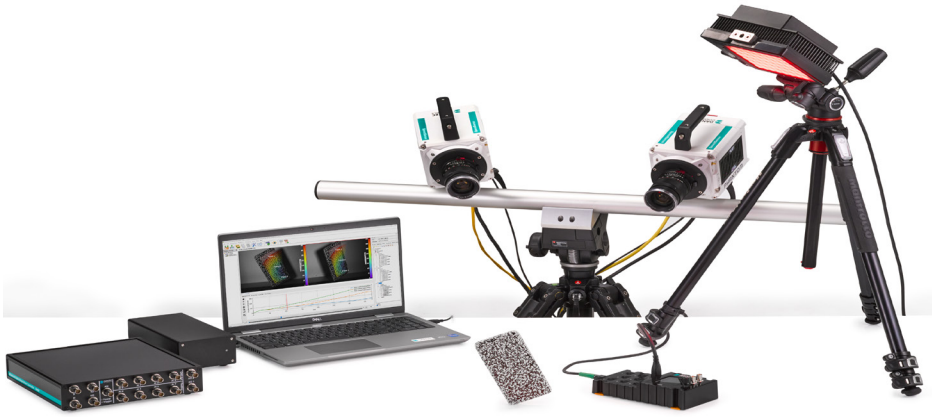
SOLUTION SHEET

HSpeedDIC System

Dynamic & transient material testing applications, motion analysis, and (ODS) vibration analysis



Phone drop impact test in Istra4D V4.11 with the HSpeedDIC system

SpeedSense cameras integrated, live, in Istra4D

All SpeedSense cameras are integrated in Istra4D within both the online measurement acquisition & calibration modes, just like any other low- or medium-speed camera.
As such, the camera can be completely controlled and operated in Istra4D making is easier & faster for users in setting up the cameras for doing DIC & point (marker) tracking. All features such as the; real-time speckle pattern quality evaluator, live feedback of sharpness, RoI selection for higher frame rates, automatic shutter time finder, overexposure display, crosshair (recticle) alignment, measurement config. settings profile, and active shutter time adaption are available.

SpeedSense TMX camera

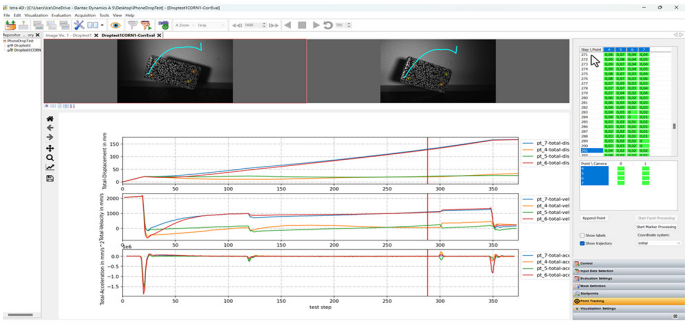
SpeedSense VEO camera

Key benefits

- SpeedSense cameras ranging from 1 to 4 Mpx and from 1 to 40 kHz
- Camera integration in Istra4D with live setup functionality
- Point (marker) tracking with auto-marker detection
- Application module plugins (i.e. ODS vibration analysis)
- Automated projection calibration with online feedback
- Analogue input data sampling & capture

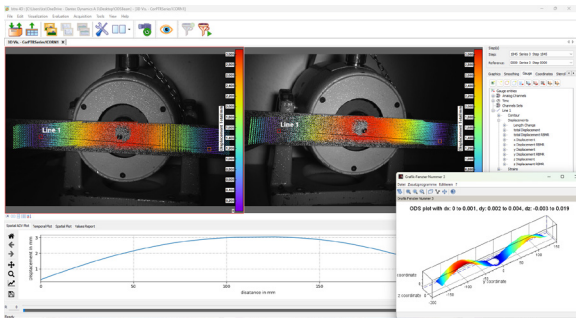
Capture fast to measure more

The HSpeedDIC is a complete & fully equipped DIC measurement system (typically) supplied with 2x high-speed SpeedSense (burst-mode) cameras, a Laptop PC, a Dual-Port 10GigE/Thunderbolt Adapter, a DAQ, lenses, calibration targets, an illumination system, mounting, and tripod. Various high-speed, SpeedSense (burst-mode) cameras are available typically ranging from 1 to 4 Mpx and from 1 to 40 kHz.
All high-speed SpeedSense cameras are available with different onboard RAM memory options. (The more onboard RAM storage, the longer the possible recording duration). Cameras can also be equipped with 10GiGE connection for fast download from the ringbuffer recording to a PC HD, and also for faster update of the live camera view.

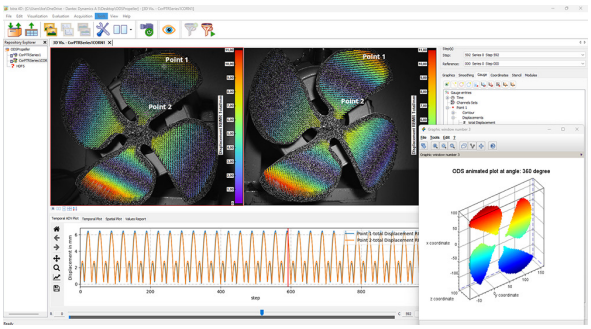


Marker visualization of a drop test indicating displacement, velocity, and acceleration of a point selected (App Video: Phone drop impact test in Istra4D V4.11)

