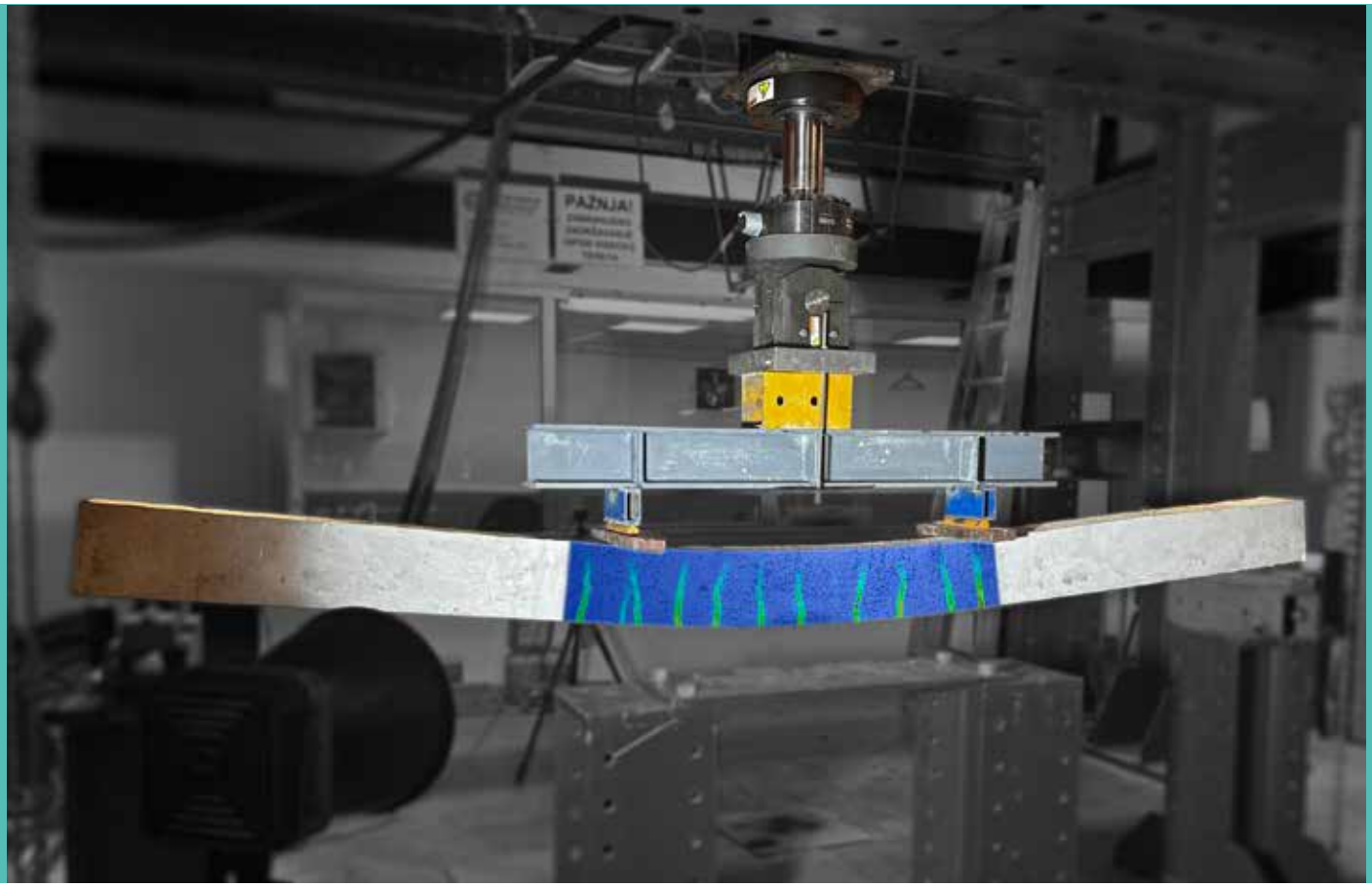
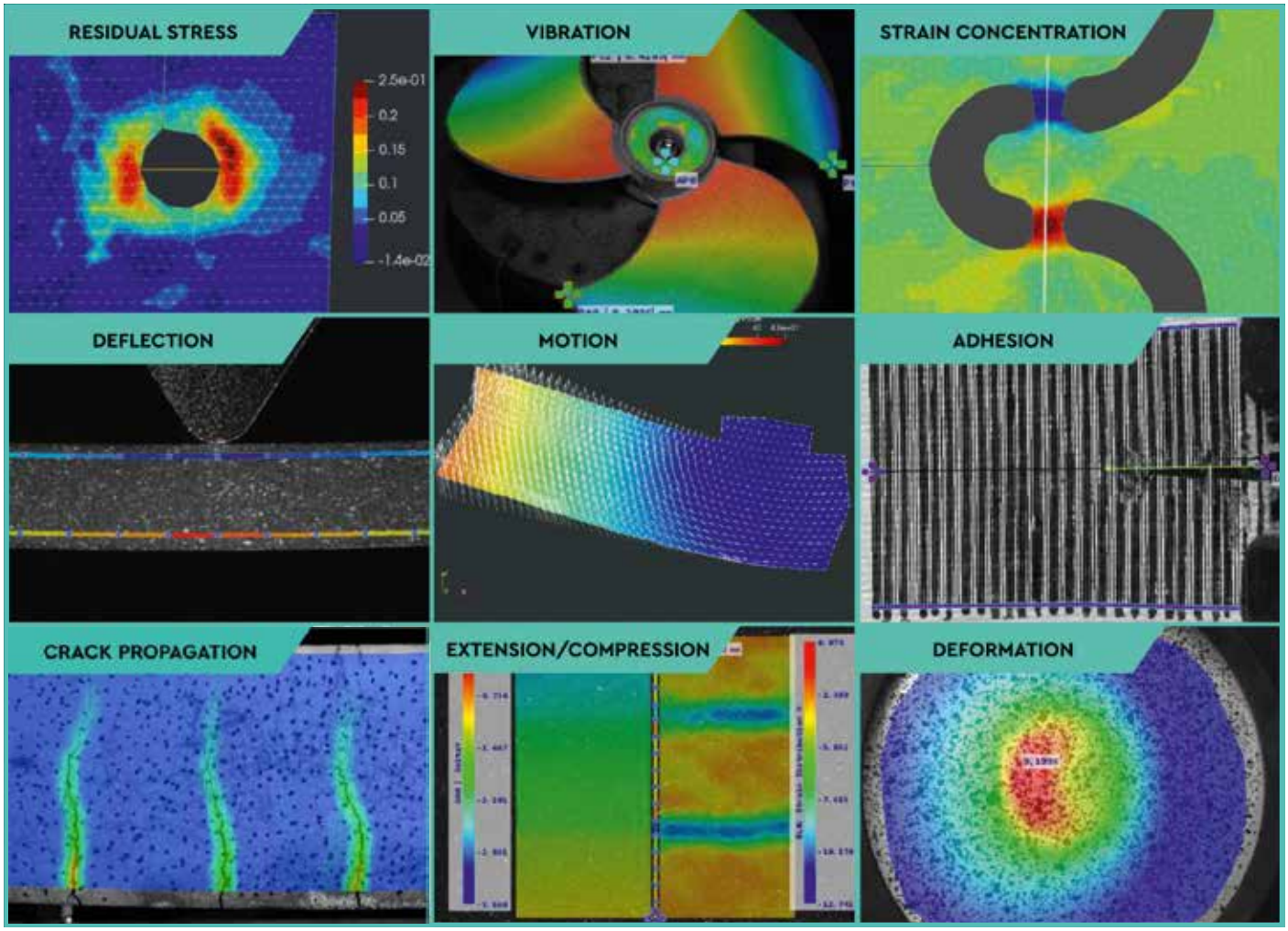
X SIGHT

DIC SYSTEMS

DIC OPTICAL MEASURING SYSTEMS

WWW.XSIGHT.EU FACEBOOK.COM/XSIGHTDIC LINKEDIN.COM/COMPANY/X-SIGHT-S-R-O/ YOUTUBE.COM/@X-SIGHT_DIC




RESIDUAL STRESS
2.5e-01
0.2
0.15
0.1
0.05
-1.4e-02
VIBRATION
STRAIN CONCENTRATION
DEFLECTION
MOTION
ADHESION
CRACK PROPAGATION
EXTENSION/COMPRESSION
DEFORMATION

KEY FEATURES

- **Optical Non-Contact Measurement** – Eliminates the risk of altering specimen behavior during experiments.
- **High-Accuracy Full-Field Analysis** – Captures deformation and displacement across the entire visible area with high resolution.
- **Quick Set-Up and Easy Operation** – Simple calibration and preparation allow for fast experiment setup and user-friendly operation.
- **Natural Pattern and Feature Tracking** – Supports measurement on natural patterns or structures without additional sample preparation.
- **Robust Algorithms for Industrial Applications** – Optimized for large deformations, thin samples, and real industrial and experimental engineering.
- **Modularity and Scalability** – Suitable for applications ranging from small components to large-scale structures like aircraft wings.
- **Universal Compatibility with UTM Systems** – Easily connects to almost any universal testing machine (UTM) and supports integration with FEM software for broader applications.
- **Real-Time Visualization** – Provides detailed deformation mapping in real-time.
- **Multi-Camera Stitching Capability** – Unlimited multi-camera setups for covering extensive experimental areas.
- **Direct Support by Developers** – Expert-level technical support directly from system developers ensures customer-focused solutions.

