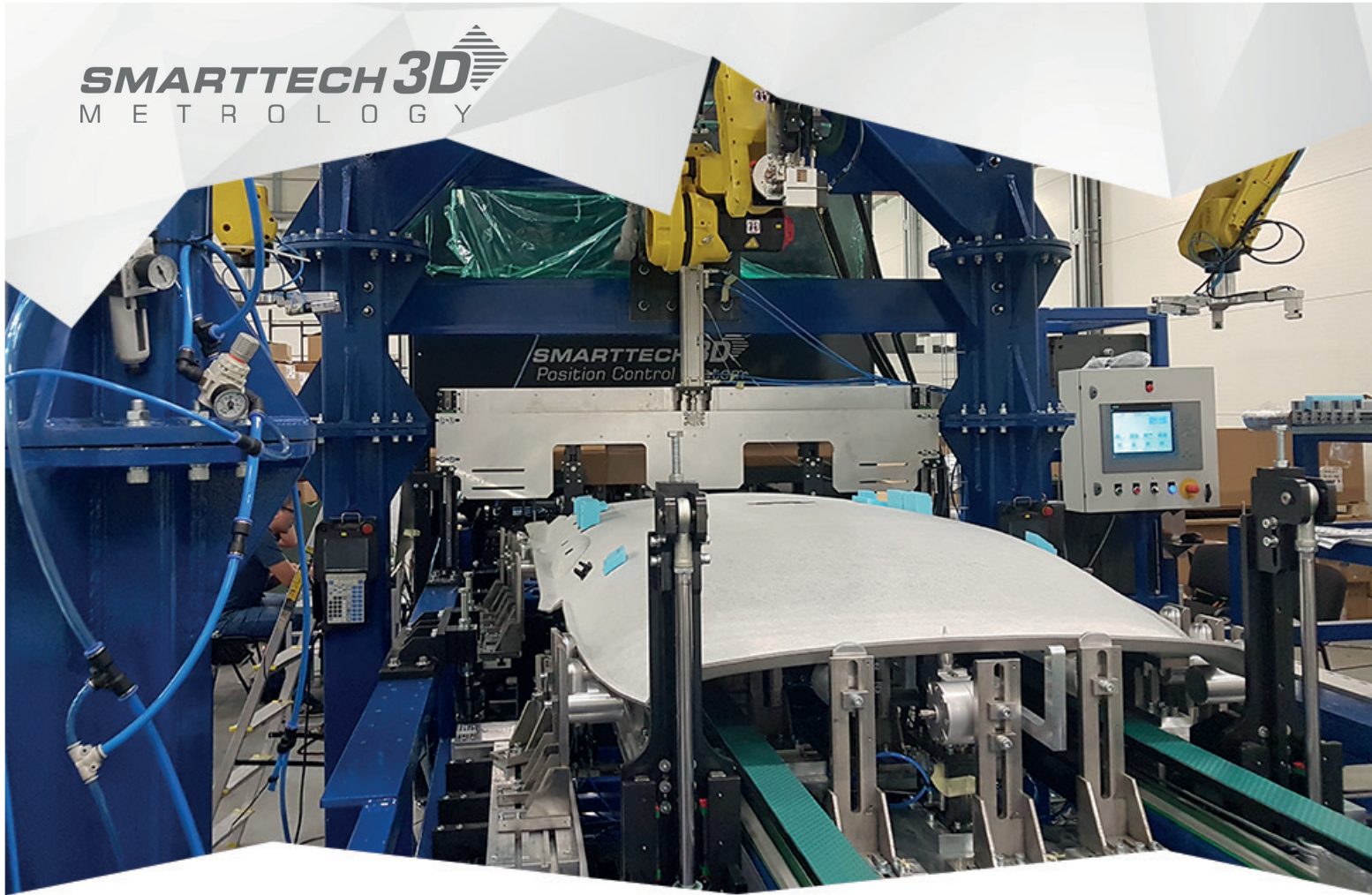


SMARTTECH3D
M E T R O L O G Y



QUALITY CONTROL: Inspection of car parts

OPTICAL MEASURING SYSTEM: SMARTTECH3D Position Control System

SOFTWARE: SMARTTECH3Dmeasure

INDUSTRY: automotive

SMARTTECH3D Position Control System - virtual eyes that verify the work of robots

