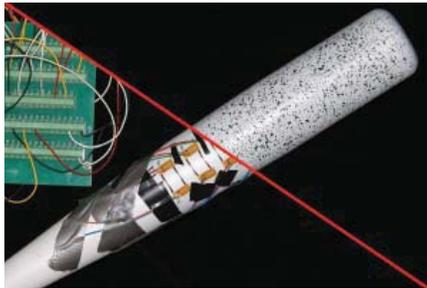


Dynamic Deformation Measurement

SOLUTIONS

High-Speed Capabilities

- Various camera models available offering a wide range of speeds and resolutions
- Extremely light-sensitive image sensors for easy illumination
- Up to 10,000,000 fps now available
- Completely integrated and customized turn-key systems with training
- High-powered cool LED lighting systems available

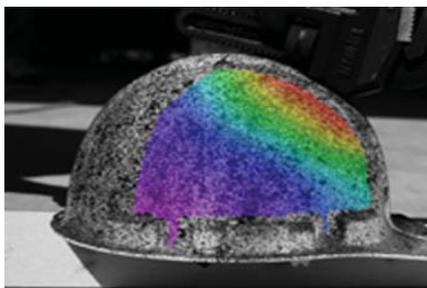
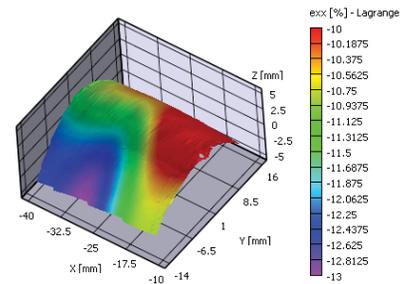


Non-Contact

- No mechanical interaction with your sample
- Eliminates the need for strain gauges, LVDTs, extensometers, etc.
- Fast and easy sample preparation
- Rigid body motion can be easily removed
- Measure dynamic mechanical properties AND vibration at the same time

User-Friendly

- No optical isolation table needed
- Safe, simple and intuitive system
- Robust system calibration with automatic target spacing detection
- Remotely control cameras with an iOS or Android device
- Cut & paste graphs and plots into any MS Windows application
- Fast data processing with intuitive inspection and extraction tools



Full-Field Measurements

- Eliminates the need for precise strain gauge placement
- Up to 4,000,000 data points possible
- Automatically identify strain concentration locations, even in complex structures under complex loading conditions
- Fast data processing: up to 55,000 data points/second
- Data can be exported for easy FEA comparison/validation

The Correlated Solutions VIC-3D measurement system can save you valuable time while improving the quality of your deformation or strain measurements. Specimen preparation is simple and quick, and your test specimen is not affected by the measurement process. It might sound too good to be true, but it has been field-proven by professionals like you. Give us a call to find out how you can increase lab throughput, while increasing data quality.

www.correlatedsolutions.com

Correlated Solutions, Inc.
121 Dutchman Boulevard, Irmo SC 29063
T: 803-926-7272 F: 803-749-7569

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Application Example

High-Speed Compression Test

Studying the behavior of metals during a high-speed dynamic compression event has always been challenging due to the complex test set up and fast data capture rates required. Currently, very little literature is available regarding deformation behavior at strain rates of 10 to 500s⁻¹. Utilizing high-speed cameras, the VIC-3D HS system can be used to quantify the surface displacements and strains in three dimensions over the entire field with great precision. Digital Image Correlation (DIC) has gained widespread popularity over recent years in such high-speed applications due to its high accuracy, flexibility and ease of use.