LINE-BASED PROBES

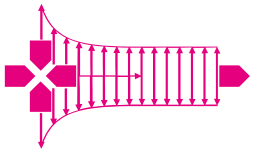
Point
A basic measuring probe for displacement determination.

Bend Line
A probe designed to be used during bending tests. Measures strain over a curved shape and enables the visualization of the strain distribution in real-time.

Line
An elementary measuring probe for strain and length determination.

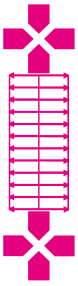
Extreme Line
Advanced probe for axial neck detection, provides an improved E-modulus reading.

Torsion Line
Enables dual position angular twist and strain measurement.



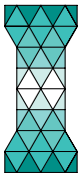
Crack Probe
Measures a crack lengthduring static or dynamic tests.

ROD Line
Advanced line measurement probe with axial neck detection feature for samples with oxide or rust layer.



Trans Line
Used for multi-positional transversal measurement with averaged and min/max width functions.

FULL-FIELD PROBE

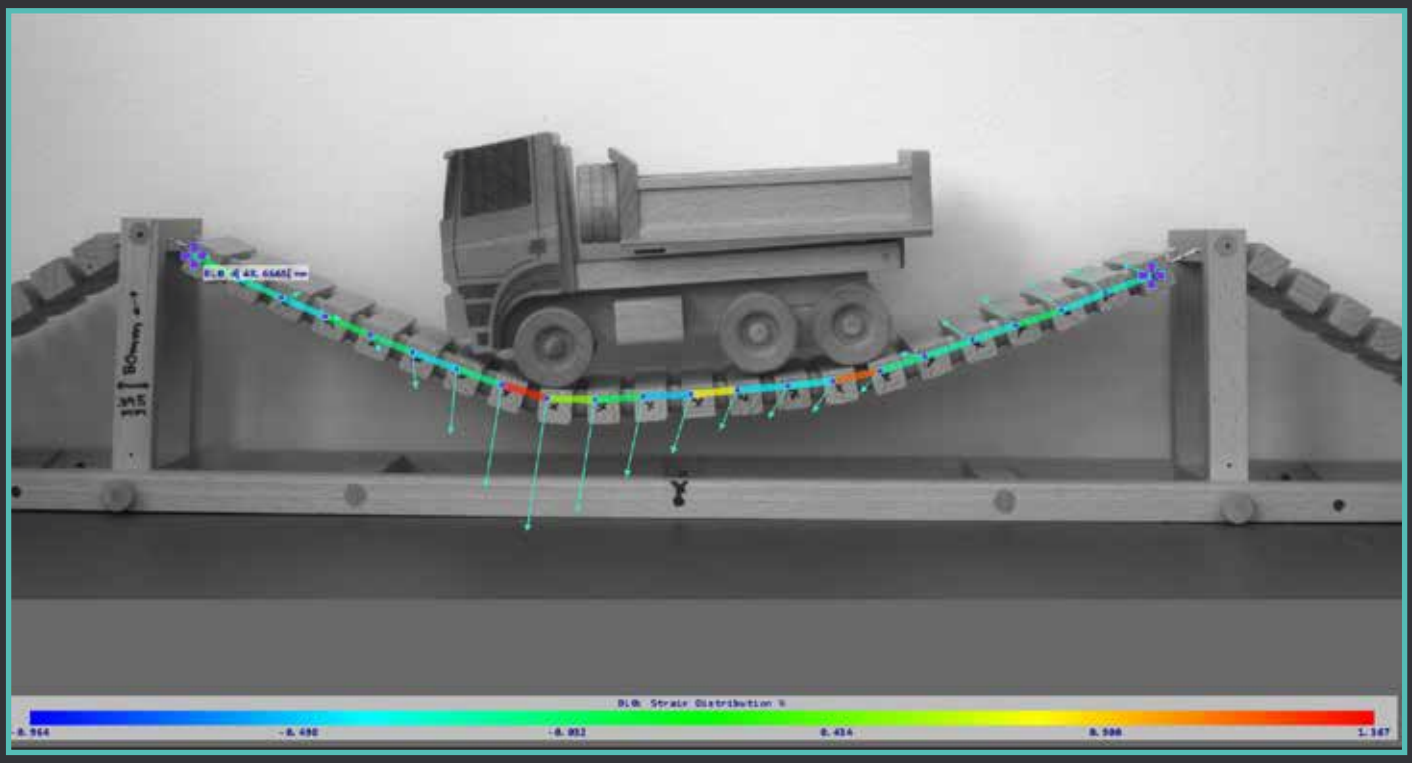


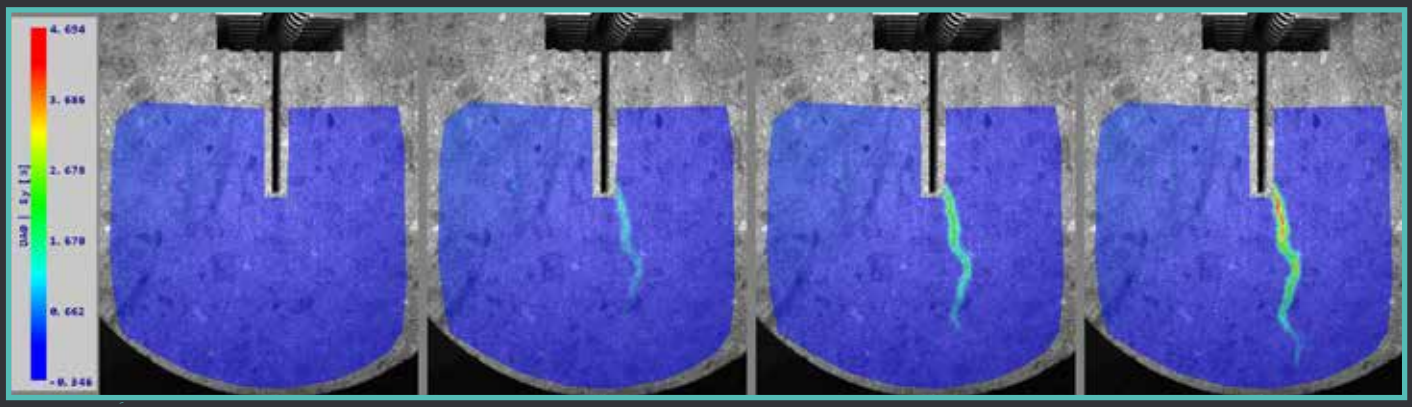
DIC Area
A full-field probe for strain and displacement distribution mapping. Supports evenly triangulated mesh as well as mesh based on user-defined points.

DIC 2D 3D FLPP

- POST-PROCESS REC
- FOR LINE BASED PROBES
- FULL FUNCTIONALITY

	FULL-FIELD PROBE	LINE BASED PROBES	POST PROCESS	REAL-TIME MEASUREMENT
DIC 3D–F DIC 2D–F	●	●	●	●
DIC 3D–FPP DIC 2D–FPP	●	●	●	×
DIC 3D–L DIC 2D–L	×	●	●	●
DIC 3D–LPP DIC 2D–LPP	×	●	●	×





X-SIGHT 3D DIC SYSTEM

The X-Sight 3D DIC optical measuring system is versatile, complex, and easy to operate. X-Sight 3D is an adaptable system for sophisticated and varied stereoscopic strain analysis involving out-of-plane deformations and motion measurements. Its high accuracy and reliability guarantee robust data outputs for various applications, including high-speed imaging. The system can also be used as the most advanced customized optical extensometer.

With comprehensive post-processing analytic functionality, the system provides an efective way to validate FEM results, verify CAD models, and perform structural deformation analyses. X-Sight 3D can be equipped with a large variety of cameras, lenses, lights, and further optical accessories

datasheet

X-Sight DIC 3D video

TECHNICAL SPECIFICATIONS

Product	Resolution [MPx]	Frame rate @ full resolution [Hz]	Interface	Measurement area [mm]		
				Class 0.5	Class 1	Class 2
M5	2×5.0	75	USB 3.0	130×110	260×220	520×440
M16	2×16.1	23		330×180	660×360	1320×750
M24	2×24.5	15		330×285	660×570	1320×1140
M67	2×67.1	13.8	10GigE	410×410	820×820	1640×1640

- **In-Plane subpixel resolution: < 0.008%**
- **Out-of-Plane subpixel resolution: 0.016%**
- **Strain resolution 50 microstrains**
  - 10 microstrains with time averaging
  - 5 microstrain in optical extensometer mode
- **Strain range from 0.005% to > 2000%**
- **Measuring area (specimen size) range from 1 mm to 100 m**
  - < 10 mm specimen must be measured with a special microscope
  - > 10 m specimen can only be calibrated using the LOCF (Large Object Calibration Function)
- **DIC of natural patterns, speckle patterns, image features and markers**

SYSTEM COMPONENTS

- **2 × low-noise camera**
- **calibration grids & speckle kit**
- **camera mount**
- **standard lenses of chosen focal length**
- **battery LED lighting**
- **transport box, cables and power sources**
- **converter – 4-channel A/D, 2-channel D/A**
- **USB license dongle with installation SW**
- **installation assistance and training**
- **24 hrs of engineering support over 12 months**

X-SIGHT 2D DIC SYSTEM

The X-Sight 2D DIC system is a straightforward single- or multi-camera measuring device suitable for experimental validation of your designs, calculations, and numerical simulations. It is ideal for assessing various mechanical characteristics of your machines, assemblies, and structures.

