpiTrex Orthopedics  
Senior Vice President of Operations

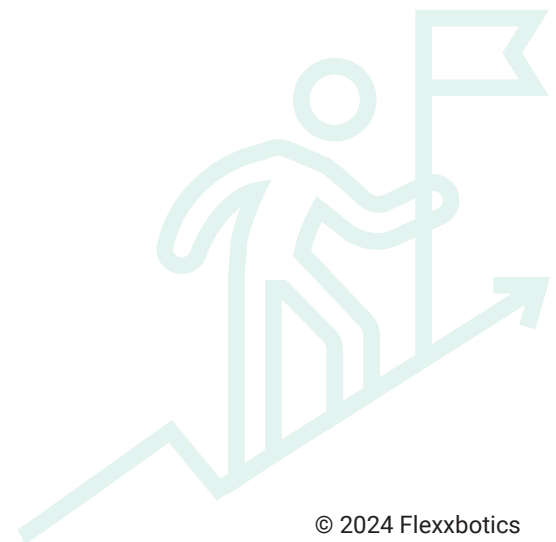
## CHALLENGE

SpiTrex Orthopedics' goal was to incrementally robot-enable smart factory workcells to achieve higher yields, greater capacity, and increased profit per part.

SpiTrex initially identified ten FOBA laser marking machine workcells where existing processes required excessive manual intervention to operate and an hour or more of an engineer's time to set-up each workcell when a new job was run.

FOBA Laser Marking + Engraving (Alltec GmbH) machines are precision laser marking systems and laser engraving equipment including fiber laser markers and UV laser markers, as well as, ultrashort pulse laser markers, CO2 laser markers and green laser markers for a diverse range of applications and industries.

This stage of the process was determined to have the highest return on investment (ROI) and business-critical impact for robotic automation because the dependance on manual labor in these operations was limiting throughput and overall profitability for SpiTrex.





# SOLUTION

**“Flexxbotics is the only robot machine tending solution we found capable of delivering the precision, cycle-time and closed-loop compliance required,” explained Brett Gopal, SpiTrex Orthopedics Senior Vice President of Operations.**

Flexxbotics’ expert consultants led the initiative to design, deploy and optimize collaborative robots for the FOBA laser marking machine workcells. Working together with SpiTrex personnel the Flexxbotics team identified the business outcomes, technical requirements and the part presentation, facility and safety considerations necessary for success.

Project roll-out plans were time phased to incrementally automate workcells in order to minimize disruption and maximize ongoing output. As each workcell was robot-enabled, an optimization period was undertaken to ensure that yield targets and utilization levels were achieved.

“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,” noted Mr. Gopal.

The Flexxbotics solution directly connects the robots to the FOBA laser marking systems enabling coordinated communication and orchestration for the processing of each part, and the ability to change jobs in real-time, reducing changeover time to less than 10 minutes from over an hour previously.



Mr. Gopal continued, “The autonomous changeover process coupled with the closed feedback loop functionality enables us to produce extremely high tolerance parts through continuous flow which reduces the overall lead time by 20% or more.”

The breakthrough FlexxCORE technology in the Flexxbotics solution enables robots to securely connect and communicate with the FOBA laser marking and engraving equipment including the integrated camera systems for robotic control of part processing with in-line inspection.

A full set of bidirectional communication, transform and routing capabilities are available in Flexxbotics for the robots and FOBA equipment that are connected including loading programs, sending instructions, updating parameters and status awareness depending on the equipment’s capabilities so the robots control and command the smart factory machinery.

Flexxbotics solution coordinates each robot’s actions with FOBA’s three-stage marking process which includes part inspection prior to marking, automatic mark alignment, and subsequent validation of the marking. Flexxbotics utilized the Intelligent Mark Positioning (IMP) capabilities in the FOBA equipment for precise alignment of the laser marker on the products being processed along with vision-assisted workflows for accurate touch-up if necessary.

***“The autonomous changeover process...reduces the overall lead time by 20% or more.”***

**“Flexxbotics directly improves our throughput and Return On Capital, which in turn increases profitability,” said Mr. Gopal.**

After the FOBA processing, Flexxbotics directs the robots to use a COGNEX vision system to determine the pass/fail status of each part and autonomously sort parts based on the results. In addition, Flexxbotics then sends alerts with the camera images to the

quality system repository when nonconformance issues are detected that need correcting from operations that occurred in prior workcells in the process to ensure closed-loop quality for higher yields.

“We are impressed with Flexxbotics’ autonomous process control using robots, and the ability to close-the-loop by alerting upstream and downstream workcells of quality problems based on automated inspection results which is quite unique,” expanded Mr. Gopal.

Flexxbotics workcell digitalization is the backbone of the Smart Factory, delivering robot-driven manufacturing at scale with autonomous process control for advanced machining operations. Flexxbotics’ SaaS/hybrid architecture runs both online and offline so production continues with or without internet access, and Flexxbotics works with existing business systems as well such as CAD/CAM, SCADA/HMI, IIoT, MES, ERP, PLM and others for complete synchronization.

“It was clear the benefit of Flexxbotics’ solution horizontally integrating from one FOBA machine to another. What made their solution extremely unique was their ability to vertically integrate to our pre-machining process, post process and IT systems,” concluded Mr. Gopal.

