

# DPAPro and DPAInspect

Portable 3D Industrial Measurement Systems



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## Industrial metrology

Industrial metrology is a basic component of state of the art production processes. Areas of application include production control, quality inspection, and product development.

Portable 3D measurement systems allow for onsite inspection and error detection without time consuming interruption of production lines. Parts no longer have to be transported to the Coordinate Measurement Machine (CMM). AICON's **DPAPro** and **DPAInspect** are light weight portable systems which are easy to use in any location.



## Applications

AICON's **DPAPro** and **DPAInspect** will measure parts from a few millimeters up to many meters in size. Objects as large as entire aircrafts can be measured. AICON's DPA systems employ a hand-held camera and are therefore particularly suitable for use on large objects that cannot be moved to a CMM and must be measured at their current location.

M E A S U R E T H E A D

AICON's DPA systems are also especially suitable for use when the environment requires that time on site is minimized. Moreover, they are very useful in areas where movement is restricted as they do not require stable measuring instrument positions. AICON's powerful DPA software delivers results within seconds of completion of the measurements.

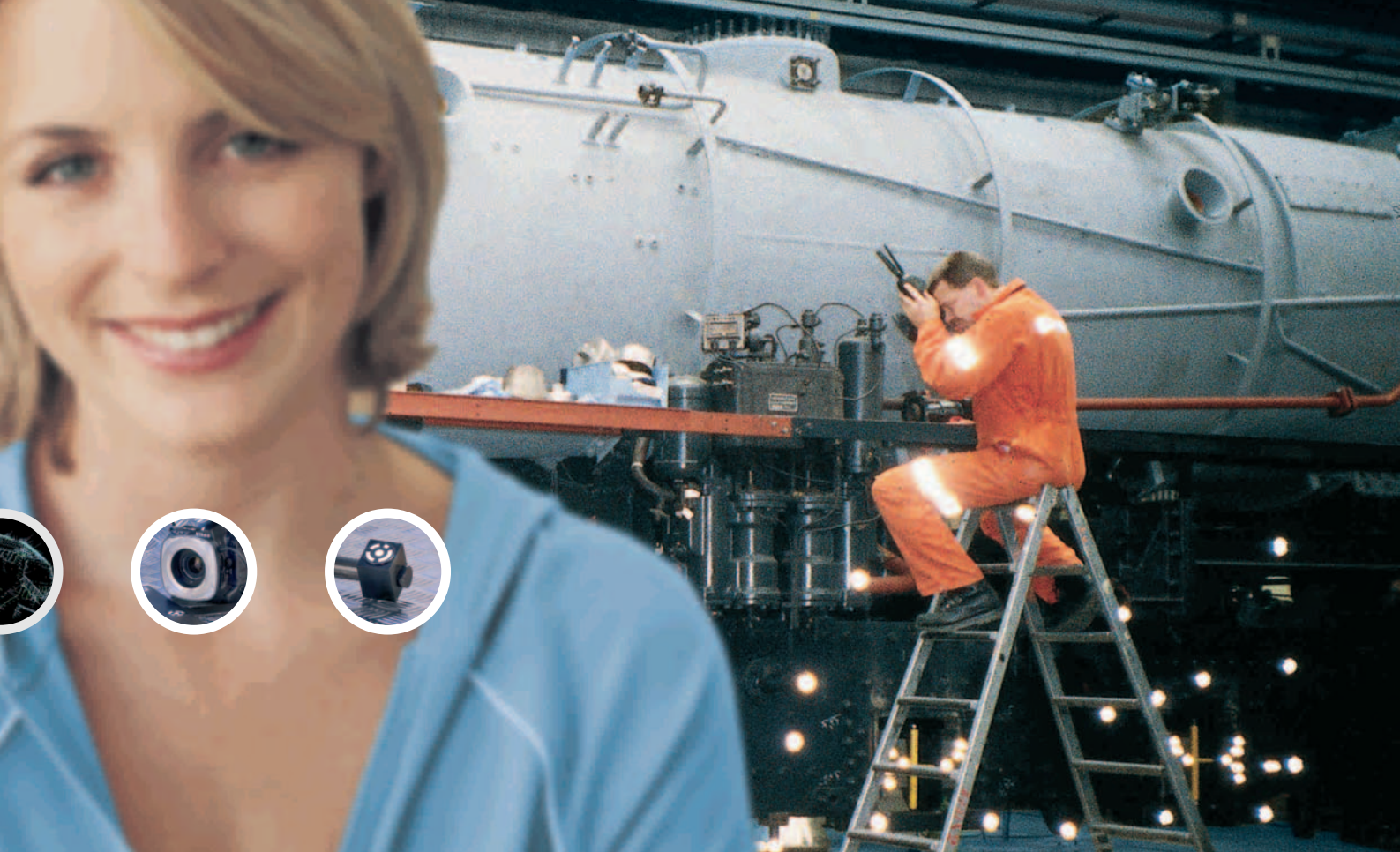
**The following are typical applications for the DPA systems:**