Equipped with advanced digital image correlation software, X-Sight 2D DIC provides precise and accurate real-time strain and deformation measurement and delivers results with nanometric resolution. Software postprocessing allows for comfortable browsing and reassessment of stored data from previous measurements.

The system can also be used as the most advanced customized optical extensometer and can be easily upgraded to X-Sight 3D DIC.

TECHNICAL SPECIFICATIONS

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M67	67.1	13.8	10GigE	410×410	820×820	1640×1640

- **In-Plane subpixel resolution: < 0.008%**
- **Out-of-Plane movement reduced by special lens type (optional)**
- **Strain resolution 50 microstrains**
  - 10 microstrains with time averaging
  - 5 microstrain in optical extensometer mode
- **Strain range from 0.005% to > 2000%**
- **Measuring area (specimen size) range from 1 mm to 100 m**
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2D → 3D DIC UPGRADE

- **Additional camera & stereobar mount**
- **3D DIC software module**

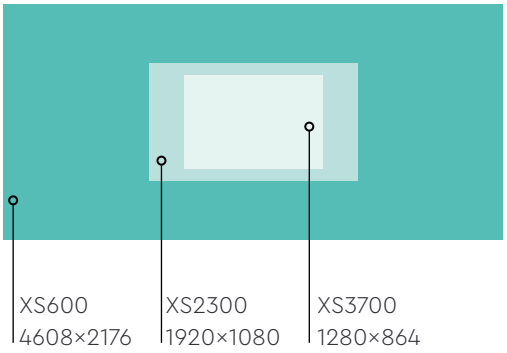
X-SIGHT 3D DYNAMIC DIC SYSTEM

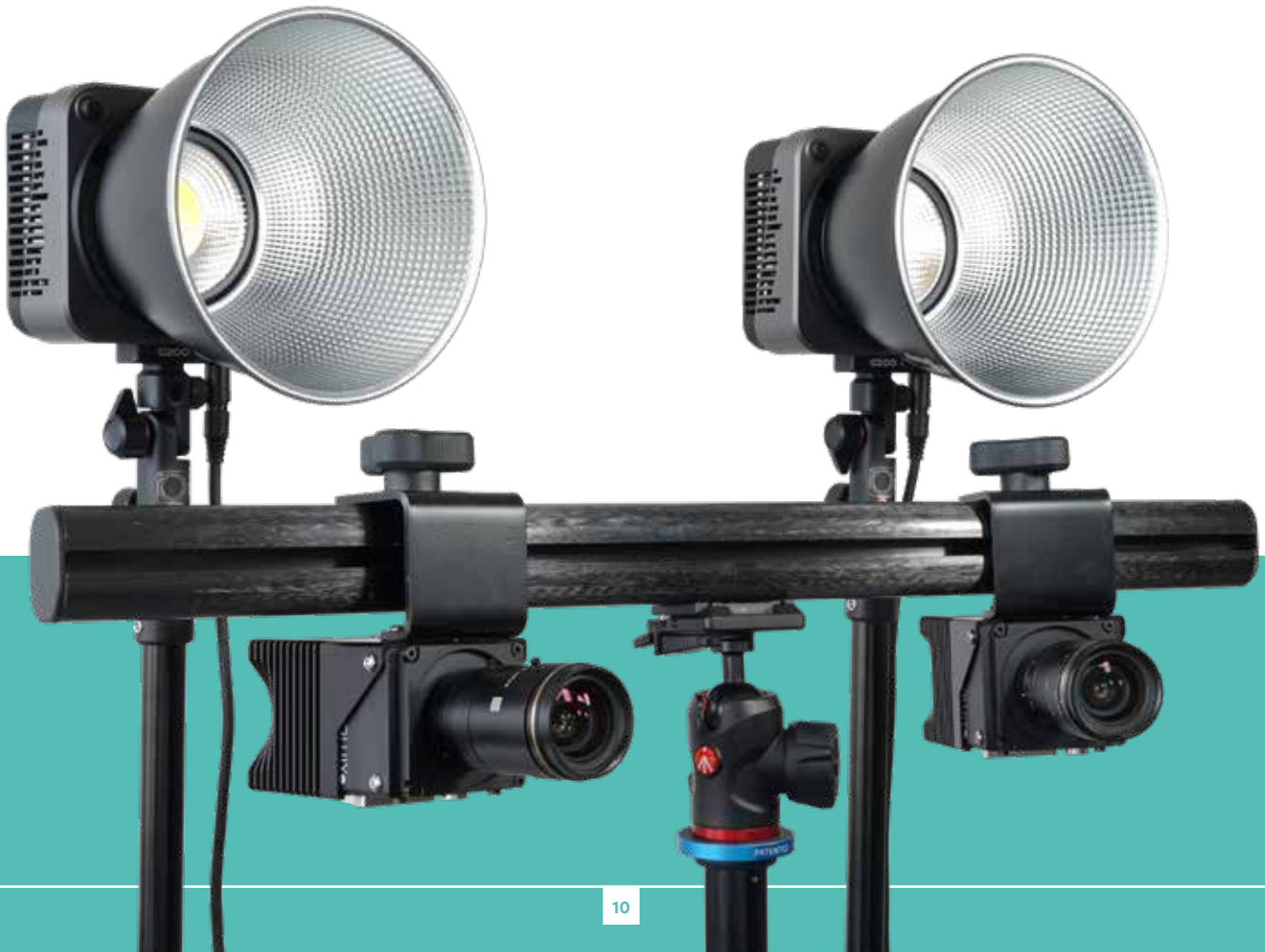
Traditional motion and deformation analysis using Digital Image Correlation (DIC) often requires expensive high-speed cameras, which add complexity to the workflow. Large data transfers between the camera and PC can turn quick measurements into a lengthy post-processing task.

X-Sight DIC 3D Dynamic provides a high-performance solution tailored for dynamic applications. With measurement capabilities up to 10 kHz, it enables immediate response and rapid evaluation of test data. This system ensures fast, efficient, and accurate deformation analysis without the limitations of traditional high-speed setups, making dynamic testing seamless and optimized.

Model	Resolution [MPx]	Frame Rate @ Full Resolution [Hz]	Interface	Aspect Ratio (W:H)	Measurement Area [mm] @ Class 1	Frame rate @ HD resolution [Hz] *	Frame rate @ VGA resolution [Hz] **	Maximum achievable frame Rate [Hz]
XS3700	2×1.1	3709	PCIe Gen3 64 Gbit/s	1.48:1	160 × 110	-	6300	10000[1)]
XS2300	2×2	2279		1.78:1	240 × 140	2300	5100	10000[2)]
XS600	2×10	600		2.12:1	530 × 270	1700	3500	10000[3)]

* Corresponding to 1920×1080 pixels.
** Corresponding to 640×480 pixels.
[1,2,3] Achievable by cropping the hight of the image to a 1) 320 px, 2) 240 px, 3) 128 px.





X-SIGHT 2D DYNAMIC DIC SYSTEM

Focused Solution for Planar High-Speed Testing

While most dynamic DIC measurements are performed in 3D, certain applications allow for accurate results using a simplified 2D setup. The X-Sight DIC 2D Dynamic system is an efficient and streamlined solution when out-of-plane motion is negligible and 2D tracking is sufficient, delivering reliable, high-frequency strain and motion analysis in a single plane.

Equipped with just one high-performance camera and a single light source, this setup supports measurements up to 10,000 fps without the typical complexity and cost of traditional high-speed systems.

And when your measurement needs grow, the system grows with you. Upgrading to 3D dynamic DIC is easy — simply add a second camera, another light, and the 3D software module. A scalable path from 2D to full 3D performance.

Model	Resolution [MPx]	Frame Rate @ Full Resolution [Hz]	Interface	Aspect Ratio (W:H)	Measurement Area [mm] @ Class 1	Frame rate @ HD resolution [Hz] *	Frame rate @ VGA resolution [Hz] **	Maximum achievable frame Rate [Hz]
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XS600	10	600		2.12:1	530 × 270	1700	3500	10000[3)]

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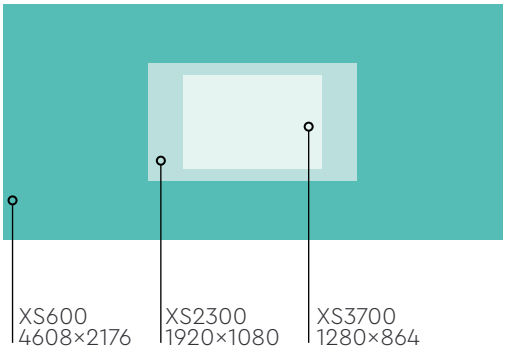


SOFTWARE KIT

The X-Sight DIC Software Kit offers a complete solution for 2D and 3D Digital Image Correlation (DIC), delivering precise strain and stress measurements across a variety of applications. Compatible with custom hardware setups, it allows seamless integration of cameras, lighting, and other components to suit your specific needs.

