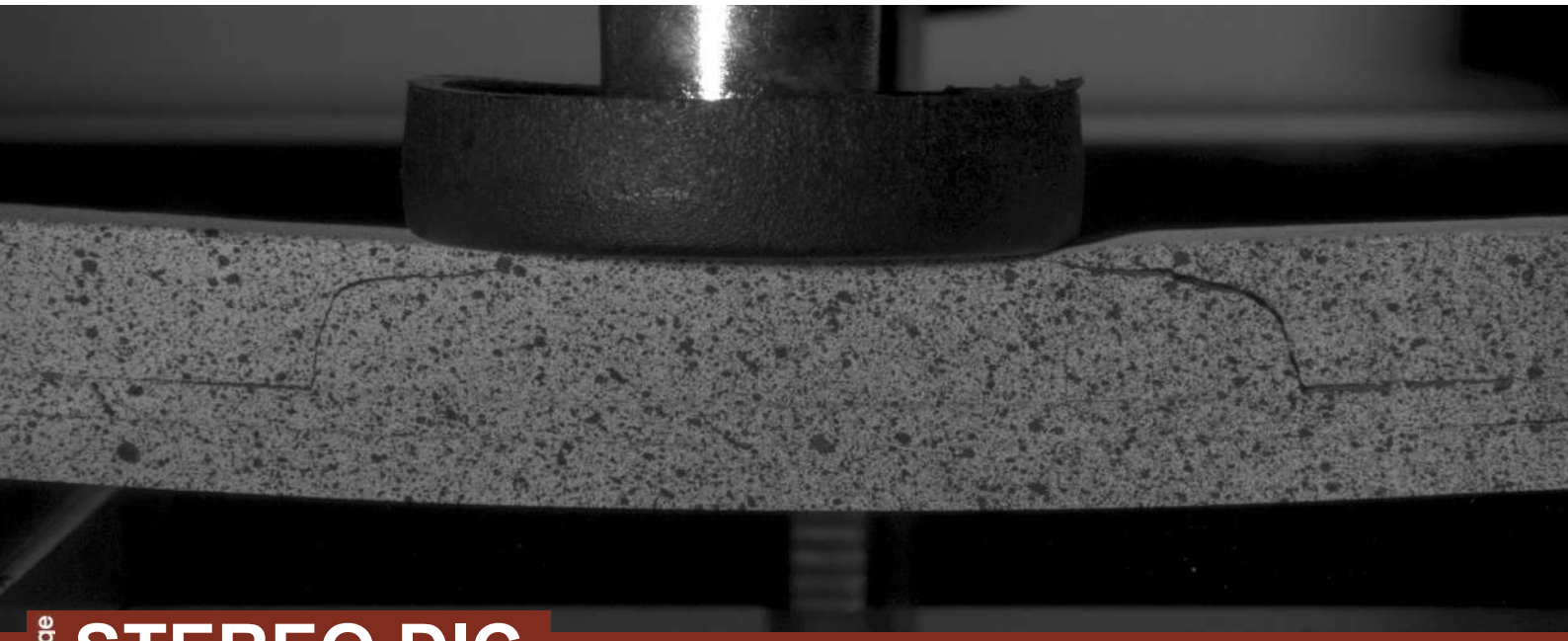


STEREO DIC

The obvious solution to stereo deformation analysis

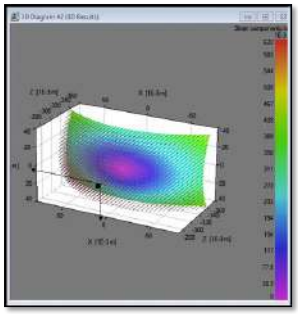
Digital Image Correlation (DIC) is a full-field image analysis method, based on grey value digital images, that can determine the contour and the displacements of an object under load. DIC is very effective at mapping deformation in macroscopic mechanical testing, where the application of a speckle pattern provides the needed contrast to correlate images.
Stereo DIC is suitable for measuring deformation and movement in a surface that is irregular, has any movement that is not planar or similar deformities. If all movement happens in one plane, DIC 2D works well. For other cases where for example a plate is bending, tire is compressed, helmet or another round object is impacted, it is a case that is well suited for Stereo DIC.

Key benefits

- Easy to use, intuitive, modular
- Handle non planar deformations
- Wide range of tracking algorithms
- Accuracy down to 0.01 pixel
- Virtual extensometers & inspection lines
- Sigma value diagram to check correlation quality
- Camera angle and lens distortion correction
- Possibility of creating templates
- Various table & image export formats
- Compatible with all major HS cameras

From images to results

From loading an image sequence, executing the tracking algorithms, applying the chosen analytics and logic to presenting the derived data - TEMA offers a straightforward workflow. Menu bars, tool bars and key bindings all provide a easy access to features and functions. The user interface is fully synchronized: any change of parameters or set-up will directly effect all parts of the tracking session, updating results, graphs and tables.