### **DPAPro: 3D process analysis**

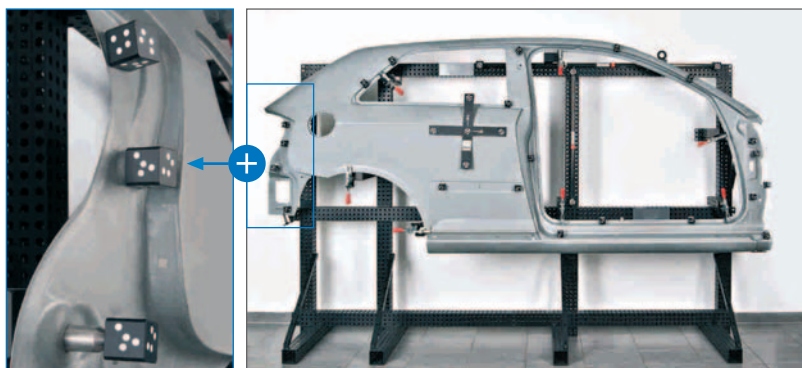
- Deformation analysis in vehicle safety tests
- Deformation analysis of sheet metal and plastic parts, e.g. in environmental chambers or strain tests
- Motion analysis, e.g. of components under load

### **DPAInspect: 3D inspection**

- Inspection of sheet metal parts and tolerance analysis
- Fixture inspection
- Comparison with CAD
- Roundness inspection, e.g. tunnels or tanks
- Measurement of large steel fabricated structures



D V A N T A G E



Especially coded adapters support the signalisation of boreholes, edges etc.

### Measuring principle

AICON's DPA systems are portable 3D measuring machines that use a high resolution digital camera for data collection. The part, which may be of any size, is photographed from a number of directions. These photographic images are processed either simultaneously with data collection (online processing) or after data collection (offline processing) with AICON's powerful software.

This software runs on a standard notebook. The software automatically calculates the 3D coordinates of all targeted points. The calculation is based on the principle of spatial image triangulation (photogrammetry) and is fully automated. Pre-calibration of the camera is not necessary because the software employs an integrated simultaneous calibration procedure.

### DPA technology

The heart of the measuring systems is Digital Photogrammetric Analysis (DPA). It allows for completely automated processing of digital images independent of the recording device. The software is easily adaptable to any kind of measuring tasks.

In addition to 3D coordinates, DPA provides statistical analysis of the results with specific accuracy information about each coordinate. This allows for instant evaluation of the quality of the measurement.

# DPAInspect

## Work flow

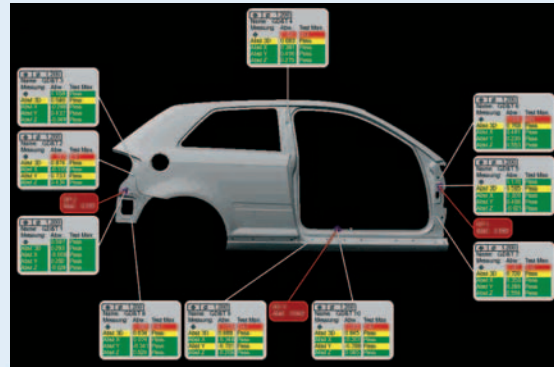
Targets or adapters are placed at all features relevant to the inspection. There are adapters for boreholes, edges etc. as well as special adapters for measuring reference points. In addition, trim lines, punch holes etc. can be measured without any additional targeting. The targeted part is photographed with a high resolution digital camera from different directions.

Then, with the help of DPA technology, the 3D coordinates are calculated and transferred to the measuring software automatically. Afterwards, the software compares the results with CAD – either automatically or manually – and a useful measurement report is generated.

## Benefit

The traditional inspection of parts often requires their transport to a CMM. This is time-consuming and often results in a delay in the availability of the results of the survey.

DPAInspect offers the capability of conducting the inspection of sheet metal and other parts onsite. This not only saves time and money but also allows for immediate process modifications if required. Fast and automatic analysis of data and production of the final report increases manufacturing reliability and makes quality controls possible at any time without elaborate preparation.



The measurement software automatically displays the inspection results.

DPAInspect is integrated with many measurement software packages, thus allowing for highly automated measuring processes, from processing the photo of the targeted object to the generation of final reports. Software packages that DPAInspect is designed to work with include PolyWorks®, RapidForm™, Metrolog®, Metrosoft and others.