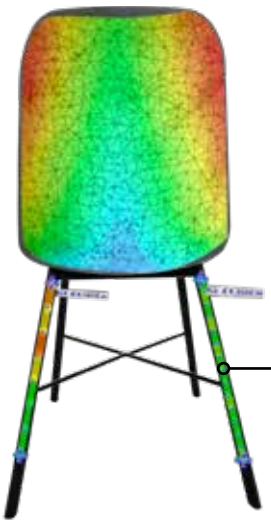
The kit includes calibration grids, a USB dongle, and all necessary tools for quick setup, along with expert support and software updates to ensure optimal performance.

datasheet

Interested in using X-Sight for teaching? Ask us about our EDU Kit – a dedicated educational package with 20 perpetual network licences and full-featured DIC software.

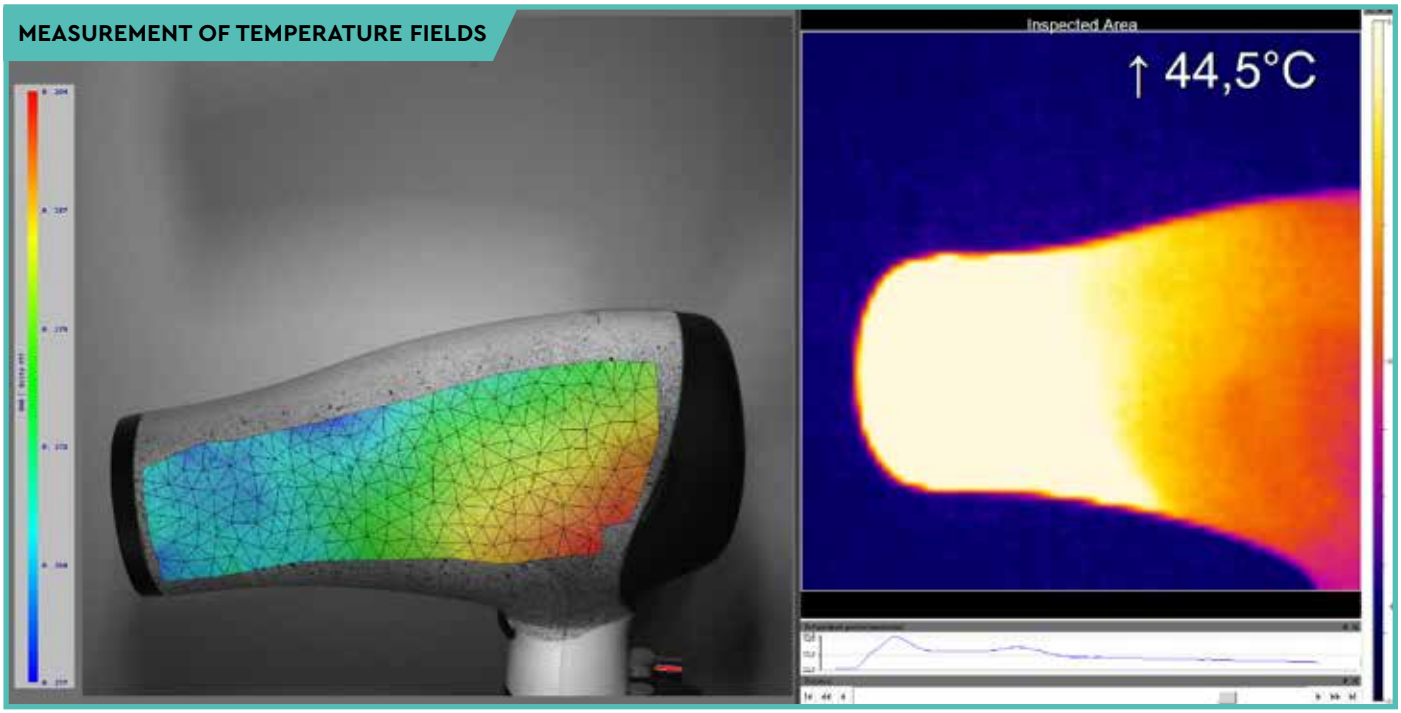
CONSUMER PRODUCTS

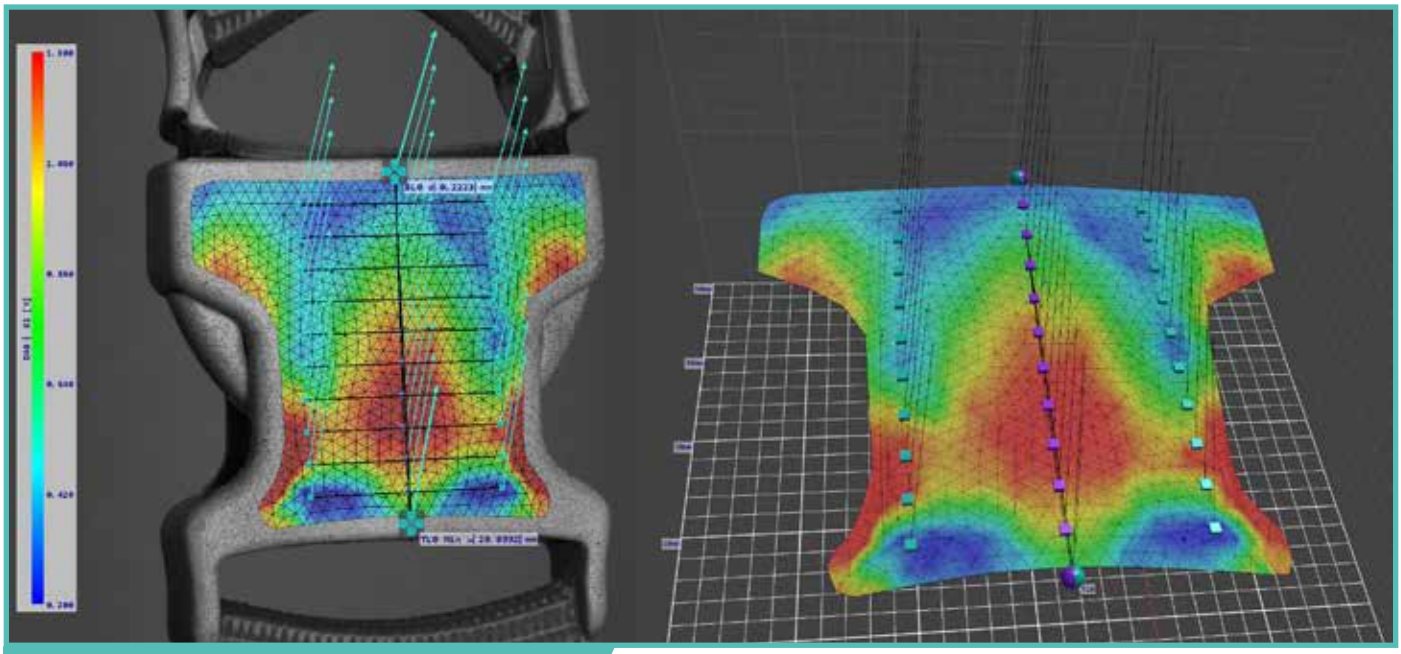
Digital Image Correlation (DIC) has become a valuable tool for evaluating the performance, safety, and durability of everyday consumer products. By providing detailed insights into material behavior under real-world conditions, DIC systems help optimize designs, reduce testing time, and lower development costs.



