



Video Photogrammetry [Dynamic 3D-Coordinate measuring system]

Linearis3D Video

The dynamic 3D coordinate measuring system computes precise 3D positions for an arbitrary number of marked points using two to 32 cameras. The underlying measurement principle is triangulation. Observations from an arbitrary number of cameras can be combined using bundle adjustment - the gold standard for precision applications. 3D Positions can be determined down to 0.1 mm, 3D deviations down to 0.02 mm.

Typical Tasks

- + Deformation measurement
- + Material testing and validation of FEM calculations
- + 6 DoF tracking of arbitrary objects
- + Kinematics analysis
- + Tracking of tactile probes

Advantages of video photogrammetry

- + Full 3D displacements
- + Unlimited number of targets
- + Measuring frequency up to 250Hz (more upon request)
- + Robust for a large range of temperatures
- + Low cost for targets
- + Targets for temperatures up to 600 C available

Measuring procedure

Calibration

First of all the system is calibrated. The cameras are shown a bar shaped calibration device and a couple of dozen images are shot. The computation of the calibration is fully automatic. The process takes between 3 and 10 minutes depending on the number of cameras and complexity.

Measurement

The points to be measured on the object are marked with self-adhesive or magnetic circular markers. A point must be seen by both cameras. Results can be viewed live or analyzed after image acquisition.

Features*

Handling

- + Fast calibration and setup of system (approx. 5min.)
- + Online tracking and evaluation
- + High speed image grabbing for offline analysis

Hardware

- + USB 2.0, USB 3.0 and GigE Cameras available
- + Different camera types can be mixed
- + 2 to 32 cameras possible
- + Natural light or infrared illumination
- + Paper or retroreflective targets available
- + Battery power only operation for certain configurations
- + Workstation notebook or High-End PC

Software

- + Live 3D display of point positions
- + Live 2D display of graph (absolute values or delta)
- + Export of data as CSV
- + SDK (.net) available to integrate 3D results in your application
- + Compatible with Windows 7/8/8.1/10 (64bit)

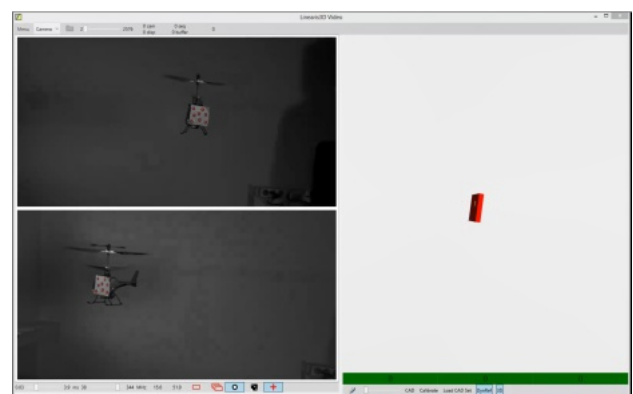


Figure 1: 6 DoF Tracking of a drone

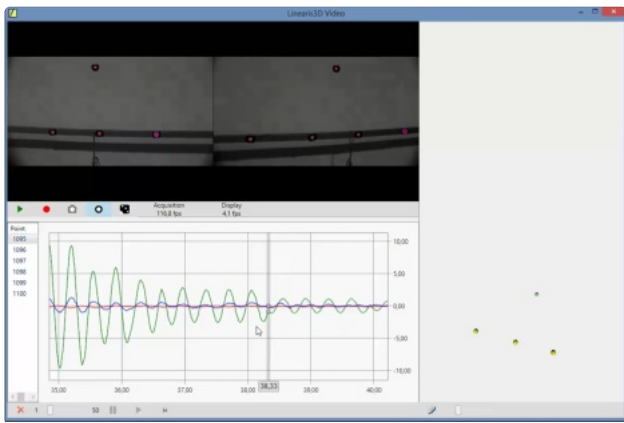


Figure 2: 3D displacement of an oscillating bar

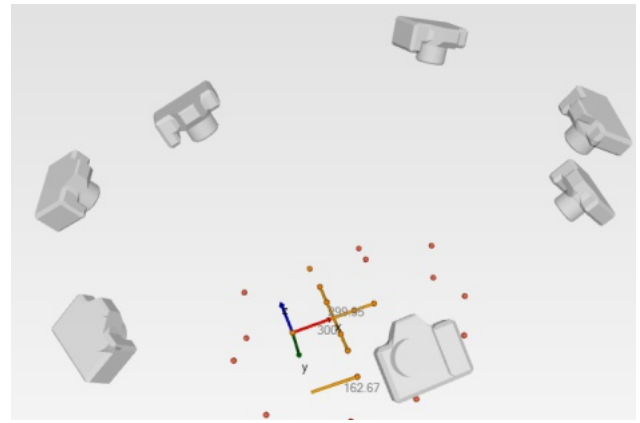


Figure 3: Multi camera setup

Geometry functions

- + Dynamic referencing of coordinate systems
- + Compatible with Linearis3D Geometry Analysis Package (geometric primitives, CAD comparison)
- + Automatic detection of unique point patterns (adapters and probes)

Classic 2-Camera Bar Configuration

Features

- + Field of view approx. 60 degrees (horizontal)
- + Precision down to 0.1mm maximum length deviation
- + 2 industrial cameras (USB 3.0)
- + Workstation notebook
- + Carbon fibre connecting tube
- + Heavy duty tripod with head
- + 1m calibration device
- + Infrared LED illumination
- + Image frequency up to 250 Hz
- + Workstation notebook
- + 1000 targets

Options

- + 3rd Camera for higher precision
- + Infrared ring illumination for maximum speed and precision
- + GigE Cameras for long distance image transmission
- + High resolution cameras
- + Field of view can be customized.

Custom configured multi-camera system using GigE

- + up to 32 industrial cameras (GigE)
- + complex geometric setups possible
- + Custom setup including illumination, workstation, camera resolution
- + Custom specific software adaptations are available including a .net API

Contact

Linearis3D GmbH & Co. KG
 Rebenring 31, D-38106 Braunschweig
 Phone 0049 . (0) 531 . 47 220 36 – 0
 kontakt@linearis3d.de
 www.linearis3d.de