Bluewrist designed a custom inspection cell for the customer to perform cradle inspections.

June 22, 2017 – A global Tier 1 automotive component manufacturer, generating annual revenue in excess of US$30 billion, approached Bluewrist Inc. with an inline engine cradle inspection problem.

Bluewrist Inc. was tasked to design and produce a custom inspection solution that can be integrated into the customer's existing manufacturing process to verify the dimensional quality of the engine cradle. What makes this project unique and challenging is the customer's need of performing 32 feature inspections in under 13 seconds in order to meet the high-volume cycle-time requirements.

An engine cradle is a complex component found in every vehicle on the road and consists of several welded hydroformed high strength steel tubes and stamped parts in precision alignment to support the mounting of the engine, transmission and control arm brackets. The front and rear body mounted on the engine cradle must also be assembled with high precision to guarantee a perfect fit with the rest of the vehicle body. The welding and assembly is performed in an automated process on the production line and must follow strict GDT specifications and other mechanical design requirements, so any deviations will lead to misfit and affect a vehicle's camber and toe angles that will lead to costly rework and recall.

100% inline is a prerequisite for this critical component and rules out the traditional sampling based quality control using a CMM, which may take more than 40 minutes of manual inspection. To accomplish this task, the ingenuity of the Bluewrist engineering team and the flexibility of the in-house designed software solutions are put to full use. In order to inspect the 32 features under the 13-second requirement, an array of 23 LED snapshot cameras have been strategically positioned on a custom designed fixture where the engine cradle will be placed, secured, inspected and removed by a robot arm. The cameras take simultaneous measurements of the features which are then streamed in real time to the Bluewrist software. The cameras capture detailed 3D point Cloud of the holes, slots, slots and timts on the engine cradle, which are then compared to the CAD design and GDT specifications. The software then compares the results and automatically notifies plant floor operators of deviations from predetermined tolerances. All data is also logged and stored in a central database for improved traceability and internal audit purposes.

Bluewrist's in-line inspection software is optimized for use in fast-paced manufacturing environments and possesses accurate, efficient and stable performance. The software effortlessly processes the large amount of data streamed from the 23 cameras in real time to perform the in-line 3D scanning and dimensional measurements of the engine cradle. Cradles that pass the inspection are delivered to another manufacturing facility for the final assembly process. Cradles that pass the inspection are delivered to another manufacturing facility for the final assembly process.

The customer's need of performing 32 feature inspections in under 13 seconds is a critical requirement for this project. Bluewrist Inc. was tasked to design and produce a custom inspection solution that can be integrated into the customer's existing manufacturing process to verify the dimensional quality of the engine cradle. What makes this project unique and challenging is the customer's need of performing 32 feature inspections in under 13 seconds in order to meet the high-volume cycle-time requirements.

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The custom inline inspection software consists of multiple snapshot cameras, an industrial robot for material handling, and PLCs for process or inspection of the inspected cradles. The Bluewrist-com/3stream industrial communications software links all these components together in one cohesive system to trigger the measurements and the inter-device, sensor and robotics communications. Bluewrist software solutions are platform and hardware-agnostic and are compatible with all major robot, PLC and industrial robot for material handling, and PLCs for pass or rejection of the inspected cradles. The Bluewrist comXtream industrial communications software links all these components together in one cohesive system to trigger the measurements and the inter-device, sensor and robotics communications. Bluewrist software solutions are platform and hardware-agnostic and are compatible with all major robot, PLC and 3D vision sensors in the market. As a result, the solutions can be integrated into a manufacturing facility with minimal delay or costly custom engineering work, notes the company.

Should the customer change the engine cradle design for future vehicle models, the Bluewrist system can be modified and reprogrammed cradles to meet their ever-changing requirements. This inline 3D inspection system is currently activated at the customer's manufacturing facility and performs thousands of cradle inspections per day, and has met and exceeded all the requirements, it notes.

"Bluewrist Inc. in Aurora/geust, Markham, Ont."

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