Chair durability and load testing

MEASUREMENT OF TEMPERATURE FIELDS

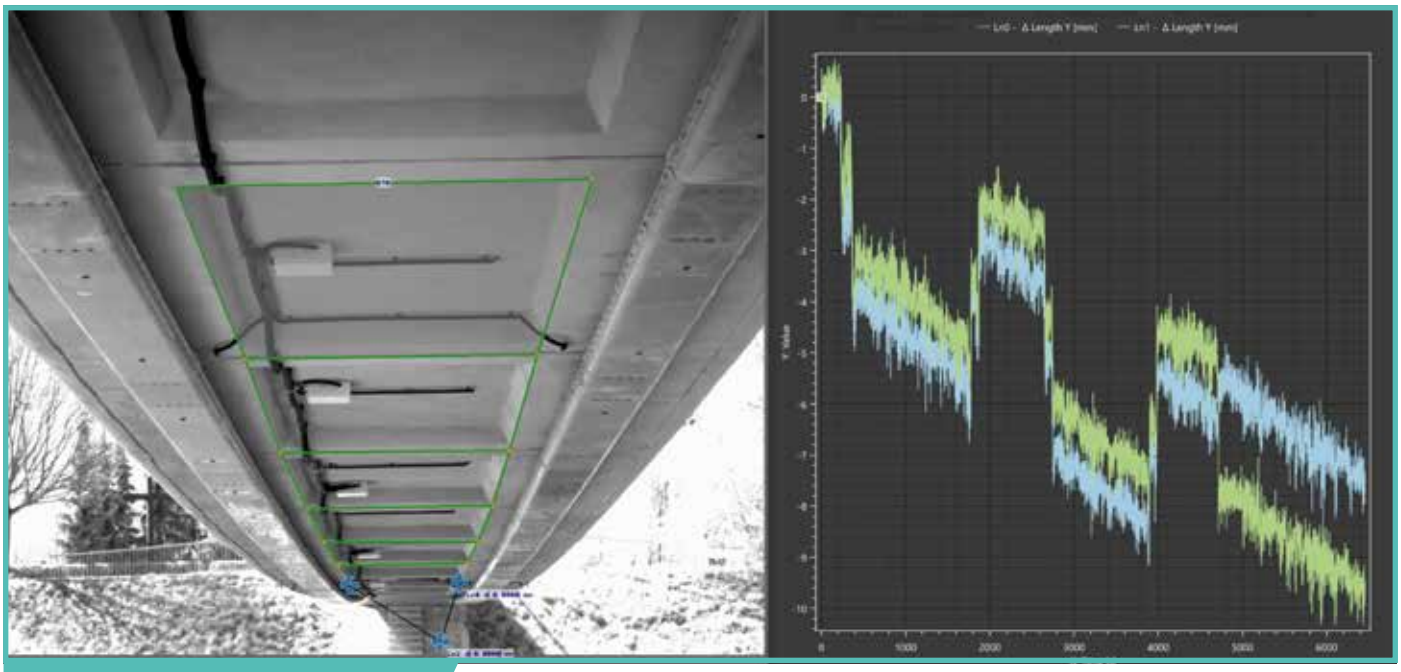




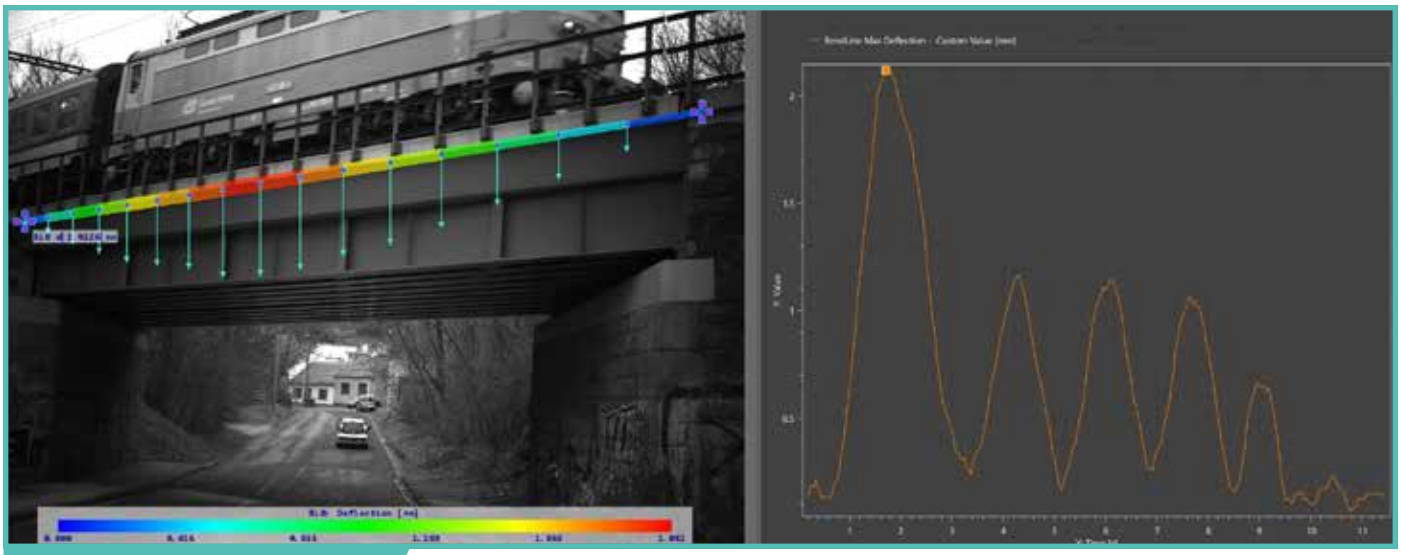
STRENGTH AND DURABILITY TESTING OF BUCKLE

CIVIL ENGINEERING

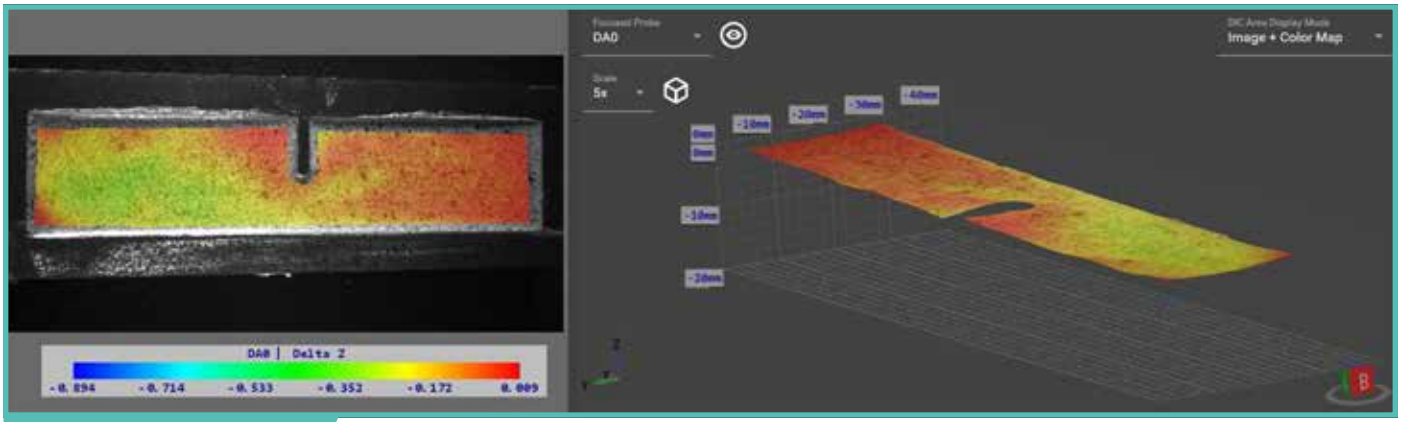
Monitoring the structural integrity of large infrastructure components, such as bridges, is critical for ensuring safety and efficient maintenance. DIC provides precise, full-field measurements that surpass traditional methods, enabling accurate evaluation of deformation and early detection of structural issues to extend the lifespan of these vital structures.



