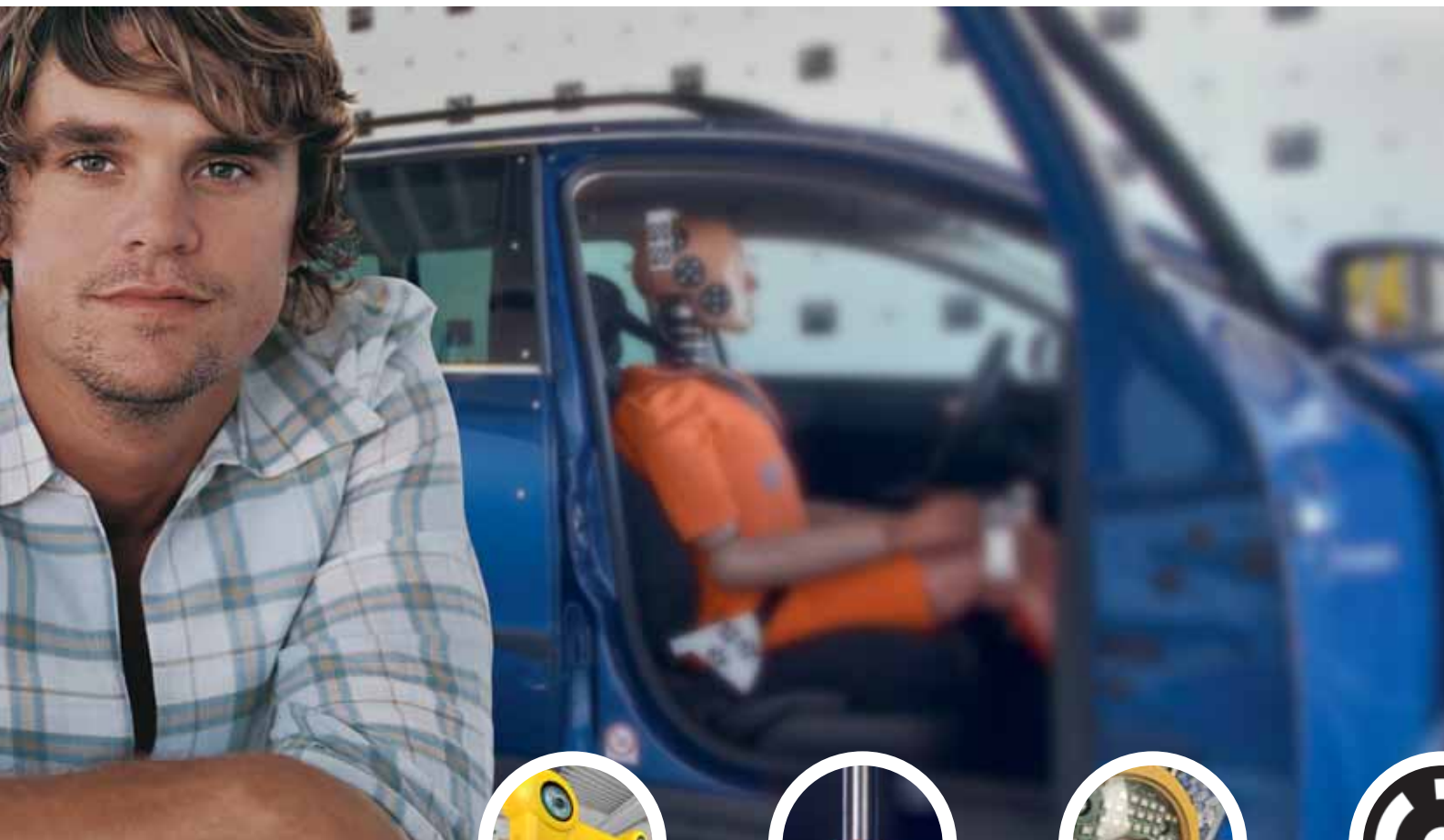


ProCam | DPS

Optical 3D metrology for vehicle safety testing



MEASURE THE ADVANTAGE



ProCam | DPS

Optical 3D metrology for vehicle safety testing

Importance of passenger protection increases

In new car development, crash and sled tests are conducted in order to minimize the passengers' risk of injury. Both complete vehicles and single components such as airbags or belt systems are analyzed. In order to receive necessary approvals, car manufacturers have to respect a multitude of standards and regulations.