Complete solution

- 2 pc 2MPix 30fps Camera
- 2 pc 25mm lens
- 2 pc 50mm lens
- Calibration board
- 2 LED light system
- 1 Laptop
- Tripod with accessories
- Speckle paint
- 1 Dongle software with license
- Cabling and power supply

STEREO DIC

TEMA Stereo DIC: How it works?

Stereo DIC is based on our DIC tracker which is stand-alone tracker in the software along with many other being used under TEMA/TrackEye. All the baseline architecture and tools remain the same as for the other trackers' framework.

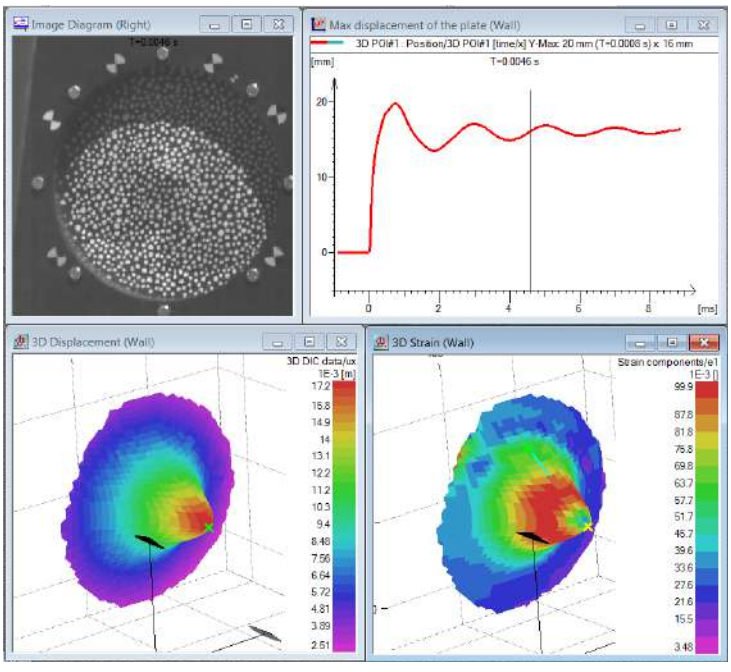
The Stereo version of DIC uses two cameras to pin-point the 3D-coordinates of all points in an area of a surface, this allows for 3D and 2D measuring of full field displacement and strain. The sophisticated algorithms calculate the complete strain tensors for the full-field solution, including many different strain formulations, such as Green-Lagrange, Euler-Almansi and Cauchy strain tensors. The camera calibration is done as in other applications, using a target or multiple points and a known distance.

Points of Interest, Inspection lines and Virtual Extensometers can be placed on the surface to measure strain at specific points or along specific lines. The Virtual Extensometer is similar to an actual extensometer and measures the distance between two points to achieve extension and engineering strain.

As qualifying data there is the sigma value, which indicates how well the correlation matched the different points. This variable can be displayed in a color diagram for easy overview of the worst areas.

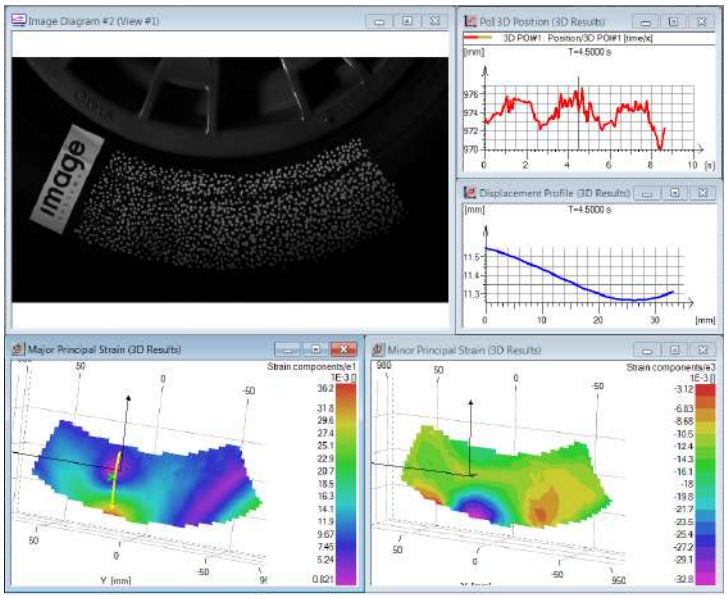
Blast on a metallic plate

Dynamic deformation of a metallic plate under the action of a blast can be analyzed easily using TEMA/TrackEye Stereo DIC module. 3D displacement as well as the main/minor components of the strain can be displayed in 3D diagrams with color maps in order to get a full understanding of the blast behaviour. Points of Interest allow to measure maximum local displacements as well as vibration frequency of the plate during the blast.



