

## ProCam

### Mobile 3D measurement technique supports quality assurance in bus manufacturing

A vast number of varieties, multiple special customer requirements and a low level of automation are significant for the manufacturing of passenger busses. An automated control of individual parts and complete vehicles as part of the quality assurance is difficult also with regard to the dimensions of up to 15 meters.

Only some of the parts are measured on stationary co-ordinate measurement machines. Quite often, scales and jigs are used. At MAN Bus GmbH in Salzgitter, Germany, the AICON 3D measurement system ProCam is used now. The system was optimized for use in bus production within a project of the EU.

Up to the present, the ProCam system had mainly been used for passenger vehicles. Together with the Institute for Tooling Machines and Manufacturing Technique of the Technical University of Braunschweig, the "Imbus" project (Inspection and Monitoring of Bus Manufacturing) was carried out. Within this project, the measurement technique was adapted to the special requirements of bus manufacturing. Together with mainly technical aspects, the implementation of the new technique into the manufacturing routines was an important aspect.

#### The System

The system consists of a measurement adaptor, several portable reference panels with coded targets as well as a measurement computer for control and evaluation. During the measurement, the camera focuses on the field of reference points with known co-ordinates. The adaptor is mechanically connected to the camera and touches the required object point. When the measurement is performed, the camera takes a picture of the reference field which is visible in this particular situation.

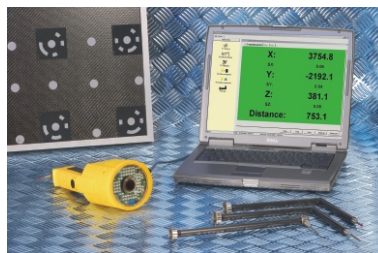


• Bus manufacturing

#### Photogrammetric Principle

By photogrammetric algorithms, the 3D co-ordinates of the camera at the time of measurement are determined. The place where the probe is situated is equally measured. All points from which a part of the reference field is visible can be recorded by the camera.

By extending the tip of the probe, the field of work can be enlarged, and also hidden points can be touched and measured.



• ProCam System

#### Application in Bus Manufacturing

For the application in bus manufacturing, the handling was significantly optimized by making a control box obsolete which had been necessary before.

The design of the probe was made more robust and consequently the use in the manufacturing line was improved. The new measurement system has been available now for several months.

For the user, a significant advantage is given by the fact that results from the line are now saved and evaluated directly. Measurement data and evaluations are made available through an intranet solution. Thus updated actual quality information is permanently available. Consequently, staff working in quality assurance, construction, planning or manufacturing gets the latest information on production quality easily.



• Mobile 3D Probe

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Source:

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