Additionally, many of them perform further analyses so that they can assure an optimal safety level. Since more and more new vehicle models are now supposed to be launched ever faster than before, the need for supporting optical metrology increases dramatically, offering enhanced productivity and efficiency required to shorten test cycle times.

Application oriented system solutions

With its portable industrial measurement system DPAPro and software solutions for camera calibration, AICON has already made its mark as a leading supplier of optical metrology for vehicle safety testing. AICON now offers two complementary systems, ProCam for pre- and post-crash vehicle measurement, and DPS for real-time dummy positioning. With application specific solutions based on the AICON 3D Studio software, each features a precise, fast, and easily operated user interface, tailored to the task at hand.

ProCam

Fast and easy crash vehicle measurement

How ProCam works

The mobile probe ProCam consists of an active probe with a high resolution CCD camera, a portable PC for system control and the software module ProCam Crash that is used as a plug-in to the AICON 3D Studio measuring software. The probe is equipped with a measuring tip to touch object points. During the measurement, the camera is held facing a field of control points that is located nearby, either on portable or on fixed panels.

M E A S U R E T H E A

Easy to use: active probe

The lightweight, hand held probe is ergonomically designed. Measurements are triggered easily by pushing the button on the handle. The reference targets are then illuminated by the integrated infrared ring flash, and the system calculates, displays, and records the coordinates of the probe tip. ProCam operates independently of surrounding light.



Application in a pre-calibrated room

To reach the most difficult points: interchangeable probe tips

Extension probe tips are exchangeable and available in various shapes and lengths allowing the measurement of any point with ProCam, e.g. points behind obstructions, under seats or behind the instrument panel. No calibration is required after an exchange.



D V A N T A G E

Flexible, precise – and fast at the same time

The ProCam system is mainly used in a pre-calibrated room or bay. However, when target panels are used, it also permits mobile application. For the stationary operation of ProCam, reference targets are fixed to walls and/or ceiling, and the coordinates of the reference points are measured with high precision. This reference volume may be any size; therefore the system even measures very large vehicles. As the measuring system is portable, the same probe can be operated in several measuring rooms. Consequently, the vehicle can remain in the same room for further instrumentation. Thus the establishment of several measuring stations is possible without considerable extra costs.

The accuracy of ProCam is independent of the object size. It merely depends on the distance between probe and reference targets. When applied in a measuring room, ProCam is able to conduct the complete measurement of a vehicle with only one alignment to the vehicle coordinate system. Through this, a homogeneous accuracy of $\pm 0.1\text{mm} + 0.1\text{mm/m}$ is achieved for the whole vehicle volume. In the process, the measurement of 180 points takes less than two hours. This is a huge saving of time when compared to conventional systems.



Dedicated to crash tests: measuring software ProCam Crash

ProCam Crash is a software module that has been specially designed for the measurement of vehicle geometries before and after crash tests. It guides the user through the measurements in an intuitive way. The software can be learned easily and uses integrated functions to optimize the measuring procedure. The user is able to define the details of the measuring procedure before the measurement starts.

Maintain order: structured measuring plans

First, the software calculates the alignment of the vehicle with an arbitrary number of points defined by diverse types of features (slot, circle, plane, etc.). An elaborate mechanical positioning of the vehicle, e.g. on a granite table with a damping system, is not necessary. The points to be measured are stored in a structured measuring plan in a tree-hierarchy. Thanks to overview pictures, the user immediately knows the position of a measuring point on the vehicle. The measured points are highlighted in the tree-hierarchy, which permits the user to follow the progress of the measurement.

During the post-crash measurement, the same points are touched a second time; they are recorded in the same coordinate system and directly compared to the results of the pre-crash measurement. The existing deformation between the points is determined automatically and can be documented and visualized with the help of user specific reports.

Unbeatable efficiency

The hand held probe allows for easy and fast measurement all around the vehicle. Relocation of the measuring equipment does not require realignment. For this reason, ProCam is by far the most powerful system for vehicle crash measurement.

DPS

Online 3D dummy positioning in vehicle safety testing



The right position is essential

When performing a crash test, it is essential that the dummy is positioned and seated in the vehicle precisely according to the standards and regulations the test is based on.

