

Automotive

Bringing surface defects to light

OLIGO Lichttechnik Surface Controls is specialized in innovative lighting and image processing technology used for the visual and digital evaluation of colors and surface finishes. With its latest generation of control systems based on B&R technology, the company has been able to increase the flexibility of its lighting systems, raise the level of automation of its inspection systems and create a control solution that can easily be scaled down for more basic applications.



Photo © QUBO Lichttechnik GmbH surface controls



OLIGO uses Automation Studio 4 to create all of the control and HMI applications for its surface control solutions. A central role is played by Automation Studio's System Designer, which is used to quickly and easily select devices, components and connection types and arrange them in either a hardware tree structure or in a 2D control cabinet view.



The experts at OLIGO recently created a 100 meter long light tunnel for a US automobile manufacturer which was put into operation in early 2014. Finished vehicles pass through this tunnel for a rigorous visual inspection. Highly concentrated workers slowly circle around the body of the car under the glow of 64 light arches, searching for signs of damaged paintwork, processing residue or any other surface imperfections.

The lighting configuration is automatically optimized for each individual vehicle that passes. "Different surface textures and colors as well as different types of inspection have very specific lighting needs to ensure that any defects are easily seen with the naked eye," explains Heiko Rieck, manager of the OLIGO plant in Lenzen, Germany and deputy managing director of OLIGO Lichttechnik Surface Controls.

A full spectrum of control optics

To provide the necessary resources for its light tunnels as well as the various other OLIGO product segments – such as workstations for surface auditing and color matching – the company developed a comprehensive range of lighting solutions for surface control applications. This selection is unique in the industry, and it is

from this range that the 64 arches that make up the light tunnel for the US automobile manufacturer were drawn.

An OLIGO control system ensures that the appropriate lighting configuration follows along with each vehicle as it moves through the tunnel's 16 stations of 4 light arches each. The main challenge here is to allow workers to reduce the speed of vehicles in any given station or briefly stop a vehicle in order to carry out essential repairs.

"With vehicles moving at different speeds, we need to coordinate the timing of the light arches to ensure that at any given time, the best lighting conditions are used for each vehicle," says Joachim Becker, development manager at OLIGO Lichttechnik Surface Controls. "This requires a high level of flexibility from the control system, which is only possible using our latest generation controls based on B&R technology."

Power Panel and X20 system for more flexibility

The control and HMI platform for the system is provided by a Power Panel with a 10.4" touch screen and Intel Atom processor. The software is developed entirely us-

ing Automation Studio 4. "This highly integrated engineering environment means we can quickly and easily modify the control system, including the user interface, at any time," says Becker. This is particularly important because each OLIGO system is built to meet the customer's specific requirements as well as the local and technical requirements of the customer's site. "It's not always possible to completely eliminate surprises during commissioning, but thanks to the flexibility of our control systems we can deal with them quickly," says Rieck.

Flexibility is also essential when it comes to the hardware, because the lighting controls and their associated higher level systems – such as the conveyor system which moves the vehicles through the tunnel – need to be networked with a wide range of different sensors. This is supported by the modular design of the X20 I/O system, which provided a broad selection of versatile modules. B&R's I/O system includes bus controllers for all common fieldbus and industrial Ethernet systems such as CAN, Ethernet/IP, Profinet and of course the real-time Ethernet POWERLINK, which is used to connect the Power Panel HMI to the control system.



Automatic color control - Generation 4.0

The X20 system offers a virtually unlimited number of outputs

For OLIGO, it was just as important that the control platform be able to communicate with the digital ballasts which have been used for several generations of controllers and feature a DSI interface. "B&R accommodated our request to include a digital standard output module to process the DSI protocol," says Rieck. "This way we can use the X20 system to implement virtually any number of outputs."

With this new generation control system, OLIGO no longer needs to install additional controllers for larger solutions, as used to be the case with earlier generations that only supported up to 14 DSI outputs. An important factor for the 100 meter light

tunnel was the fact that distances of up to 100 meters between I/O modules could be spanned cost effectively with POWER-LINK and a bus controller. Even longer distances – up to 2 km – can be handled using fiber optic cable.

In addition, the X20 system includes a DALI module which allows OLIGO to equip controllers with this internationally standardized interface at minimal cost.

A direct route to success

Before switching to B&R technology, OLIGO had developed its control systems in-house. In order to limit system certification expenses, an external power supply with ETL approval was used.

"Workarounds like this are longer necessary, because B&R handles certification of all the control components and ensures compliance with EMC/ESD regulations," Becker is pleased to report. "In addition, we benefit from B&R's high level of innovation and global presence, not to mention the long-term product availability and excellent support."

With the assistance of B&R's expert engineers, OLIGO was able to incorporate machine vision into the color matching controller in a very short time, using the same B&R technology as the light tunnel control system. The image processing software runs on Windows using the same Power Panel that provides HMI and control. "We use the camera to automatically adapt



Heiko Rieck, OLIGO surface controls

"With B&R automation solutions we are in a position to quickly and easily build and modify customized control solutions in different performance categories for different areas of application."



The surface control optics from OLIGO are installed in the light tunnel to create reflections that make defects on reflective surfaces more visible.

the color temperature and light density to the surface being viewed during production and inspection," explains the head of development.

B&R technology for state-of-the-art operator controls

OLIGO is driving the industry trend towards increasingly automated surface inspection. "As well as automatic defect detection and support for human inspectors, we are committed to improving ergonomics to prevent fatigue from factors such as glare," says Rieck with respect to recent market developments.

For OLIGO, the switch to B&R has already paid off. The company has used the generously dimensioned Power Panel touch screen to create a state-of-the-art user interface, whose realistic visualization of lighting configurations in a virtual workstation provides exceptionally intuitive operation.

Particularly when inspecting larger objects, when working in the light tunnel and when inspecting surfaces inside vehicles, workers appreciate the convenience of using a tablet PC to operate the controller without having to stop what they're doing and walk to a terminal.

Scalable controls for custom solutions

"New paint systems, innovative substrates such as carbon-fiber reinforced plastic (CFRP) as well as a trend toward increasing automation are placing more challenging demands on surface inspection control," says Rieck. "This requires high-performance controllers. With our new control generation featuring modular B&R hardware and the highly integrated Automation Studio engineering environment, we are in a position to quickly and easily build and modify customized control solutions in different performance categories for different areas of application." ←