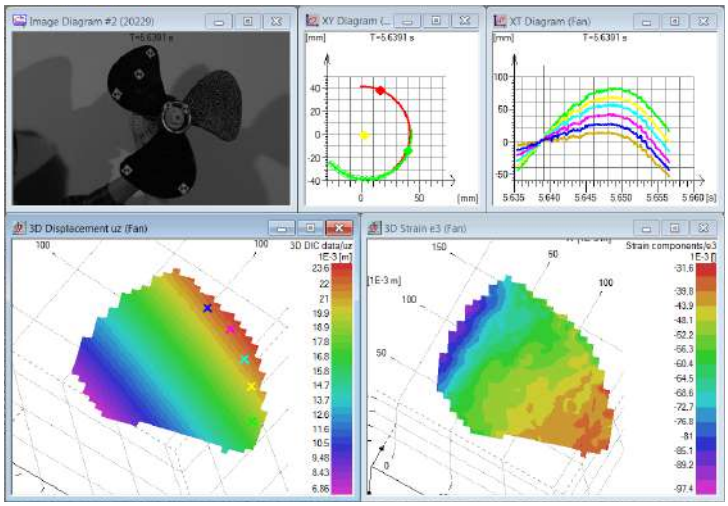
Tire Deformation

Full analysis of the deformation of a tire under compression cycles can be retrieved with TEMA/TrackEye Stereo DIC module. Tension and compression phasis can be visualized in 3D diagrams as well as displacement along profile lines.



Spinning Fan deformation

3D deformation of fan blades can be performed during rotations. 3D displacement, vibrations as well as compression phasis can be analyzed to optimize the performances.



More applications

- Tire deformation analysis
- Bulletproof vest deformation under impact
- Droptest stereo deformation under impact
- Textile material characterization
- Concrete deformation & crack analyses
- Fatigue tests in engine parts
- Tensile test machine
- Deformation of vehicles during crash tests
- ...

STEREO DIC

Camera setup

The Image Systems Stereo DIC system is delivered with a horizontal bar for camera mounting, suitable for all major brands of high speed cameras, and also other low speed full-frame cameras.
These Cameras are supported in our Camera Control to capture images using both pre- and post-trigger.

Calibration

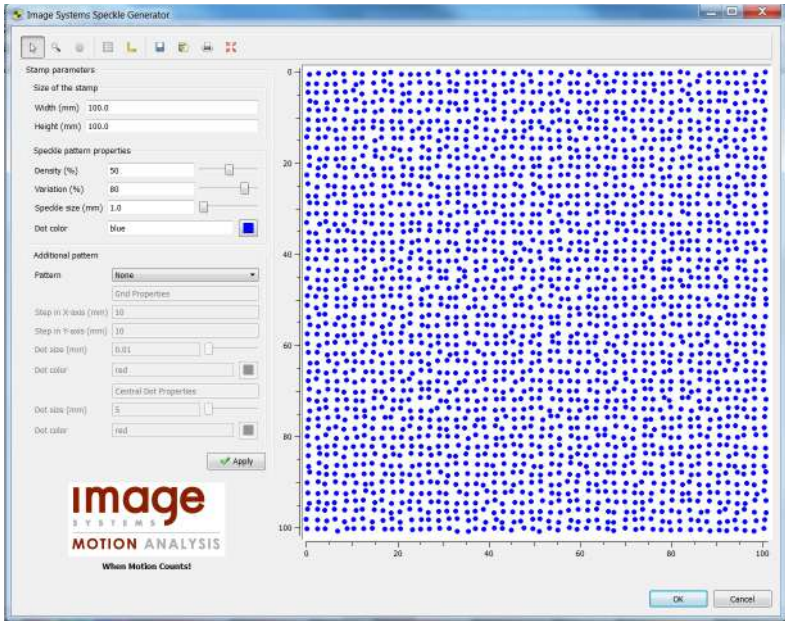
A calibration for a DIC Stereo system consists of two separate steps:

The first one is the lens calibration and it has to be done for a specific lens & its focus setting:
This most easily done with the calibration board as seen in the image to the left, the board is moved and angled through the image while low-speed snap shots are taken, this serves as a way to calibrate it simply through the lens calibration wizard which guides you along the way.

The second step consists in getting the orientation of the cameras in a common coordinate system using reference points.

Speckle pattern

Image Systems deliver a software for generating speckle patterns for printing, this allows the user to easily switch size, density and randomness of the pattern to the users liking.
For smaller objects, Image Systems has developed a stamp, which has an ideal speckle pattern, and may be used in order to prepare the sample prior to test.



Learn more

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