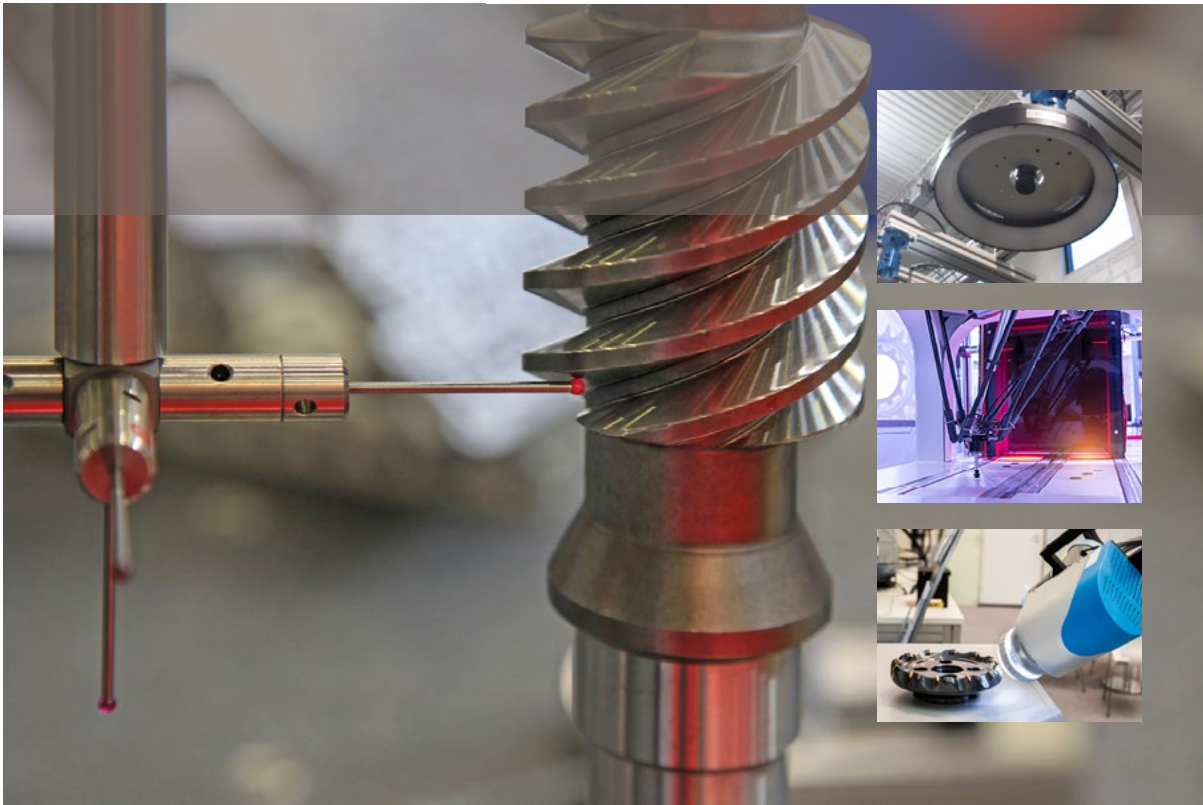
ADVANCEMENTS IN AUTOMATED INSPECTION

THREE CASE STUDIES

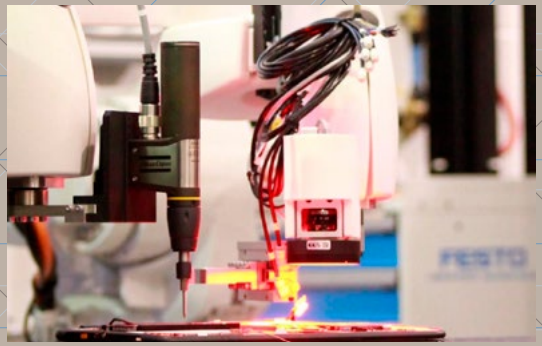
EWI®

We Manufacture Innovation



AUTOMATED INSPECTION FOR GREATER MANUFACTURING PRODUCTIVITY

Incorporating automated inspection into production enables manufacturers to increase inspection frequency, achieve higher repeatability, and respond faster. In turn, this allows them to improve product quality, increase manufacturing efficiency, and reduce manufacturing costs to positively affect both the top line and the bottom line. Thanks to major advancements in machine vision cameras, robotics, and sensors in recent years, automated inspection is seeing more successful integration within manufacturing. In addition, the technology has also become more cost effective with more widespread use.