How DPS works

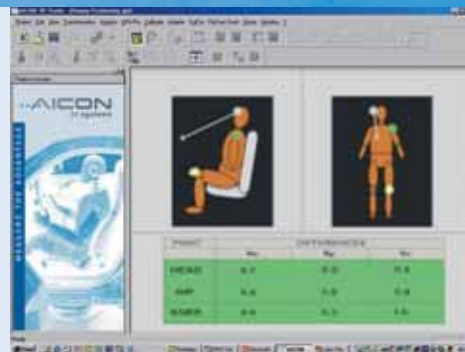
The DPS system consists of the DPS measuring head, comprising four high resolution digital cameras with infrared ring flash, a portable PC for system control, a wireless probe, accessories to target the points on the dummy, and the software module DPS in AICON 3D Studio.

Mobile application

For its mobile application, the DPS measuring head is integrated as a complete system into a cart including a PC for system control, a non-interruptible power supply and accessories. The system is immediately ready for operation and the location of DPS can be changed quickly. No setup time accrues. The active infrared ring light allows for reliable measuring independent of any surrounding light.

Easy dummy positioning: software module DPS

The software module DPS has been specially developed for the purpose of dummy positioning. Combined with the DPS system, it serves as optical 3D positioning equipment that controls the 3D position of the dummy relative to the vehicle during the positioning process. With the help of measuring points or adapters, the current dummy position is recorded in real time, and compared to nominal data.



The system allows for the measurement of additional coordinates of single points, lengths or angles with the probe according to a pre-defined measuring plan. The results are shown in a measurement report. Further individual processing via an XML export is available.

Application for both sled and crash barrier facility

AICON's DPS is the only system for dummy positioning that is able to simultaneously record multiple measuring points in vehicle 3D coordinates. Using the wireless probe, DPS combines the qualities of a 3D positioning system with those of a mobile CMM.

The differences between the target positions and reference positions are displayed graphically or numerically. With all points on the dummy measured and displayed simultaneously in vehicle coordinates, the technician can quickly put the dummy into its target position. Movements of the vehicle that are caused by the positioning of the dummy are compensated automatically because of continuous monitoring of a set of targeted reference points.

The user can conduct a complete positioning including preparation and additional measurements within a few minutes. The portability of the system makes it applicable for dummy positioning both in vehicles for crash barrier and on bucks for sled tests. The high positioning accuracy guarantees reproducible, user independent results and facilitates the comparison to simulation data.



Specifications

ProCam



DPS



System	ProCam Crash	DPS
Application	pre- and post-measurement of crash vehicles	online dummy positioning in vehicle safety testing
Hardware		
Camera	ProCam probe with high resolution CCD camera	DPS measuring head with 4 high resolution CMOS cameras
Resolution	1628 x 1236 pixels	1280 x 1024 pixels
Lens	high performance lens, f=6.5mm, minimal distortion	high performance lens, f=8.0mm, minimal distortion
Data transmission	IEEE 1394	IEEE 1394
Flash	IR-LED ringflash	IR-LED ringflash
Controlling computer	notebook	notebook or industrial PC
Operating system	Microsoft® Windows® XP	Microsoft® Windows® XP
Accessories	exchangeable probe tips, carbon fiber target panels, tablet PC	active probe, calibration plates, exchangeable probe tips, dummy adapters, wheeled tripod, tablet PC
Software		
Driver software	ProCam	3DTargets
Control software	AICON 3D Studio with ProCam Crash	AICON 3D Studio with DPS
Automatic on the job calibration	yes	yes
Generation of templates for measuring plans	yes	yes
Transformation into vehicle coordinate system	yes	yes
Automatic referencing	no	yes
Deformation analysis	yes	yes
Interface to external analysis software	yes	yes
Interface to external data bases	yes	yes
System parameters		
Length measuring accuracy	±0.1mm + 0.1mm/m of distance to reference	±0.1mm + 0.15mm/m of distance to measuring head
Measuring volume	depends on reference area	up to 3m x 3m at max. 3.5m distance to measuring head
Max. measurement frequency	7Hz	5Hz



ProCam

Fast and easy crash vehicle measurement

- Mobile optical probe replaces conventional CMM or articulated arm
- For pre- and post-crash measurement, analysis and documentation
- Free movement around the vehicle without any additional alignment
- Easy measurement of hidden points

DPS

Online 3D dummy positioning for vehicle safety testing

- Mobile measuring head with 4 digital cameras and wireless probe combines 3D positioning and measuring capabilities
- Fast and easy dummy positioning, in any location, within a few minutes
- User independent and repeatable positioning
- Procedures and documentation according to international regulations

MEASURE THE ADVANTAGE



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