



**3D INFOTECH**  
UNIVERSAL METROLOGY  
AUTOMATION®

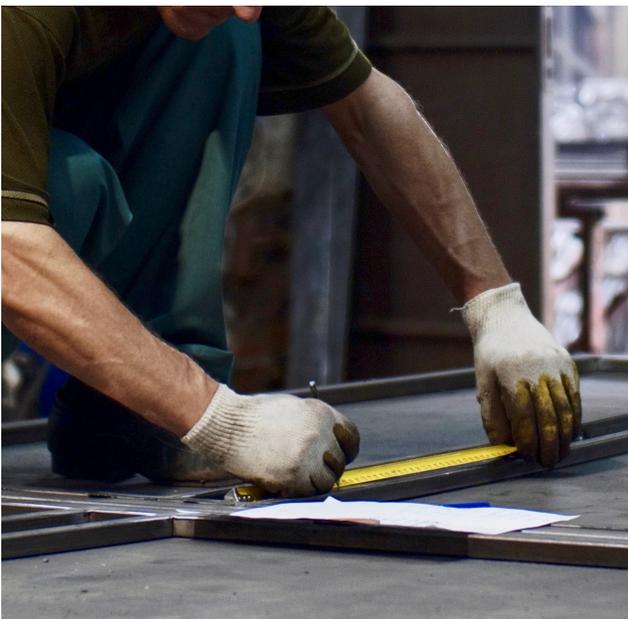
Universal Metrology Automation (UMA) Case Study  
Customer: Sierra Alloys  
Industry: Forging



# OPEN DIE FORGING QUALITY CONTROL FROM COMPLEX AND CHALLENGING TO SIMPLE AND RELIABLE

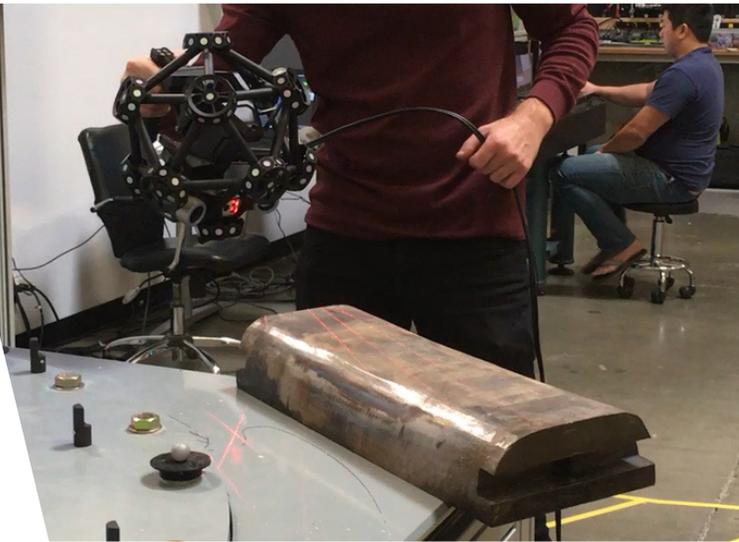
## About Sierra Alloys

*Sierra Alloys is a world-class manufacturer of flat bar/narrow plates of titanium and special alloys with a comprehensive line of products and services that are delivered efficiently and cost-effectively.*



## CHALLENGE ▾

Open die forging companies have been relegated to legacy measurement hand tools like handheld micrometers, calipers and measuring tapes. Given the fact that many open die forged parts are large and heavy, there is no current “off the shelf” inspection tool available to improve measurement accuracy or measurement repeatability. In addition, given that the inspection process is labor intensive, the results take time to acquire which does not lend itself to rapid communication when issues arise or accurately communicating with production as to the performance of the operation. Another challenge is that the inspector can only measure a few points along the length, width, and thickness of the part which leads to missing potentially oversize/undersize areas within the bar.



## SOLUTION ▾

3D Infotech was contacted by the customer to develop a solution that could inspect the forged bars via laser scanning. Then take the scanned data and analyze it via 3D analysis software and provide an inspection report on an order by order basis while making the data available offline for trending and other related statistical analysis.

After an on-site evaluation of the operation, talking with management and inspectors, 3D Infotech identified and implemented the following hardware, software, and customization combination.

**Hardware** – 3D Infotech chose Creaform’s MetraSCAN as the hardware solution due to its high measurement accuracy capability, shop floor reliability, ease of use, and lightweight design among many other benefits.

**Software** – 3D Infotech’s Streamline software with PolyWorks.

For the software component of this solution, 3D Infotech chose its proprietary software Streamline as the principal HMI and communication software. Through Streamline, the user can enter part characteristics and order information. In addition, the customer provided an XML file that Streamline uses to preload information prior to the start of the scanning process. The XML file contains order, material type, and dimensional information that Streamline then passes on to PolyWorks for 3D analysis and subsequent reporting.