In this example, a 6mm diameter cylindrical specimen is compressed at a strain rate of 50s⁻¹. The VIC-3D HS system was used to capture the surface displacements and strains on the specimen during the event. Figure 1 shows the test setup with the high-speed cameras focused on the specimen. A random speckle pattern is applied to the specimen that allows the analysis software to easily track the deformation to sub-pixel accuracy. Although the high-speed cameras are capable of much higher capture rates, for this test they were set to an appropriate frame rate of 14,400fps to maximize spatial resolution while acquiring an adequate number of images during the event. The cameras were post-triggered at a resolution of 1024 x 400 pixels. After the event, the images are transferred to the computer's hard drive, and then post-processed using VIC-3D analysis software. Figure 2 shows a full-field contour plot of the transversal strain (Exx) overlaying the raw image at t = 4.4ms. The compressive strain observed was found to be non-uniform.

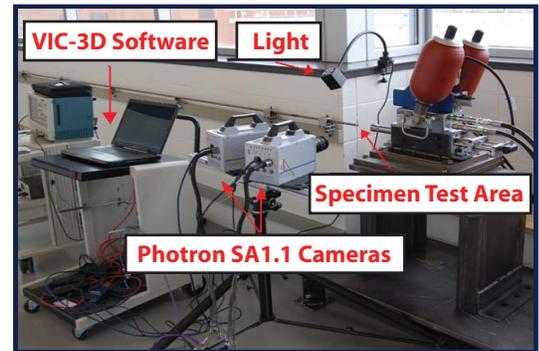


Figure 1. VIC-3D HS Test Setup

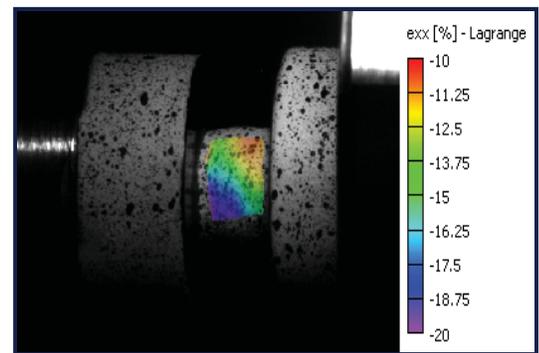


Figure 2. Contour image overlay of transverse strain at t = 4.4 ms

Specifications

The content from Ohio State University is greatly acknowledged

	VIC-3D SR/HR/XR	VIC-3D CL	VIC-3D HS	VIC-3D U-HS
Camera Resolution	Up to 29 Megapixels	Up to 4 Megapixels	Up to 4 Megapixels	400 x 250 pixels
Frame Rate	Up to 110 fps	Up to 500 fps	Up to 300,000 fps	Up to 10,000,000 fps
Exposure Time	20µs – 10s	Down to 20 µs	Down to 368 ns	Down to 50 ns
VIC-3D Data Variables	3D displacements, strains tensors, strain rates, velocities, accelerations, and much more			
Analog Data Recording (inputs)	Up to 32 inputs	Up to 16 inputs	Up to 8 inputs	Up to 2 inputs
VIC-3D Full-Field Real-Time Analysis	Yes, up to 10Hz	Yes, up to 10Hz	n/a	n/a
VIC-Gauge 3D Real-Time Analysis (output of points, gauges, extensometers, etc.)	Yes, up to 100 Hz Up to 4 real-time analog outputs	Yes, up to 100Hz Up to 4 real-time analog outputs	n/a	n/a
Camera Disturbance Correction			Included	
Multi-System Stitching (requires multiple camera systems)			Included	
Marker Tracking			Included	
Measurement Area			mm ² to m ²	
Strain Measurement Resolution			50µε	
Strain Measurement Range			0.005% to >2000%	
VIC-3D HS Vibration Analysis Module	Available with VIC-3D Fulcrum	Available	Available	n/a



Edificio Antalia
Albasanz, 16
28037 MADRID
Tel.91 567 97 00
Fax:91 570 26 61

Torre Mapfre-Vila Olímpica
Marina, 16 - Planta 11-C2
08005 BARCELONA
Tel.93 459 42 50
Fax:93 459 42 62

www.alavaingenieros.com

alava@alava-ing.es

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