More and more manufacturers from many industries are implementing technological innovations to catch up with the industrial revolutions speeding at a dizzying pace. Trend Industry 4.0. in the intelligent Factories of the Future is slowly becoming a fact and more companies implement developed solutions in their factories as part of this great undertaking. An automotive industry becomes a particular leader in this field using the most automated processes and innovative solutions for production.

Problematic quality control of headlining

One of the leading manufacturers of German brand cars has requested SMARTTECH for a dedicated optical measuring system to improve the quality control process in its factory. The company went that time through the process of digital transformation and sought to fully automate the production line when a serious problem appeared during the production of headlining lining the roofs of cars from the inside.

There are rectangular sponges between the headlining and the metal roof, which are used to cushion the driver's or passenger's head in the event of a collision or accident. The arrangement of the sponges is fully standardized and must comply with international ISO standards to allow car to move and the factory to continue production.

Before the modernization of the production line, sponges were assembled by hand by six employees, who within one hour were able to produce 3 complete headliners. Product was then randomly inspected for quality, which unfortunately increased the risk of producing a product that was not compliant with ISO standards. Automating the assembly line and allowing modern robots to work has shortened the production process of the complete product to a record 3 minutes. However, research has revealed that variables such as ambient temperature significantly affected the drying speed of adhered sponges, making it difficult for programmed robots to connect the metal roof with the corresponding protective sponges faultlessly. For this reason, the manufacturer gave up selective quality control and decided to make a detailed inspection to every headlining coming from the production line to verify the location of the sponges.

The car manufacturer was looking for a dedicated optical measuring system that will be fully integrated with the entire assembly line and will be one of the maintenance-free production stages. The challenge for the system was, therefore, to measure the mounted sponges on the headlining and verify their location, and later send information to the rest of the devices installed on the line to enable them to take further actions.

Implementation of intelligent optical measurement

Specialists from the SMARTTECH company created a solution consisting of two measuring devices scan3D surface 10 MPix integrated into a dedicated SMARTTECH3D Position Control System, to meet the expectation of the manufacturer. The technical requirements of



