

# Intelligent Mirror Test in Production

with Embedded Cameras (Alignment, Calibration and Test)

## About the Cooperation

Intelligent mirrors were firstly introduced to the automotive market in 2014 by Nissan. What followed was a quick adoption in the premium segment and we were contacted by a leading global Tier 1 producer to develop a test system that could test intelligent mirrors in the production line with a very fast cycle time.

The combination of high resolution optical test (mirrors) and combined vision and optical test know-how for intelligent cameras made Konrad the ideal choice for this complex test machine.

## Project Scope

### Challenges

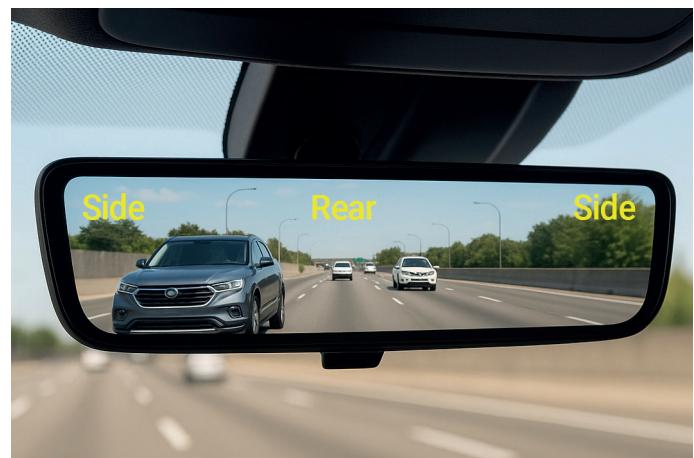
- With the business scope mainly around mirror production it was a significant challenge to integrate intelligent cameras and make sure they would work perfectly in the newly released product.
- Working together with R&D at the tier1 as well as the OEM customer to understand the key requirements and ensure that everything gets tested accordingly and meets the quality standards set by the OEM.

### Objectives

- A large test specification was created in collaboration with OEM and Tier1 that had to be tested during production ensuring that the delivered product could be assembled into the car without any quality issues.

## Solution

- Development of a large customized tester, combining optical, electrical and intelligent functional testing.
- Functions:** Automated DUT handling, power up of DUT, communication with the device to grab test data, optical test head for optical tests, display and functional test, test sequence execution for all tests on the specification
- Used technologies and processes:** automated DUT handling, alignment, calibration, test automation



Smart mirror with combined information from different sensors

- Applied test procedures:** FCT, EOL, vision test, optical test

**Debris Measurement:** Different lighting situations, from visible light to infrared light, Details about testing:

**MTF Measurement:** Collimator can be adjusted with the focus point, making it very easy to test mirrors from different manufacturers on the same system.

**Intrinsic Calibration and Measurement:** Using a specially developed dot target, distortion and the necessary correction factors can be calculated within a limited space. This calculation was also developed for prismatic mirrors, as they behave very differently from planar mirror glass.

## Customer Benefit

With the combination of optical, sensor, electrical and automation know-how we took over the challenging task to develop this complex machine and the customer could focus on product improvement and product marketing instead of worrying about the test implementation.

Time to market was accelerated which led to a growth in revenue at the end customer that couldn't have been achieved if they went with a different solution.

## Our Know-how

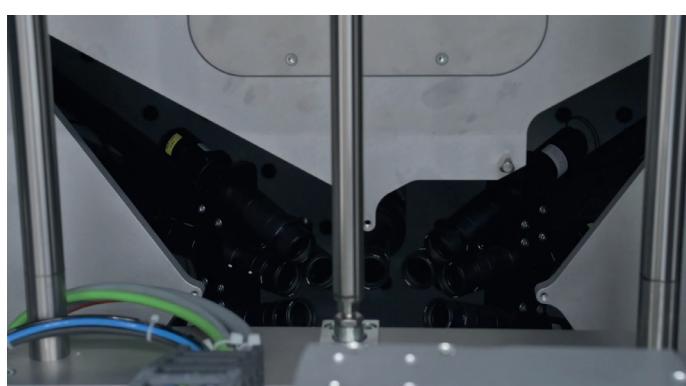
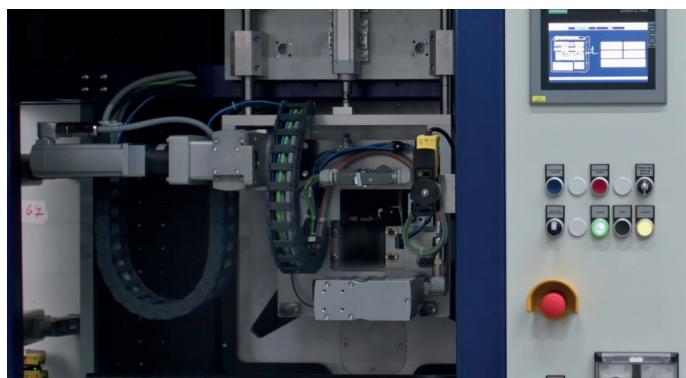
- Optical inspection of mirrors
- Optical inspection for smart cameras
- Image processing
- Functional testing

## Supported Software & Hardware



TestStand

LabVIEW



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