



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 64 cameras. The underlying measurement principle is triangulation. The observations of all cameras are combined using a bundle adjustment – the gold standard for precision applications. 3D Positions can be determined down to 0.05 mm, 3D deviations down to 0.01 mm.

Typical tasks

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

Advantages of video photogrammetry

- + Full 3D displacements
- + Unlimited number of targets
- + Targets are extremely light and cost effective
- + Measuring frequency up to 500Hz (more upon request)
- + Robust for a large range of temperatures
- + Non-contact measurements

Measuring procedure

For calibration the cameras are shown a board shaped calibration device and a couple of dozen images are taken. The computation of the calibration is fully automatic. The process can take as little as 3 minutes depending on the number of cameras and the complexity of the measurement volume. The points to be measured on the object are marked with self-adhesive or magnetic circular markers. A point must be seen by at least two cameras. Results can be viewed live or analyzed after image acquisition.

Features*

Hardware

- + Camera resolutions from VGA to 18 MegaPixel
- + High speed image grabbing for offline analysis
- + 256 GB RAM and more can be used for image recording
- + USB 2.0, USB 3.0 and GigE cameras
- + Different camera types can be mixed
- + 2 to 64 cameras
- + Natural light or LED illumination (infrared or colored, flash or constant)
- + Paper or retro reflective targets
- + Special targets for temperatures up to 700°C
- + Battery powered operation for selected configurations

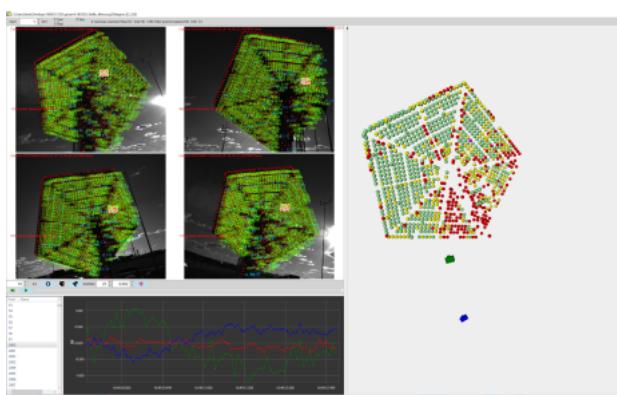


Figure 1: Multi-Camera measurement of a "Stellio" heliostat for DLR, a leading German research institution

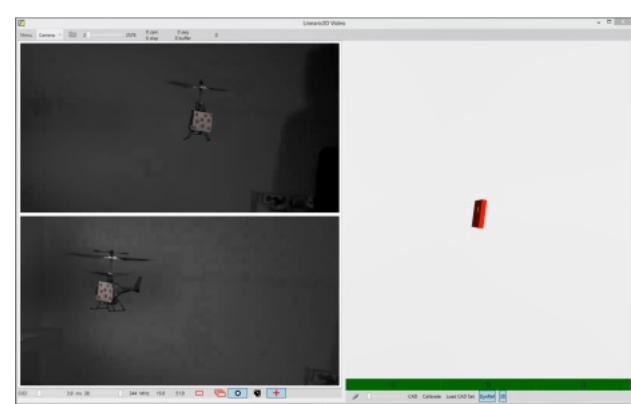


Figure 2: High speed live 6 DoF Tracking of a drone

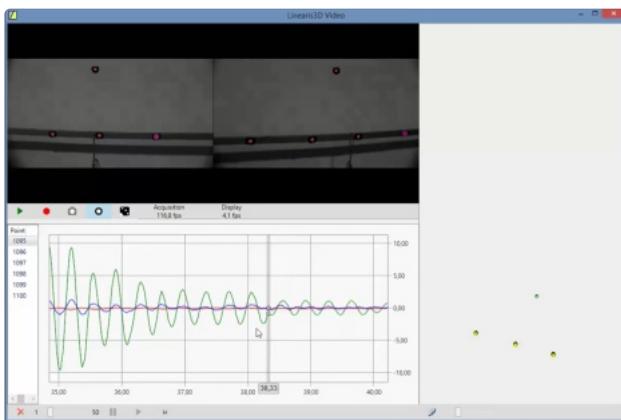


Figure 3: 3D displacement of an oscillating bar

Software

- + Live 3D display of point positions
- + Live 2D display of graph (absolute values or delta)
- + All available processor cores can be used
- + Automated calibration
- + Dynamic referencing of coordinate systems
- + Dynamic camera referencing
- + Automatic detection of unique point patterns (adapters and probes) for 6 DoF applications
- + Live data export via HTTP or UDP
- + Export of data as CSV
- + SDK (.net) available to integrate 3D results in your application
- + Compatible with Linearis3D Geometry Analysis Package (geometric primitives, CAD comparison)
- + Compatible with Windows 7/8/8.1/10 (64bit)

Typical Configurations

2-camera lab system

- + 2 monochrome industrial cameras (USB 3.0) with HD resolution (cable length 3m)
- + Field of view approx. 50 degrees (horizontal)
- + High precision hardware trigger
- + 2 LED illumination rings for maximum speed and precision
- + Carbon fiber connecting rod (1m)
- + Heavy duty tripod with head, easily adjustable, well suited for R&D environments
- + Calibration board
- + Image frequency up to 130 Hz (faster with reduced resolution) using RAM recording (time limited)
- + Image frequency for live measurements up to 150 Hz depending on scene complexity, camera resolution and workstation (unlimited measuring time)
- + Mobile workstation (16GB RAM, four cores with hyperthreading, 500 MB SSD)
- + 1000 retro reflective targets
- + 1 year warranty and maintenance, on site training
- + Software with dongle

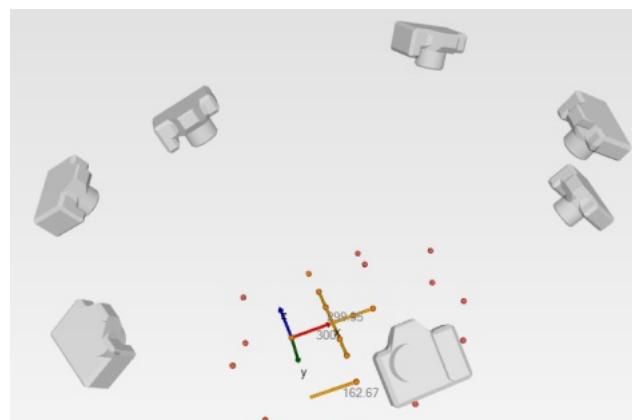


Figure 4: Multi camera setup

Popular Options

- + Additional cameras for higher precision and larger measuring volumes
- + GigE cameras for long distance image transmission
- + High speed cameras up to 500 Hz
- + USB 3.0 cables up to 20m
- + Custom lenses/field of view
- + IP 67 housing with LED lighting

Custom configured multi-camera system

- + Up to 64 industrial cameras
- + Complex geometric setups possible
- + Custom setup including illumination, workstation, camera resolution
- + Custom specific software adaptations are available including a .net API

Contact

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