CASE STUDY

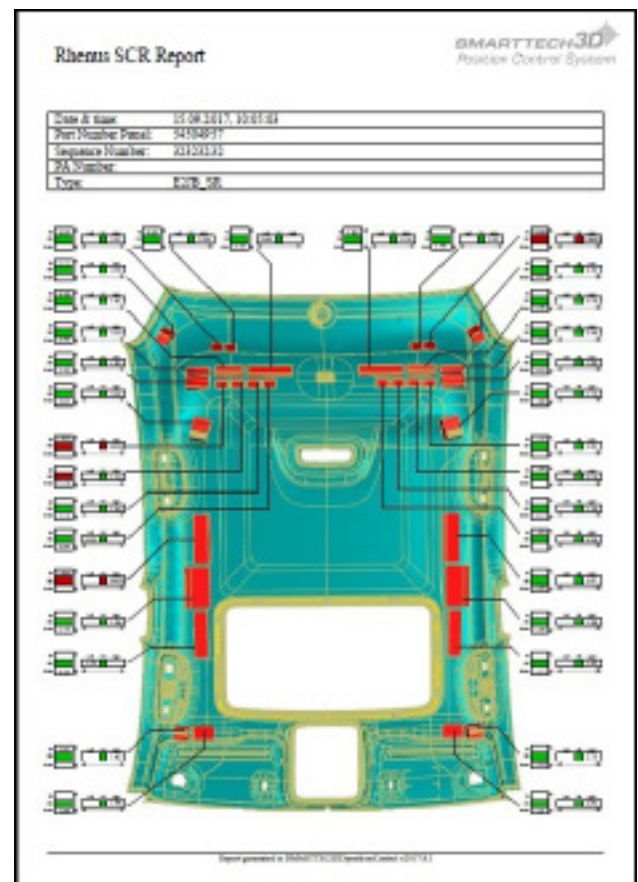


the production line in the factory assumed inspection of the entire surface of the produced part due to the location of foams, which is why the innovative SMARTTECH solution measures 1800 mm x 1250 mm x 350 mm and maintains the accuracy specified by engineers of 0.7 mm.

SMARTTECH engineers also designed a special measuring stand, including a tilt and rotary frame, which was included in the production line of the German car manufacturer's factory. This approach not only perfectly fits the client's needs, but also in the mission of the SMARTTECH company focused on providing customers with personalized measurement solutions and implementing innovations brought by the Industry 4.0 revolution.

Measurement with SMARTTECH 3D scanner is based on analysis of the curvature of the fringes displayed on the measured surface. Their deformation is recorded by the detector built into the scanning head. During the measurement, the image from the detector is transformed into a cloud of points thanks to a special control software algorithm. Each of the points describes the geometry by the X, Y, Z coordinates and this information can be used for quality control in the SMARTTECH3Dmeasure software.

Due to the uniqueness of the project, the SMARTTECH3Dmeasure software control module has been expanded to adapt it to customer standards. First, a program for performing automatic sponge inspection was adapted, which involved a modification of the measurement algorithm. A personalized system for reporting and analysis of controlled headlining to PDF



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format has been implemented. Detailed reports contain information on the position of sponges and their deviations from the assumed tolerance and data on the headlining itself, including its serial number or quality control result. The customer received also the SDK package along with the software so it is possible to make modifications such as changing the tolerance of the measurement system at any time.



As part of the Industry 4.0 assumptions, the SMARTTECH3Dmeasure software was integrated with existing production systems. It was connected with the implementation of intelligent communication module capable to communicate with other industrial devices and internal factory systems. Thanks to the innovative communication module, the measurement results are not only included in the digital ecosystem of the production line, but also stored in a special repository for further analysis.

Autonomous inspection of fifteen headlining per hour

SMARTTECH3D Position Control System inspects the headlining every 4 minutes. This means that the efficiency of the entire solution allows you to conduct quality control of fifteen headlining per hour. Achieving such a result would not be possible without listening to and understanding the client's needs, creating a solution based on the latest technologies and



integration of the measurement stand with intelligent factory systems.

The system was also calibrated in laboratory conditions, thanks to which the preparation time of the device was reduced to an absolute minimum, and operation of the measuring station does not require metrological knowledge.

CASE STUDY

The combination of two measuring devices scan3D surface allows to achieve a large volume of 1800 mm x 1250 mm x 350 mm, and the use of white structural light allows to obtaining the required accuracy of 0.7 mm.

Quality and competitiveness of the SMARTTECH measurement technology was confirmed in the testimonial.

More about RHENUS

The Rhenus group is a supplier of comprehensive logistics services with a global reach. The company has over 610 locations around the world and employs over 2900 employees. Rhenus in all its wide range of services is, among others, a partner in all matters related to the automotive sector. Original equipment manufacturers (OEMs), suppliers and Logistics specialists work hand-in-hand to provide the best possible results.



Read more at www.rhenus.com

More about SMARTTECH

SMARTTECH is a leading global manufacturer of professional grade 3D scanning solutions for the rapid digitizing of customized products utilizing its proprietary consumables across a variety of markets. Established as a spin of company on Warsaw University of Technology under the leadership of Prof Małgorzata Kujawińska in 2000, SMARTTECH has been constantly developing its 3D scanning technologies based on structured LED light.

Read more at www.smarttech3d.com

