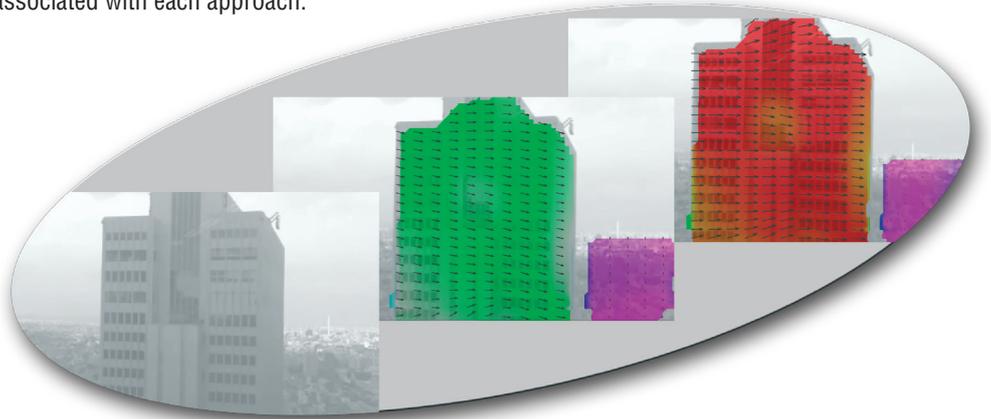


StrainMaster Large FoV

for increased areas
of interest

LaVision offer **StrainMaster** Digital Image Correlation (DIC) systems for measurements over a wide range of scales; from microns to metres. The system flexibility means that we are able to work with a huge range of optical components, and in this document we describe the capabilities for large field of view (FoV) measurements with either one or two cameras, and the recommendations and limitations associated with each approach.

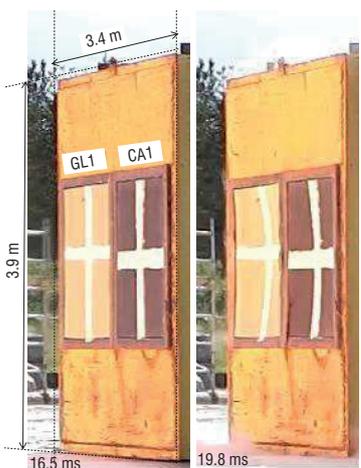


Applications

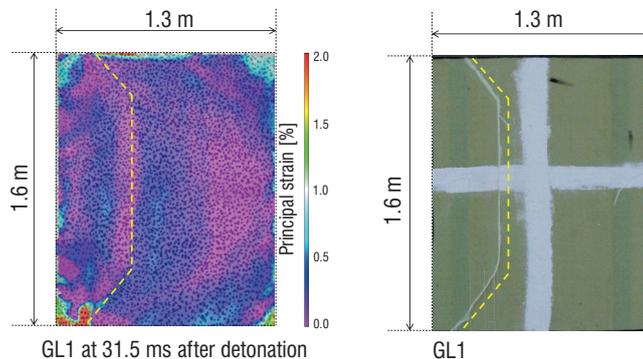
- ▶ building movement due to wind and gust loading
- ▶ testing of large structural components
- ▶ deformation due to thermal loading on civil structures
- ▶ blast effects on safety panels

3D Stereo

In cases where it is necessary to carry out stereo 3D measurements with large fields of view, one has to consider the stability of the two cameras and rigidity of the system: one camera must not be able to move relative to the other in the stereo system, and we have dedicated mounting solutions for this. We recommend a practical maximum field of view for accurate stereo DIC measurements is up to approx 6m². At this size field of view the cameras can be mounted on a single rail whilst maintaining a suitable separation angle, and the system can be easily calibrated with views of our large calibration plate in multiple positions.



*Courtesy of Arora et al,
Imperial College London*



In the example above from Imperial College London, high-speed 3D Digital Image Correlation (DIC) was employed to capture full-field displacements of the rear surface of composite panels subjected to an explosive blast. The tests showed that the CFRP-skinned sandwich panels provided a greater resistance to the blast wave impact, deflecting a smaller amount compared to the GFRP-skinned panels.

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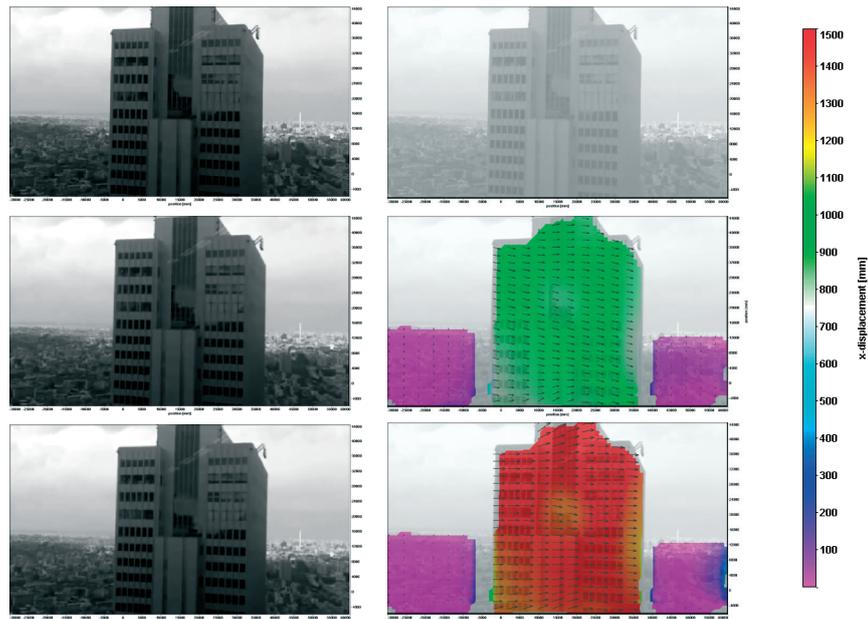
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Single camera options



Images from youtube
YamachanUS
(www.youtube.com/watch?v=NisWbAXfyWI)

Often for very large FoV a single camera approach is sufficient to measure the displacements of interest (and at very large working distances the error due to movement in z is negligible). With single camera configurations it is possible to scale the image based on a known feature size. In the example below a video has been analysed showing building movement in Tokyo during an earthquake. Shift correction using the background view (of smaller buildings) was used to remove the original (understandable!) camera shake.



When working with large fields of view such as these, high resolution cameras are beneficial to reveal the small scale details in the observed large Field of View. The LaVision Imager X-Lite 29M is therefore particularly well suited for this type of work.

System features



Data provided by LaVision are believed to be true. However, no responsibility is assumed for possible inaccuracies or omissions. All data are subject to change without notice.

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The LaVision **StrainMaster** systems are able to capture full-field displacement data for large fields of view in many different applications, and have several important features to accommodate such tests:

- ▶ utilize a fully featured **StrainMaster** system or import any standard image type from your existing cameras
- ▶ shift and rotation correction to remove camera shake or fix the results relative to a datum
- ▶ dedicated mounting solutions to ensure stability with large camera separation
- ▶ easy calibration procedure for 3D-stereo measurements
- ▶ high resolution and high speed cameras available to reveal small details in large field of view tests

StrainMaster from LaVision combines the most advanced Digital Image Correlation (DIC) algorithms with the highest quality hardware to provide a complete device for materials analysis. **StrainMaster** is applicable across all industries investigating material behaviour and gives fast, highly accurate results.

We look forward to working with you on your specialist applications and being able to provide suitable optical solutions for your large scale DIC testing.

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