EFFICIENT AUTOMOTIVE ASSEMBLY LINE
WITH ACCURATE 3D ROBOT VISION

CUSTOMER: ALSONTECH
LOCATION: VOLKSWAGEN FACTORIES IN CHINA
INDUSTRY: AUTOMOTIVE
IMPLEMENTATION: 2020-2021
Basler’s customer Alsontech is a high-tech company focusing on 3D vision solutions in China. The company designs and builds 3D robot vision systems that are widely used in automotive automation.

Volkswagen has applied Alsontech’s 3D robot vision systems to automate their assembly lines for exhaust pipes on car chassis; propelling themselves above their competitors, thanks to the speed, precision, and targeted results.

The key challenges and requirements of this application include:

- **Large field of view with reflective object surface**: the exhaust pipe is approx. 2 meters long with a large end section and reflective surfaces.
- **Real-time spatial information**: in bin-picking tasks, 3D spatial information is essential for exact positioning.
- **High flexibility**: the assembly line with robot vision system should be flexible enough to work with different types of car chassis.
- **High precision**: to meet the daily capacity target, the required accuracy for the pick and place robot is 99.9% and for the 3D vision positioning system the accuracy must be ±1mm.

*Figure 1: A working 3D-vision-guided robot system that can locate randomly placed exhaust pipes and assemble them onto car chassis.*
The 3D vision system developed by Alsontech can perfectly address the above-mentioned key challenges in applying vision to advanced assembly lines. The system uses two Basler ace 2.3MP cameras, while Alsontech develops laser imaging technology and SmartVision Software.

On the factory floor, the 3D vision systems are mounted onto robot arms to give the robots the freedom to see within their reach. The vision system performs three tasks: scanning the exhaust pipe using Basler ace industrial cameras and line-laser module, generating a detailed cloud image with the pipe’s bend as the feature, and calculating the best unique coordinates for the robot arm to pick up an exhaust pipe and place it onto the car chassis correctly.

**Key benefits of the 3D robot vision solution include:**

- **Small Footprint:** It is important to have a compact vision system for the vision-guided robot to fit in the confined space of a work cell.
- **High accuracy:** With accurate visual information to precisely navigate along its edge, a pick and place robot executes pick tasks accurately and reliably.
- **High flexibility:** Flexibility in vision system design allows the application to be extended to other car components on the same assembly line.
- **Reduction in overall production costs:** Costs decline with less workforce needed for material handling.
- **Easy to use software:** System engineers can focus on the total automation solution.

**Figure 2:** The 3D cloud image of an exhaust pipe bend.

Miniaturization is a dominant trend in smart manufacturing, demanding a high degree of robustness in the integrated vision system, so we need small and stable vision components. In this project, the robot with vision should complete a pick-and-place task in 4 seconds with 100% accuracy. Our experience in designing a vision system for this project demonstrated how reliable and effective Basler’s vision products are for use in a vision-guided robot pick-and-place installation. The high image quality and reliability of Basler products perfectly align with our commitment to customers.

*Mr. Miao, General Manager of Alsontech.*

** SOLUTION AND BENEFITS**

**TECHNOLOGIES USED**

- Basler ace acA1920-155um camera
- Alsontech’s binocular 3D vision positioning software
- AT-S1000-04A series 3D Vision System by Alsontech