STATIC LOAD TESTING OF A BRIDGE



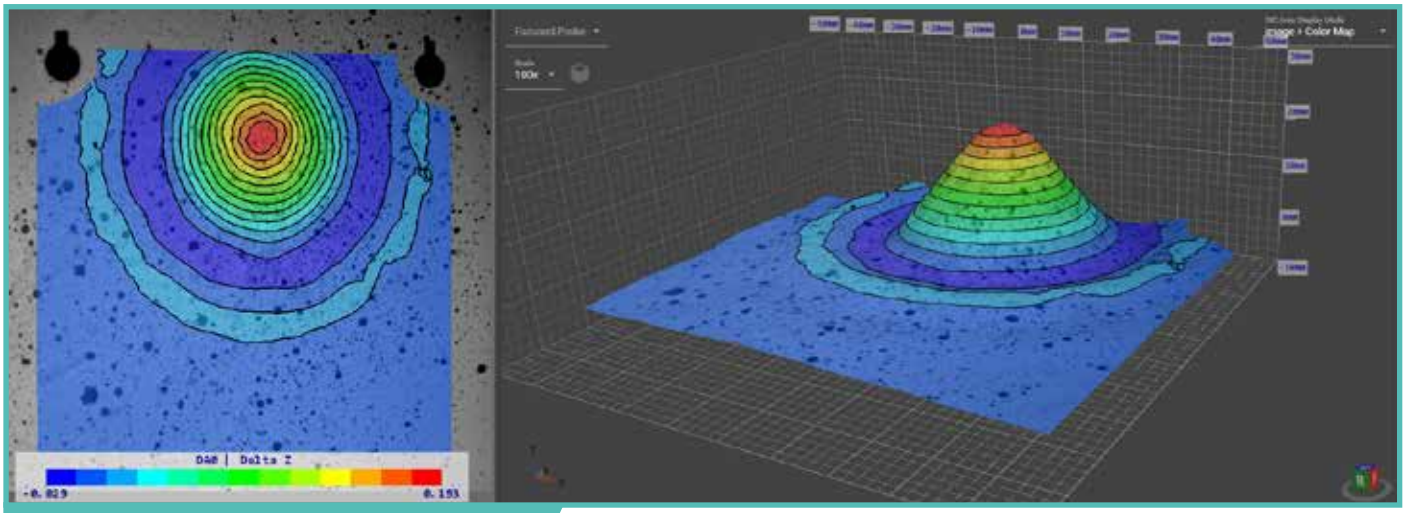
ANALYSIS OF RAILWAY BRIDGE



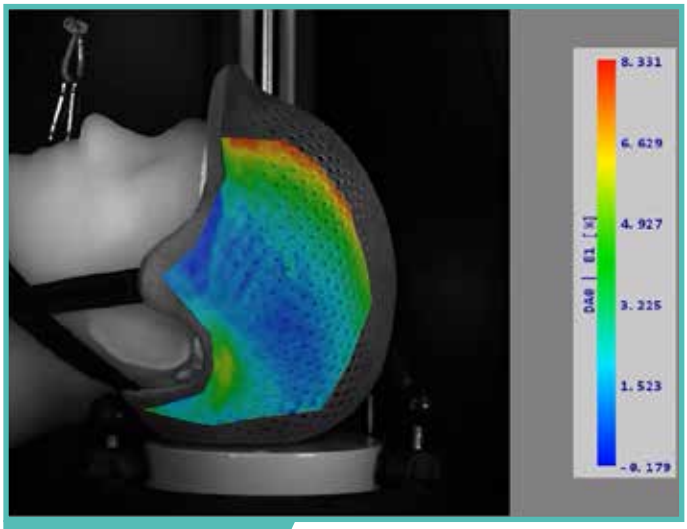
CONCRETE STIFFENING

HIGH SPEED

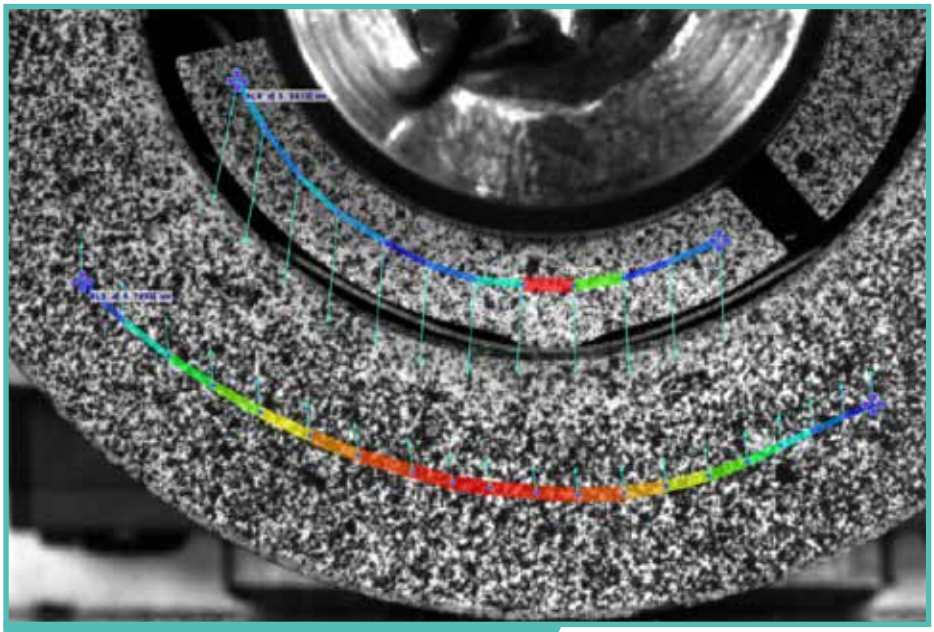
High-speed testing with DIC captures rapid events, such as impacts, explosions, or shock waves, providing precise full-field deformation and strain data. This enables detailed analysis of dynamic material behavior under extreme conditions, essential for industries like aerospace, automotive, and defense.



AIR GUN PELLET HITTING A STEEL PLATE



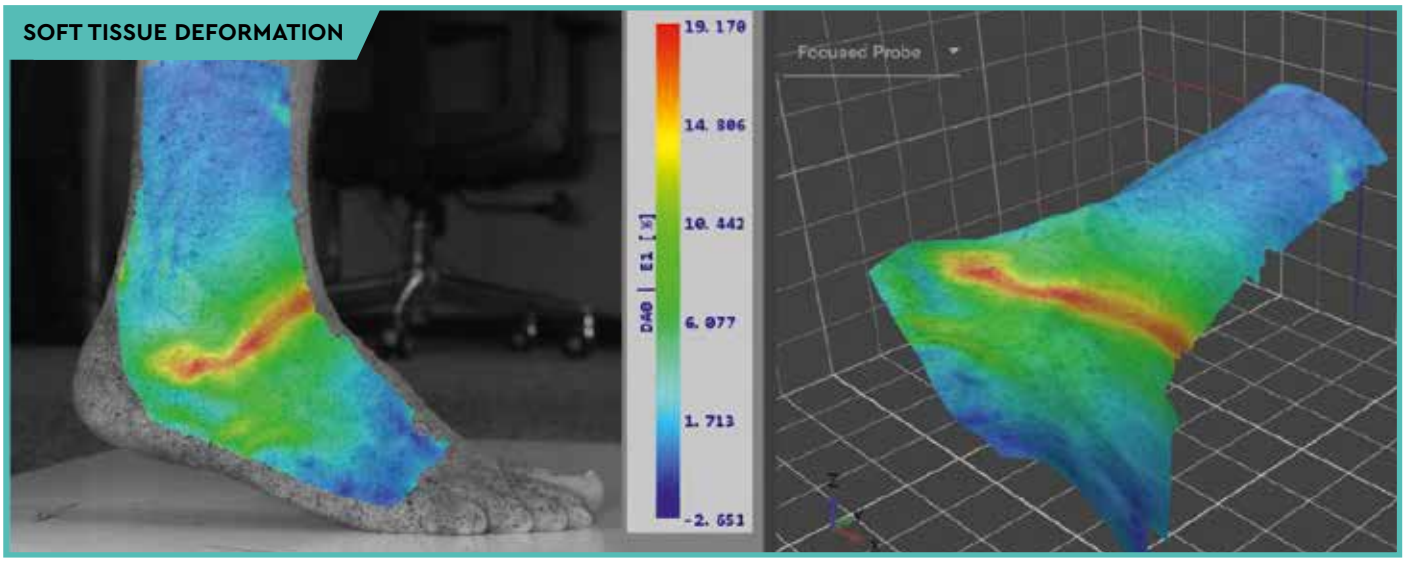
HELMET DROP TEST



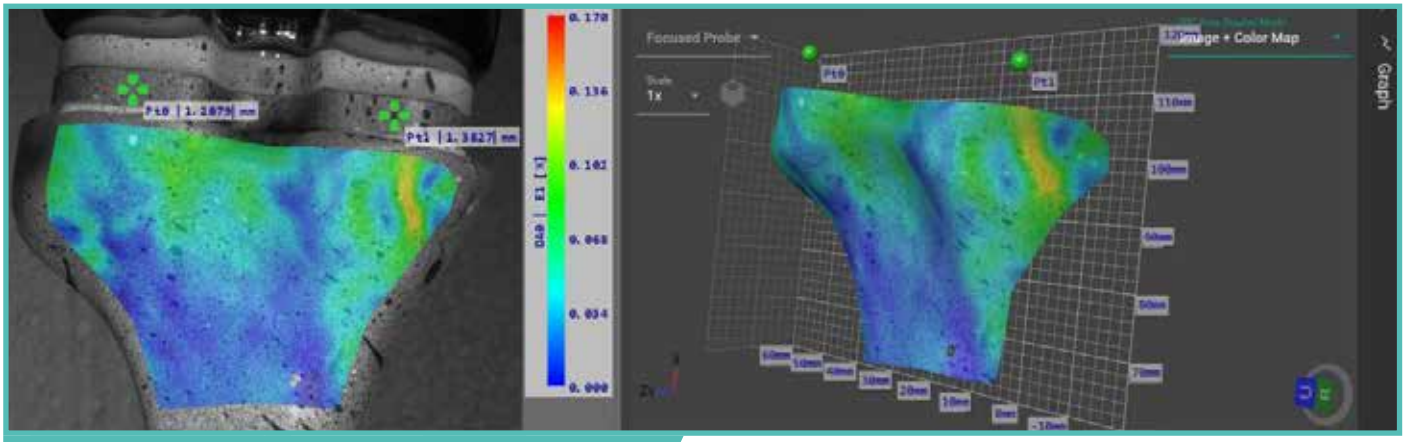
AERODINAMIC BEARING WITH TILTING PADS

BIOMECHANICS

Biomedical engineering bridges the gap between medicine and engineering, applying advanced technologies to improve healthcare. Stereo DIC systems are used to measure strain on biological materials like hearts, aortas, skin, bones, and tendons, aiding in the development of prosthetics and medical treatments. Additionally, volumetric software provides detailed insights into brain tissue and bone structures, advancing our understanding of complex biological systems.



