MITSUBISHI ELECTRIC
Changes for the Better

Automating the World

FACTORY AUTOMATION

Customer reference

Noffz GmbH

INDUSTRIAL ROBOTS AS AN UNUSUAL MEASURING TOOL FOR TESTING RADAR SENSORS

More and more radar sensors are being installed in modern cars today. These increasingly complex sensors must be tested and calibrated during production in order to deliver reliable results during operation. NOFFZ Technologies GmbH develops and produces test and automation systems for these tasks. Industrial robots from Mitsubishi Electric are used as unusual measuring equipment that ensures high precision in movement.

Short and sweet

- o Precise calibration of radar sensors for safe operation in modern vehicles
- o Robots perform high-precision sensor movements during testing
- o Fast and easy calibration without additional programming

Up to 10 radar sensors detect objects and directions in modern cars.

The Challenge

Automated testing and calibration of radar sensors

Sensors based on radar or other technologies play an important role in modern motor vehicles. This is because they support the driver with assistance systems for semi-autonomous or autonomous driving. Modern radar sensors are complete systems, sometimes consisting of dozens of radar antennas and integrated signal processing. Due to this complexity, they have to be tested and calibrated as part of quality assurance.

The medium-sized company NOFFZ Technologies GmbH has developed the Universal Tester Platform (UTP) for this task, which the company sells worldwide. The exact positioning and movement of the radar sensors in the test chamber is particularly challenging.

In the first versions, the test specimens were tilted in two directions in order to simulate the horizontal and vertical position of an object to be detected. However, this separate adjustment of azimuth and elevation no longer fulfils the increased requirements of modern radar sensors. The test object must therefore be able to move around both axes simultaneously in order to simulate that the entire field of view is covered.

NOFFZ Universal Tester Platform UTP tests and calibrates radar sensors that are used in automotive applications, for example.

The Solution
Industrial robots as measuring equipment

NOFFZ decided to enable the movement of the test specimen using an industrial robot from Mitsubishi Electric's MELFA-FR series. The task of moving the test specimen within the system as required places high demands on the robot used. Absolute accuracy and repeatability were particularly important. In the systems, the robot is used more or less as a measuring device.

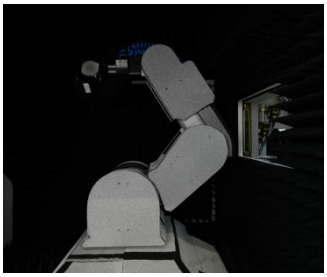
The mathematical centre of the sensor (centre of rotation) must always be at the centre of the rotational movements during the calibration run of the test specimen in the test system. In addition, the robot movement and calibration program must be precisely synchronised, which is why NOFFZ uses a real-time controller to control the robot directly. An embedded system calculates the path movements for the robot from the required movements of the radar sensor in the measuring chamber.

"The test and calibration process can be parameterised and started via a touch display," explains Martin Nieskens, Team Leader ADAS System Design at NOFFZ.

The Result:
Universal System

The radar sensor is calibrated directly during the test. The calibration parameters are written to the sensor module, in which a DSP is installed in the more complex radar sensors. The sensor is then usually tested again.

The entire process takes between a few seconds and a good minute. The UTP software is designed in such a way that the measurement task can only be created by parameterization. The customer therefore no longer needs to program the system once it has been commissioned.



The industrial robot from Mitsubishi's MELFA-FR series moves the test specimen in the test chamber with high precision and in real time.

Video and further information

Further information and the video can be found on the
- Homepage Noff:
- Video