In comparison to manual inspection, automated inspection is:

- Faster
- More accurate
- More consistent
- Available 24/7

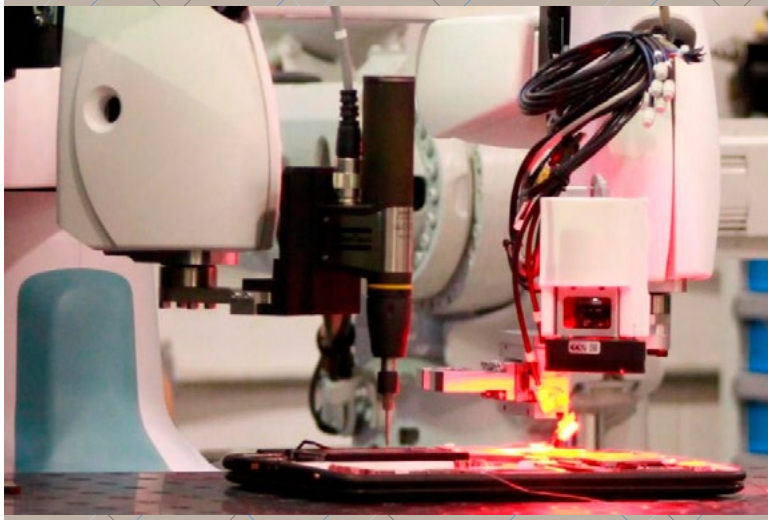
BROADER NDE APPLICATIONS

Since inspection requirements vary significantly by application, one-size-fits-all automated solutions aren't effective. EWI is focused on developing innovative inspection techniques and creating customized inspection solutions for fixed and flexible automation systems.

EWI is leveraging expertise in automated inspection process development, multi-sensor integration, and automated data analysis to advance automated nondestructive evaluation (NDE) and enable efficient, cost-effective NDE for a much wider range of manufacturing applications.

AUTOMATED NDE APPLICATIONS:

- Inline part inspection
- Surface re-treatment and inspection
- Automated metrology



CASE 1

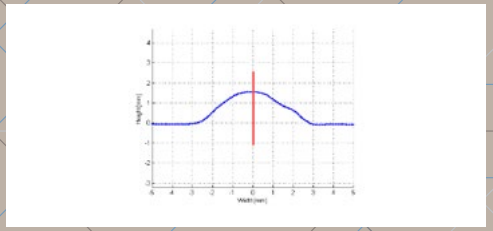
AUTOMATED INSPECTION PROCESS DEVELOPMENT

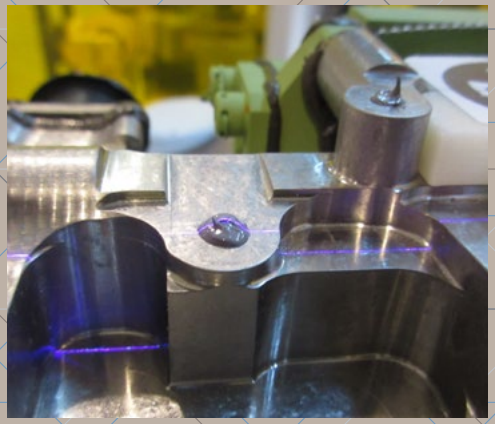
Reliable automated inspection processes enable manufacturers to meet evolving customer demands by quickly progressing from design to production.

Company:
Large manufacturer of aerospace parts

Challenge: The need for a non-contact, accurate, and fast solution for in-process inspection of critical surfaces on a suite of aerospace components.

Solution: EWI's advanced automation team at Buffalo Manufacturing Works developed a human-collaborative, robotic multi-sensor metrology tool to demonstrate the automated inspection of 50+ different parts with over 200 unique critical surfaces. The company is currently in the process of procuring and integrating this unique system to implement the solution in their production environment to achieve both increased inspection speed and 100% part inspection.





CASE 2

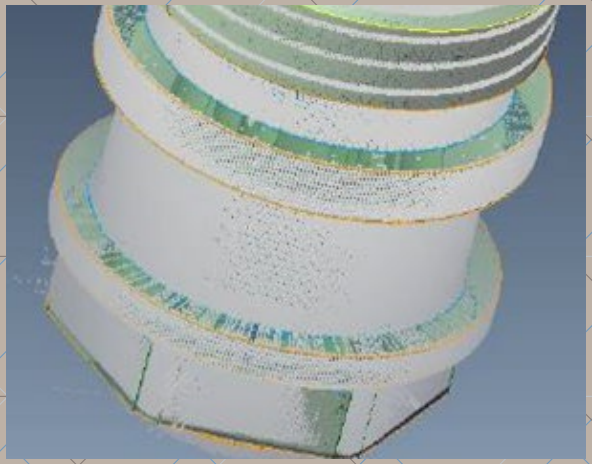
MULTI-SENSOR INTEGRATION

Combining sensor technologies to create measurement cells allows the integration of data from multiple sources. This approach allows manufacturers to use ultrasonic, touch, IR, and laser sensors to make more intelligent in-process and post-process decisions.