SOFT TISSUE DEFORMATION

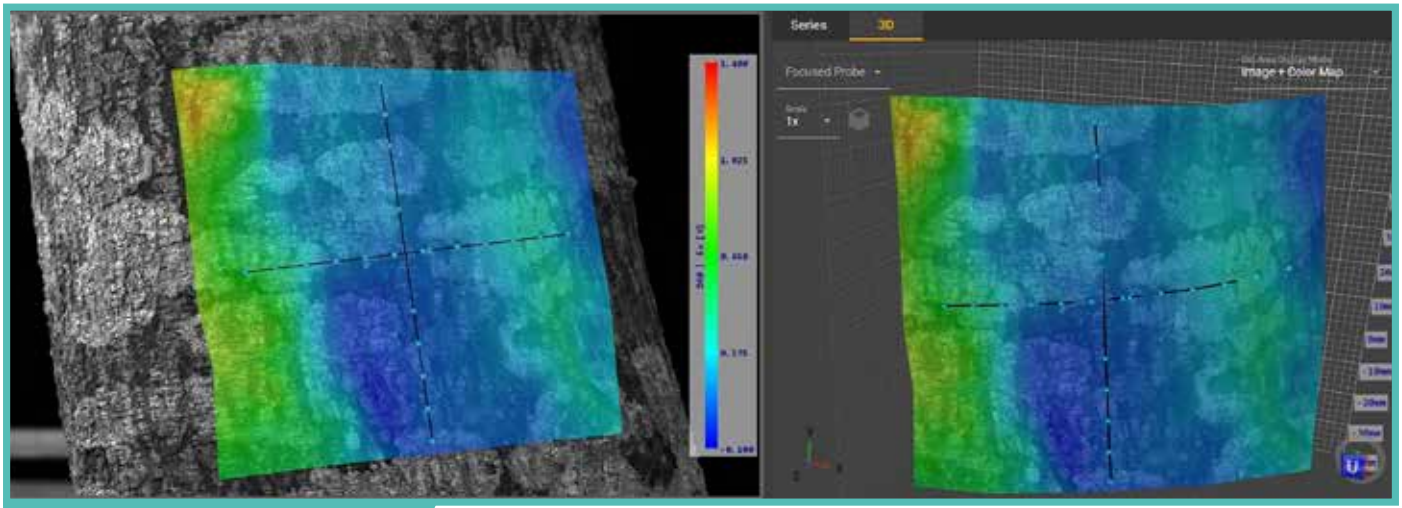


TOTAL KNEE ENDOPROSTHESIS INFLUENCE ON FEMUR

APOSTOLOPOULOS, Vasileios. Biomechanickéa klinické srovnání totální náhrady kolenního kloubu typu All-poly a Metal-backed Online. Disertační práce. Brno: Masarykova univerzita, Lékařská fakulta. 2024. Dostupné z: https://is.muni.cz/th/le1t7/. [cit. 2024-04-18]., n.d

ENVIROMENTAL MONITORING

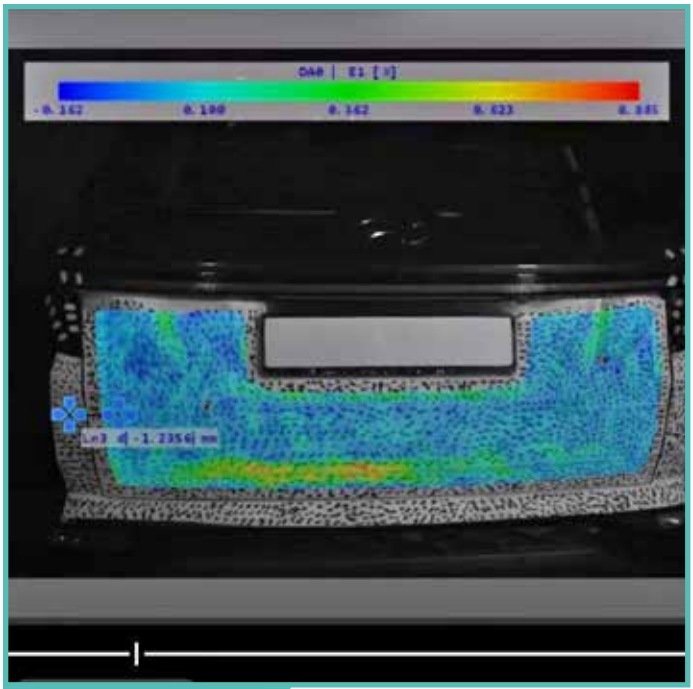
DIC systems provide precise data for analyzing natural structures, such as tree stability, soil erosion, and rockfall risks, aiding in hazard prediction and conservation efforts.detailed insights into brain tissue and bone structures, advancing our understanding of complex biological systems.



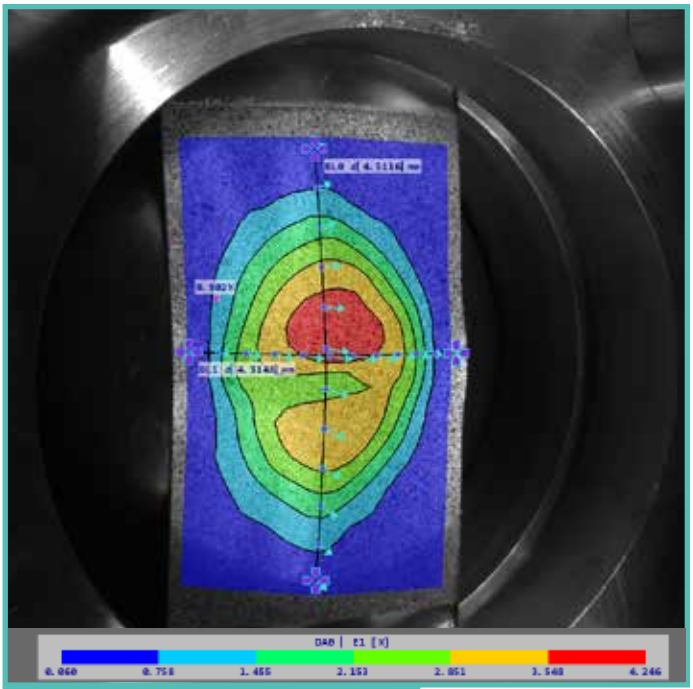
DIC ANALYSIS OF TREE GROWTH

AUTOMOTIVE

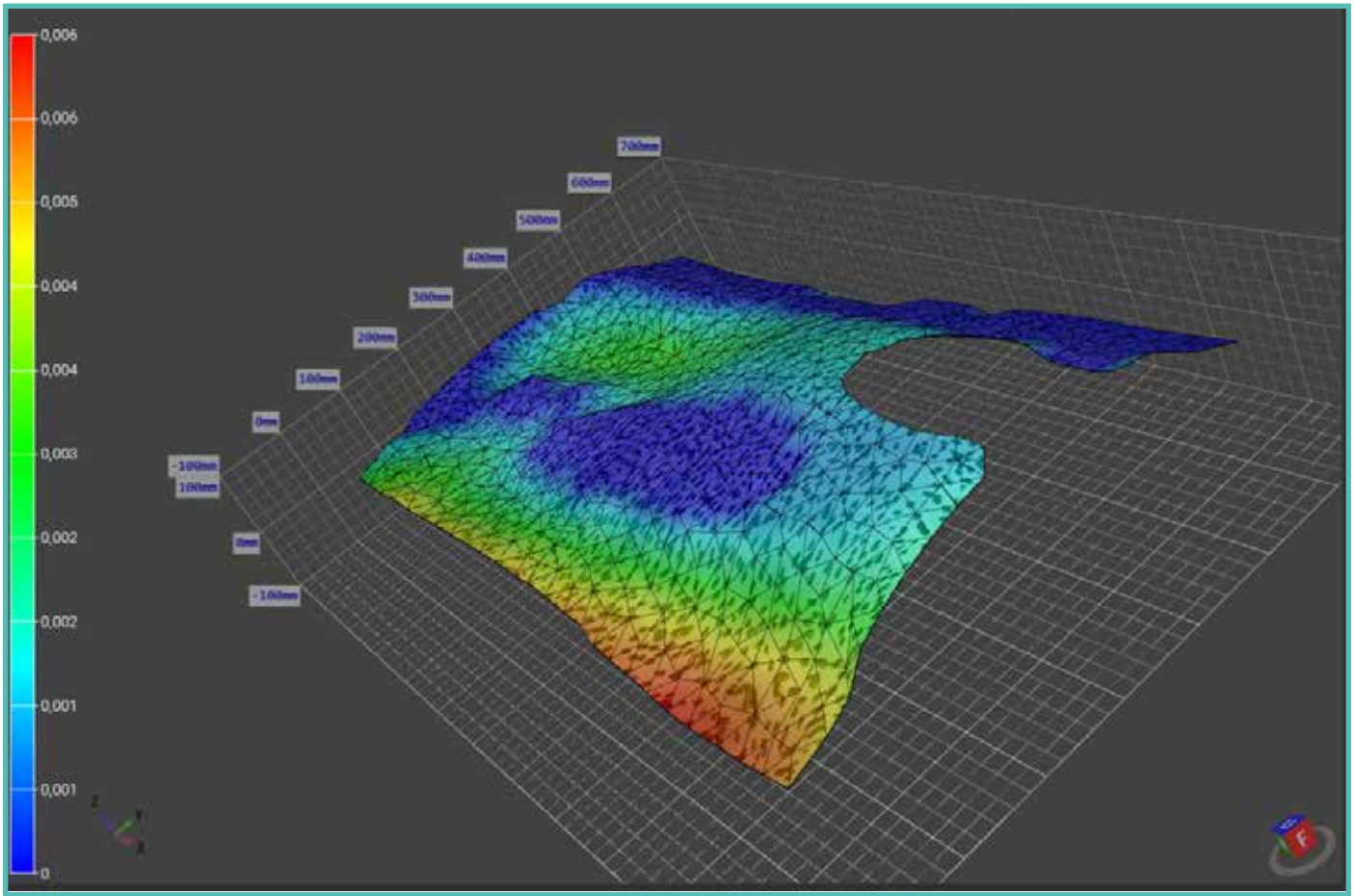
Digital Image Correlation helps engineers in the automotive industry better understand how materials and components behave under real-world conditions. It is used to analyze deformation during crash tests, monitor how parts change shape under load or heat, and measure how structures respond to vibrations. The method is also commonly applied in sheet metal forming, including forming limit analysis and material failure detection. With precise full-field data, DIC supports design validation, improves simulations, and speeds up development.