## HARDWARE



**CREAFORM**  
MetraSCAN 750™ Elite

## SOFTWARE



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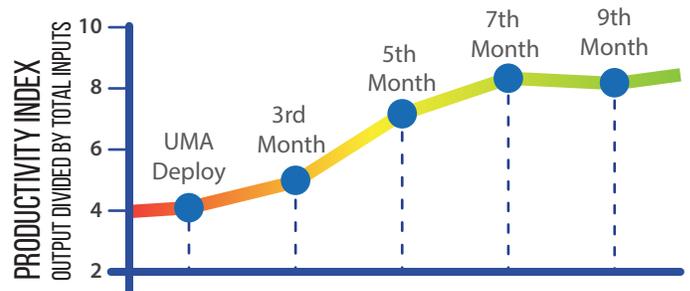
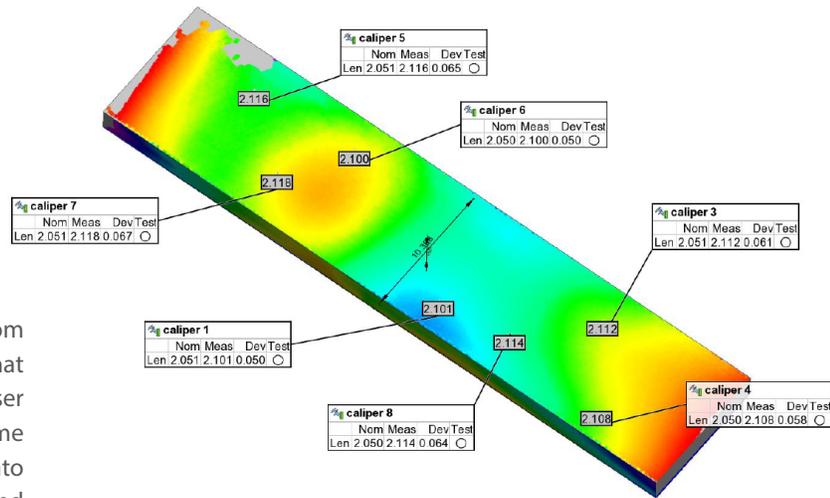


Streamline connects software and hardware to reduce human error and speed up the process.

For 3D analysis in PolyWorks, 3D Infotech created custom macros in PolyWorks. A macro is a program or script that automates steps or processes, in this case, it allows the user to scan 2 bars (forgings from the same order) at the same time, the macro is then able to separate the 2 scans into individual inspections saving the operator time and increasing productivity. The macro also performs thickness, width and length analysis and identifies any over or undersize conditions along the length the width and/or thickness.

When all the pieces (forgings) of a given order have been scanned and inspected, the macro saves the information and generates an inspection report that was pre-formatted to the customer design/requirements. This methodology is integrated to their back-end database for getting nominal values of the entire bar stock.

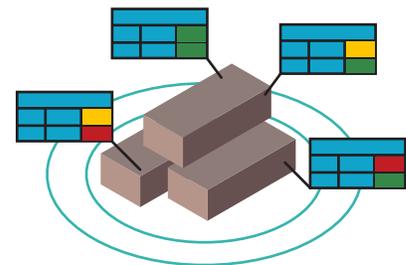
3D Infotech used Streamline software as the missing central element that connects software and hardware to create a solution tailored for the factory floor, removing most of the complexities, reducing human error and speeding up the complete process.



INSPECTION



DATA PROCESSING



REPORT

# SOLUTION BENEFITS



Increased measurement accuracy and repeatability.



Increased throughput with no overhead.



Provided the ability to electronically collect, report, and store the data.

3D Infotech worked closely with the customer to develop a solution that has given the customer the ability to:

1. Increase measurement accuracy and repeatability. By replacing the manual approach to forged bar inspection and replacing it with non-contact laser based 3D scanning, the measurement accuracy increase from 0.015" to 0.0010". As a result, the customer can confidently make "go" "no-go" decisions by providing the ability to have a high level of trust in the data collected.

2. Increase throughput with no over-head. Initially, the customer was concerned that the 3D scanning process could potentially be slower than the manual approach. Through the selected software and customization process (macros designed by 3D Infotech) which includes the ability to scan 2 forging at the same time, the inspection process time was improved by 30% allowing the inspection department to accurately and reliably allow the material to move on to subsequent processes.

3. Provided the ability to electronically collect, report, and store the data. The manual process that the customer was using extended to manually writing the results on an

inspection sheet and then evaluating if the results fell within the required tolerances for the order. The new electronic process included evaluating whether or not the collected data met the required parameters in addition to flagging (on the screen) out of tolerance conditions and on the inspection sheet. As a result of having the data electronically, the customer is now performing statistical evaluations without having to manually input data which has led them to make production adjustments that previously were not possible due to the lack of accurate and reliable data.

4. Reduce human error during inspection. Manually collecting measurements is prone to all kind of errors, from simple errors on reading the measurements to problems in the consistency of the measurements due to different interpretations of where the measurements need to be taken.

Having increased the ability to make faster "go"/"no-go" decisions, the customer can now move product through to additional operations faster reducing processing time and improving on on-time delivery. The customer can now also analyze the data and make operational decisions that in the past were difficult to obtain and, in many cases, not possible at all.

## About 3D Infotech, Inc.

Founded in 2005, 3D Infotech, Inc. is an award winning company that develops hardware and software tools to accelerate and simplify the quality assurance process for manufacturers in the aerospace, automotive, and consumer product industries.



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