



# ORTHOPAEDIC LASER MARKING

FOR VALIDATION, TRACEABILITY AND SCALE

## THE SITUATION

In this automated project, the manufacturer relied on a largely manual laser marking process. Operators loaded parts individually, managed multiple marking steps and verified results manually. While the process met compliance requirements, it was not an efficient use of operator time and struggled to keep pace with production demand.

As volumes increased, the limitations of the existing process became increasingly clear.

## WHERE THE RISK WAS

The obvious challenge with this project was cycle time, but the deeper risk lay in consistency, validation and scalability.

- Each implant required multiple laser markings, applied to different surface finishes.
- The process needed to work equally well on polished and matte surfaces, which introduced inspection challenges.
- Any new solution had to integrate with an already validated laser system, limiting design freedom.

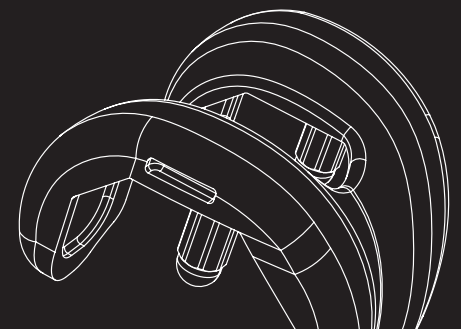
Add to this a constrained footprint and the requirement for full ERP integration, and the risk was no longer just speed, it was whether the process could be automated without compromising traceability or validation.

## THE DECISION THAT MATTERED

The most important decision for the mechanical design team was to design the automation around validation and traceability first, rather than treating them as constraints to work around later.

- 1 This meant integrating an existing, approved laser system into the new design and ensuring that part identification, marking, inspection and data capture were tightly linked from the outset.
- 2 Another key decision was to automate loading in batches rather than individually, allowing operators to step away while maintaining control over part flow and identification.

These early decisions ultimately defined what the system could achieve.



## HOW DESIGNPRO APPROACHED THE PROBLEM

DesignPro developed a compact robotic laser marking solution that balanced speed, accuracy and compliance within a limited footprint.



A drawer-based loading system allowed operators to load multiple parts at once, with each part scanned prior to processing to link it back to internal systems. A six-axis robot provided the dexterity required to navigate complex movements for marking and inspection.



Vision was a critical element. Multiple vision technologies were evaluated during development to ensure reliable inspection across different surface finishes. The final solution integrated an intelligent vision system capable of verifying marking quality in real time.



Close collaboration with the laser supplier ensured that robotics, vision and the marking technology worked seamlessly within existing validation requirements.

# 4000%

CYCLE TIME IMPROVEMENT

# 96+

PRODUCT VARIATIONS

## WHAT CHANGED AS A RESULT

The automated solution transformed the marking process.

- Cycle time increased dramatically, operator intervention was significantly reduced, and marking quality became more consistent across all product variations.
- Full traceability was maintained through direct integration with internal systems, providing confidence in compliance and data integrity.

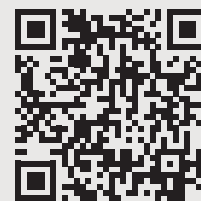
The success of the system demonstrated that high-speed automation and strict validation requirements do not need to be at odds when addressed early in the design process.

## A LESSON FOR ORTHOPAEDIC MANUFACTURERS

In manufacturing, automation success is often determined long before the machine is built.

When traceability, validation and inspection are treated as core design requirements, rather than constraints, it becomes possible to improve speed, consistency and scalability without increasing risk.

This case highlights the value of engaging engineering expertise early, especially for processes that appear straightforward but carry hidden complexity.



*View the video case study*



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your next project

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