AUTOMOTIVE

AUTOMATED ACTIVE ALIGNMENT SYSTEM ENSURES PERFECT CAMERA MODULE ASSEMBLIES

Our client is an automotive safety leader with products installed in 100+ car brands that together save 30,000+ lives a year. A machine-vision auto safety system (in the category Advanced Driver Assistance Systems) is a flagship product of theirs; Averna performs the Active Alignment on their camera lens/sensor/PCB assembly.

CHALLENGE

Like many suppliers serving the ADAS market, Averna's client was experiencing increased demand for onboard automotive sensors and cameras. Due to high demand plus this technology's unique optical characteristics, different form factors, and error-free assembly requirements, the client needed to quickly implement a high-throughput and flexible manufacturing-assembly system.

At the production stage, their system needed to efficiently bond image sensors to a lens assembly, requiring high-speed quality inspection, elimination of any contamination, application of adhesive, assembly of the components, and 6-DOF optical verification.

RESULTS

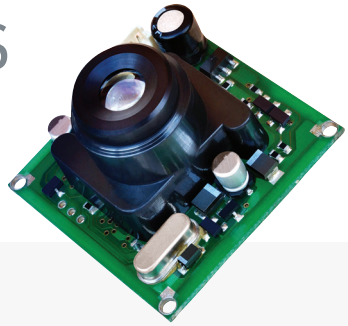
AFTER EVALUATING THE CLIENT'S CURRENT AND FUTURE REQUIREMENTS, AVERNA DESIGNED AND DELIVERED **A ROBUST AND FLEXIBLE** SOLUTION TO **AUTOMATICALLY HANDLE** DIFFERENT CAMERA MODULE ASSEMBLIES WHILE ENSURING **SUB-MICRON PRECISION AND ACCURACY**. THE ALL-IN-ONE MODULAR SYSTEM OPTICALLY VERIFIES THE ASSEMBLIES IN ALL **6 DEGREES OF FREEDOM**, PERFORMS GLUE DISPENSING AND UV CURING, AND REMOVES ANY CONTAMINATION.

Averna

"Averna's Active Alignment systems are precisely designed, fabricated and tested. After qualification, these fully automated solutions quickly assemble and verify client units."

BART COX
Customer Solution Architect, Averna

FAST SYSTEM ALIGNS, COMBINES AND VERIFIES CAMERA MODULE ASSEMBLIES



THE AVERNA SOLUTION

Due to the many project challenges, Averna tapped its optical, machine vision and robotics expertise.

Based on the client's yield and quality targets, Averna designed a fully automated and modular clean-room system, featuring precision handling, high-speed testing, and continuous quality monitoring.

First, sensor components enter the assembly chamber, where decontamination and cleaning occur. Next, the surface is treated and adhesive is quickly and precisely dispensed, followed by location and quality verification. Once the glue bead is verified, the camera lens assembly enters the chamber.

While precise mechatronics bring the sensor and camera parts together with sub-micron accuracy, fast algorithms assess, verify, and correct (where necessary) the unit's optimal alignment in all 6 degrees of freedom (X, Y, Z, α, β, γ) on a hexapod platform at multiple distances.

Once perfect alignment has been achieved and verified, UV curing secures the bond, and the fully assembled camera module assembly leaves the chamber, ready for the client's next manufacturing stage.

Glue bead appliance and inspection

Sensor raised to optics for active alignment

Benefits

- State-of-the-art optics, electronics and mechatronics ensure highest process and product quality
- All-in-one, modular system provides maximum flexibility, easy servicing and minimal retooling
- Supports multiple camera modules and long focal lengths while occupying very little floor space
- Designed for all manufacturing stages, including prototyping, optimization and production