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# FEATURES OF THE FLEXXBOTICS SOLUTION

1

Ability to autonomously configure the robot and the FOBA laser marking systems for each job that will run

2

Closed-loop in-line inspection with the FOBA vision system which directs the robot to sort parts based on the FOBA marking results and conformance to critical characteristics

3

Open connectivity and interoperability between robots, FOBA laser marking system and COGNEX vision systems, along with existing IT business systems

4

Interchangeable multi-level trays with the robot controlling each tray level to enable long unattended runs and quick changeover for faster set-up times

5

Direct feed of workcell operations & inspection data including camera images into quality repository

6

Solution flexibility to start with initial workcells, get success quickly and scale to additional FOBA laser marking workcells as well as other workcells factory-wide



# RESULTS



## 83% REDUCTION IN CHANGEOVER TIME

New job set-up that previously took more than an hour of engineering time has been streamlined to less than 10 minutes.



## 20% REDUCTION IN LEAD TIME

The autonomous changeover process coupled with the closed-loop feedback functionality enables SpiTrex to provide extremely high tolerance parts through a continuous flow which reduces the overall lead-time by 20%.



## 10:1 MACHINE TO MAN RATIO

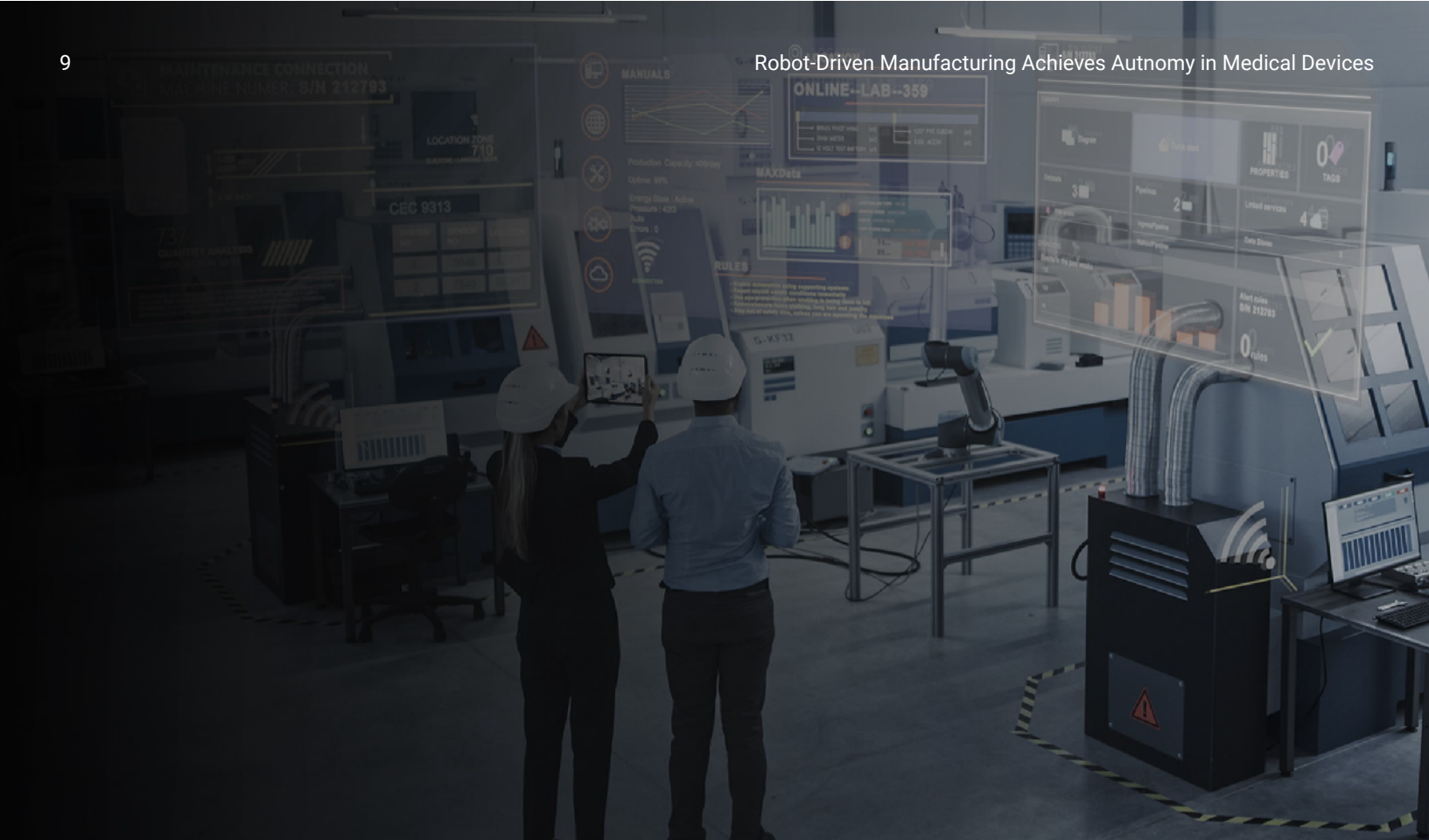
Rolling out Flexxbotics across the SpiTrex FOBA laser marking workcells results in a 10:1 machine-to-man ratio, enabling continuous operations - even with with labor shortage challenges - which enables SpiTrex to ship more high-quality parts.



## HORIZONTAL AND VERTICAL INTEGRATION

The Flexxbotics solution vertically integrates from one FOBA machine to another and also integrates horizontally to both prior workcells and to IT systems.





## ABOUT FLEXXBOTICS

Flexxbotics robotic workcell digitalization is the backbone of the Smart Factory delivering autonomous process control for next generation machining environments. Flexxbotics SaaS/hybrid solutions enable robot-driven manufacturing at scale. Flexxbotics breakthrough, the FlexxCORE™ technology, seamlessly connects and coordinates robots with existing automation equipment, IT systems and people. More powerful, flexible and open, Flexxbotics revolutionizes the use of robotics in complex production.

[www.flexxbotics.com](http://www.flexxbotics.com)

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