# DPAPro

## Work flow

Targets or adapters are placed at all points which are to be measured. Photographs are then taken of the object from different viewing directions with a high resolution digital camera. The photographs are automatically analysed on location. If the measurement task is a deformation analysis, the part is subjected to the required force or environmental condition.

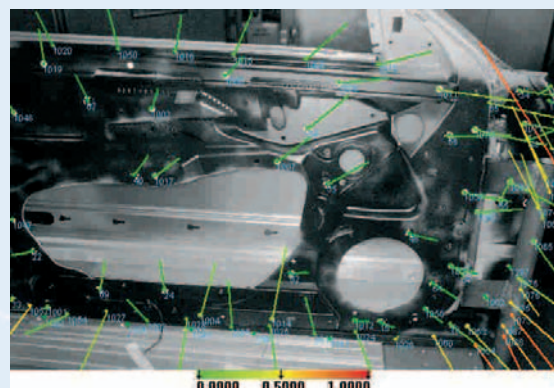
At the end of the deformation process, the object is again photographed with the digital camera. Data may also be collected at the intermediate points in the study, if desired. 3D movement of the measured targets is calculated by AICON 3D Studio measuring software. A variety of useful reports can be created.

The results are in the form of vector depictions of the deformations between two or more states. Results may be shown as a graphic overlay or as a comparison to CAD. In this way, processes can be analysed and interpreted very rapidly.

## Benefit

In order to shorten the development cycles of increasingly complex parts, it is necessary to collect product dimensional quality information quickly and easily. DPA technology meets these requirements by providing effortless onsite data analysis. These results can then be directly integrated into the product development process.

DPAPro provides dense high quality 3D information. This data allows for fast and precise evaluation of the dimensional quality of a part, thereby contributing to a reduction in development time.

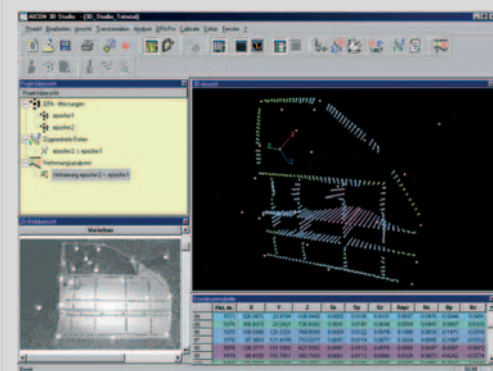
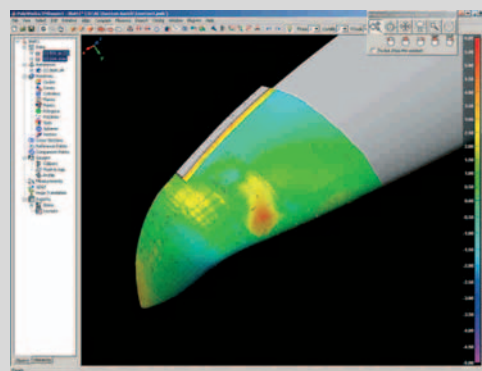


Color-coded vectors show value and direction of the deformation.

# System Specifications

## DPAInspect

## DPAPro



Hardware		
Digital camera	NIKON D2x with Nikkor 24 mm	
Camera resolution	4288 x 2848 pixels (12.4 mega pixels)	
Data transmission	W-LAN or removable storage device	
Length accuracy according to VDI 2634	± 0.015 mm/m	
Viewing angle (horizontal/vertical)	58° horizontal, 36° vertical	
Illumination	white light flash	
Storage time	5 images per sec.	
Processing unit	high end notebook	
Operating system	Microsoft® Windows® XP	
Accessories	scale bars, coded targets, standard targets, adapters	
Software		
Photogrammetric processing	DPA	DPA
Control software for post processing and reporting	PolyWorks®, RapidForm™, Metrolog®, Metrosoft etc.	AICON 3D Studio
Automatic on the job calibration	yes	yes
Automatic referencing	yes	yes
Deformation and motion analysis	no	yes
Adapter correction	yes	yes
Feature measurement	yes	yes
Application areas	3D Inspection <ul style="list-style-type: none"> <li>- Inspection of sheet metal parts and tolerance analysis</li> <li>- Fixture inspection</li> <li>- Comparison with CAD</li> <li>- Roundness inspection, e.g. tunnels or tanks</li> <li>- Measurement of large steel fabricated structures</li> </ul>	3D Process Analysis <ul style="list-style-type: none"> <li>- Deformation analysis in vehicle safety tests</li> <li>- Deformation analysis of sheet metal and plastic parts, e.g. in environmental chambers or strain tests</li> <li>- Motion analysis, e.g. of components under load</li> </ul>



# DPAPro and DPAInspect

Portable 3D Industrial Measurement Systems

- Portable optical 3D measurement systems with a digital camera for data collection
- Process analysis of deformation and motion
- Inspection of parts

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