TRUNK SLAM TEST



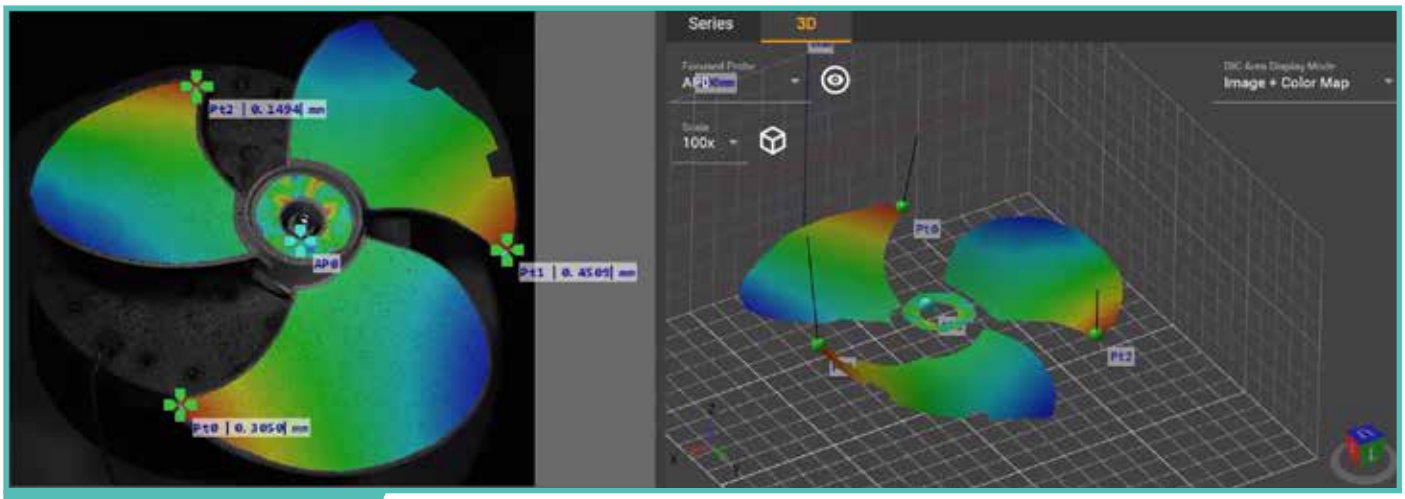
FLC – FORMING LIMIT CURVE



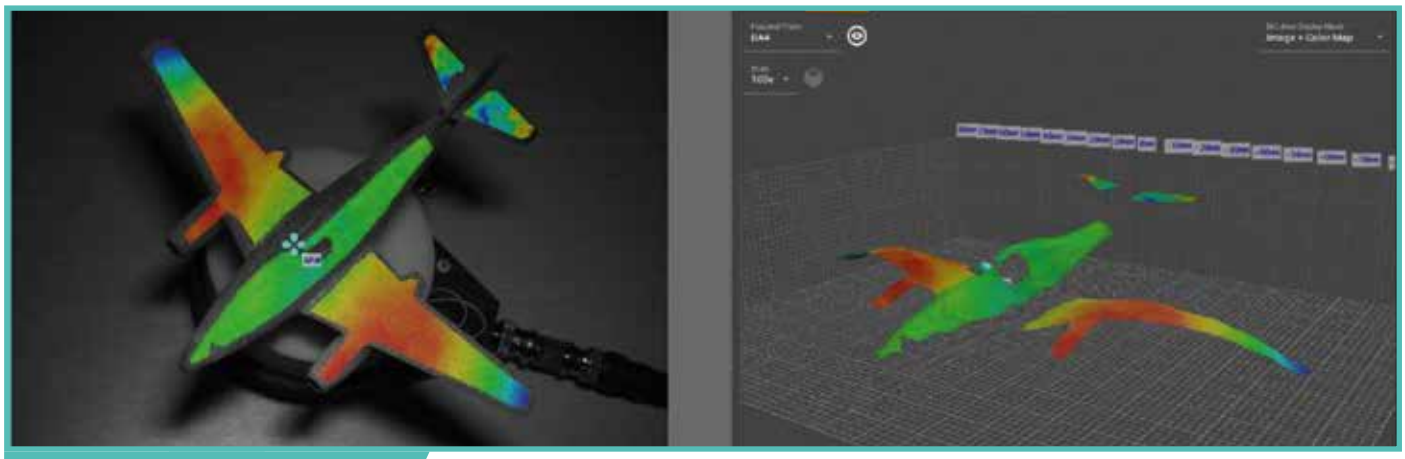
MODAL SHAPE OF A CAR SIDE DOOR EXCITED BY INTERNAL SPEAKER

VIBRATIONS

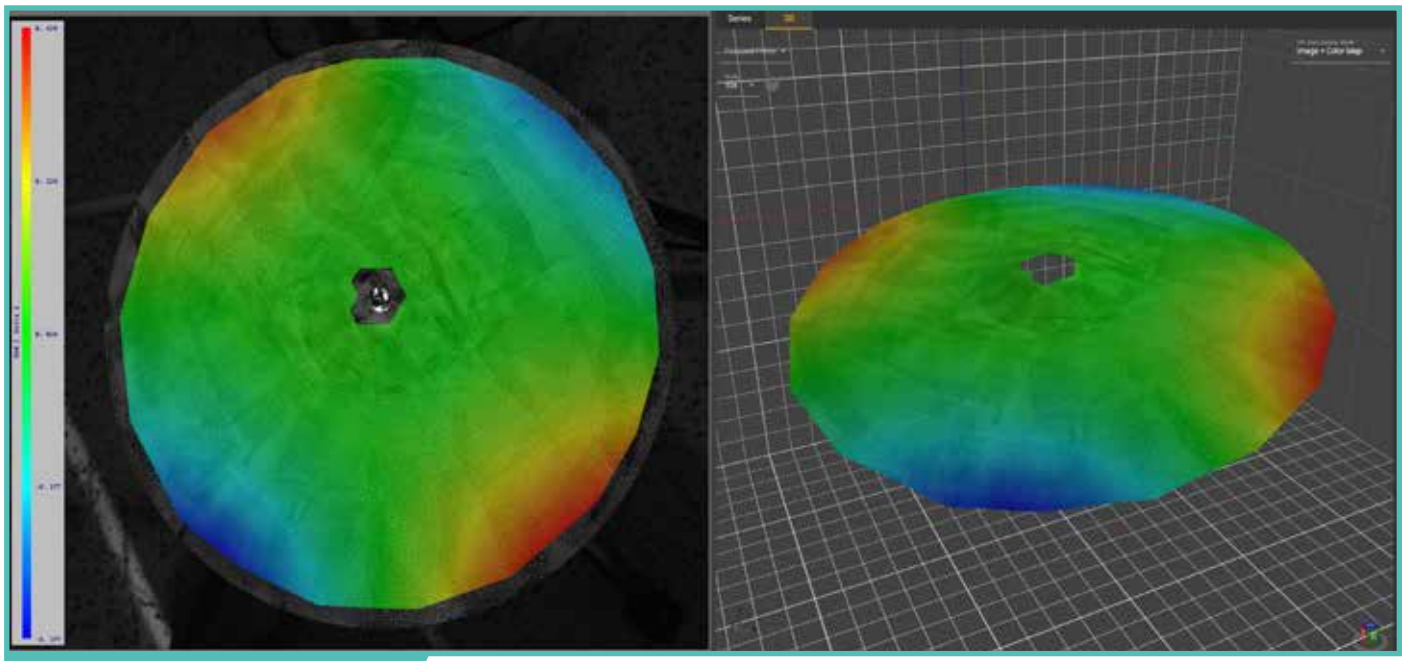
Modern demands for high reliability and durability in machines, electronics, and mechanical components require dynamic measurements beyond static stress/strain analysis. DIC-based Vibration Analysis provides precise insights into dynamic material deformation and strain, meeting the needs of advanced performance evaluation.



DYNAMIC RESPONSE OF FAN



MODAL SHAPE VISUALIZATION



OPERATIONAL MODAL ANALYSIS

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