3D – Camera system for measuring parts in production

Introduction
The 3D camera system made by Compar facilitates quality control and accurate dimensional inspection in three dimensions in production environments. The principle of triangulation is used to make depth images and accurately measure structures in x, y and z. Even for large numbers of positions to be measured only a minimum of time is required and complex parts can be fully inspected, which would be uneconomic if carried out by deploying tactual measuring equipment or infeasible at high-speed production cycles. The VISIONexpert® platform ensures the devices’ ease of use.

How it works
The 3D camera system deploys the principle of triangulation, which has been well-established in the sector of optical optic metrology. Here is an abstract of this principle:
An LED or laser line is projected onto the object to be measured from a position oblique to the camera’s optical axis. The line’s position in the camera image changes corresponding to the object’s height and thus allows for calculating the structures’ height and lateral positions. By arraying, numerous light lines are strung together to calculate the entire surface’s space coordinates (x,y,z).

The benefits of a 3D camera system with triangulation
Rapid and highly precise complex parts measurement
Technical data

System platform
The platform is a PC system equipped with the VISIONexpert® software package, which includes image data acquisition, image analysis, system operation and parameterization as well as communication. This serves as state-of-the-art and tried-and-tested tool to realize applications with.

The benefits of platform VISIONexpert®
- PC-based machine vision system running with Microsoft Windows
- modularity in terms of hardware and software
- efficient machine vision libraries (e.g. Cognex PatInspect)
- various access authorization levels with corresponding operator interface
- traceability (21 CFR Part 11 - compliant)
- uncomplicated parameter setting
- Immediately run-capable without re-compilation
- results visualization

VISIONexpert® enables authorized operators to set parameters for test runs quickly and easily. New products require the definition of:
- the position of the surface or structure to be measured
- reference positions in x,y
- reference positions or layers for
- height determination
- nominal values
- tolerances

Application example
In order to ensure the perfect quality of electronic modules used for solar and wind energy, for each of the up to 90 test positions in total the presence of a spring contact is checked. Additionally, the height of each identified spring contact is determined. It has to be within a tolerance range of ±0.1mm of the reference value. Consequently, the measurement accuracy required has to be above ±0.01mm. It takes about 0.5s to scan a test item. The overall time required to check 90 contacts is less than one second.

Limitations
The quality of the measurement depends on the properties of respective product surfaces. Glossy surfaces or black areas might hamper or even impede measurement. Depending on the parts' geometry and array, masked sections caused by areas positioned in the shade of line lighting are also imaginable.

Target Markets:
Automotive, packaging, watchmaking, printing, electronic, medical, and pharmaceutical industry

Compar industrial machine vision systems are deployed wherever quality control is required, zero-defects strategies are applied, or value for money and high productivity are needed.