Company: Maker of large aerospace components

Challenge: To be able to measure both visual and touch features at an increased resolution in a single station.

Solution: EWI recently combined multiple types of sensors on an automated stage to examine a wide range of features and dimensions. The project utilized laser profilometry for the form factor and less critical dimensions and an optical profilometer for critical dimensions such as surface roughness, as this measurement that was beyond the capability of laser profilometry.



CASE 3

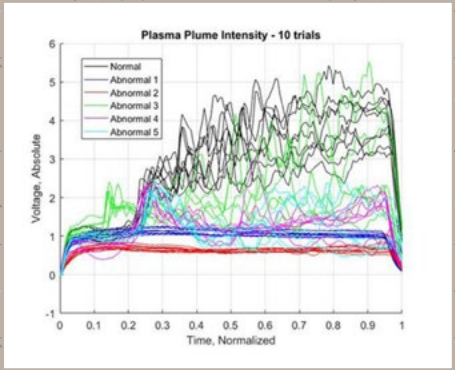
AUTOMATED DATA ANALYSIS

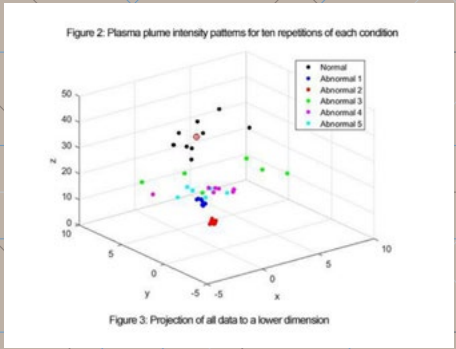
Since automated inspection systems produce a large amount of data, manufacturers are faced with the challenge of determining how to most effectively use this information to improve. Future work will focus on machine learning and big data processing to provide feedback for dynamic process control and drive process improvement.

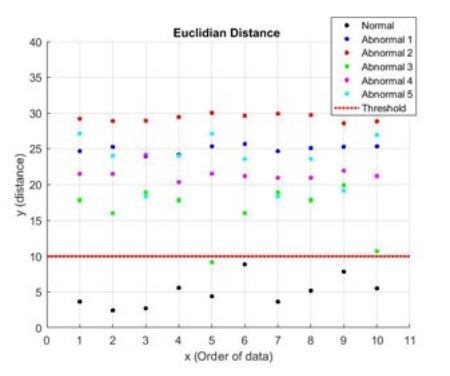
Company: Large manufacturer of electronic components.

Challenge: Cost-effective monitoring of laser keyhole welds.

Solution: By collecting plasma plume intensity measurements with photodiodes and adapting PCA and K-NN methods to analyze the collected data, EWI created a viable, cost-effective automated classification procedure for monitoring laser keyhole welds. As a practical application of this work, PCA can be applied to multidisciplinary data from welding processes, allowing an algorithm for quality to be developed. This algorithm could then be used to assess real-time process data to predict weld quality.





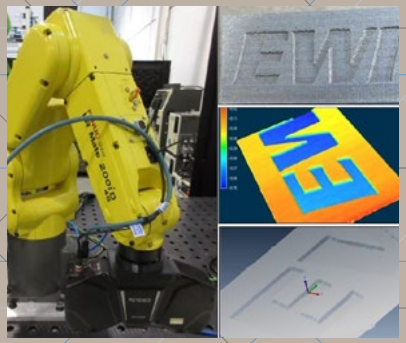


EWI'S AUTOMATION LAB

The examples cited in this report are just a few of the ways EWI has developed and implemented automated inspection solutions to help manufacturers solve challenges and be more competitive. To see how EWI can help you with automated solutions for your production line, we invite you to visit our automation laboratory in Buffalo, New York. The lab offers a unique toolbox of simulation software, robots, vision systems, and related automation components that allows us to develop, test, demonstrate, and validate vendor-agnostic solutions in our lab to qualify processes for our clients before they make the significant capital investment required to implement them on their manufacturing floor.

ABOUT EWI

With deep expertise in automated inspection, machine vision, and joining automation, EWI provides innovative, industry-driven solutions to enhance process efficiency, improve quality, and reduce operating costs. We develop custom automated process solutions to meet our clients' specific manufacturing needs with an aim to establish a significant competitive advantage. To learn more, contact Matt Malloy at **mmalloy@ewi.org** or call **716.710.5530**.



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