Setup of HSpeedDIC system



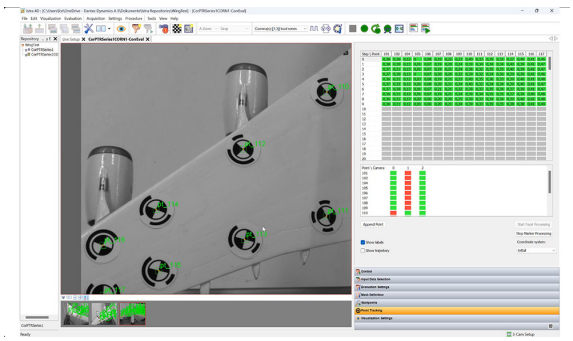
Displacement and Modal Shape visualization of a beam (App Video: Operation, Deflection & Shape (ODS) analysis of a beam in Istra4D V4.11)



Displacement and Modal Shape visualization of a propeller (App Video: Operation, Deflection & Shape (ODS) analysis of a propeller in Istra4D V4.11)

Detection - right on the mark(er)

Istra4D has a dedicated point (marker) tracking functionality, using either coded-target markers or discrete subset/facets. This allows users to analyse discrete points of interest for kinematic quantaties such as; displacements, velocities, accelerations, and (6DOF) rotations.
For users, the possibility of being able to perform point (marker) tracking for discrete point-data acquisition and/or Digital Image Correlation (DIC) for full-field data acquisiton, allows a wide scope of testing applications.
Point (Marker) Tracking is applicable for dynamic materials testing, motion and vibration analysis applications. Coded-target markers can be easily adhered directly to the test object, for which can then be automatically detected and tracked in Istra4D.



Auto-detection of coded markers (App Video: Wing Deflection Measurement in Istra4D V4.11 using point (marker) tracking)

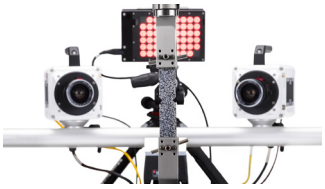
36-coded marker stickers

Analyze data with application modules

Dantec Dynamics has free-of-charge, application modules that plug-in (and can be directly executed) from Istra4D. These modules are ready-made, scripts that are programmed in either; SciLab™ or Python™, and are installed automatically with Istra4D and also available via eLearning. Specific application module plugins for the HSpeedDIC system include;

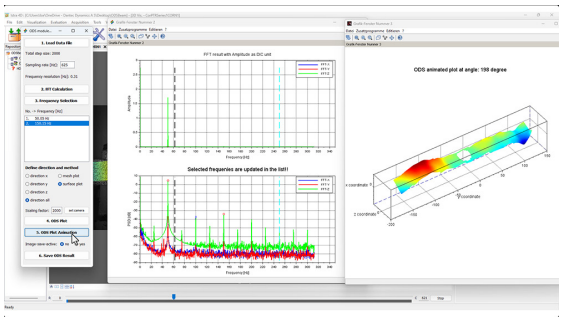
- Materials Testing Applications Package ➔ Strain Rate Calculation
- Dynamic Testing Applications Package ➔ Operation, Deflection & Shape (ODS) analysis & Rotation Analysis

For users, the application modules are ready-to-use. Each application module is fully explained and developed for a specific application purpose. Coded scripts can also be further modified by the user (no licensing conditions).

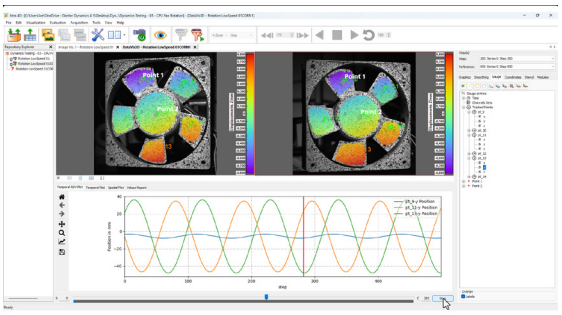


HSpeedDIC system used for a high-strain rate test

HSpeedDIC system used for deflection and ODS vibration analysis of a propeller



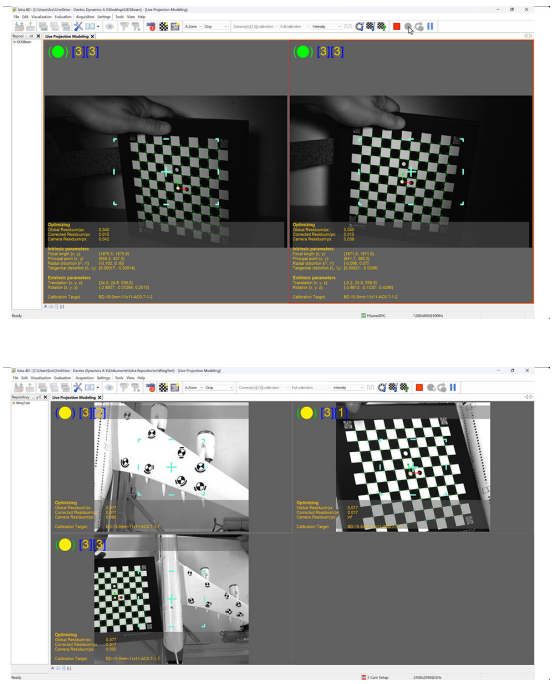
ODS application module (App Video: Operation, Deflection & Shape (ODS) analysis of a beam in Istra4D V4.11)



App Video: Motion analysis of a PC ventilator fan in Istra4D V4.11

Experience a projection calibration that takes seconds

The projection is calibrated online, by the user, within an automated protocol. Firstly, the calibration target size, tolerances, and double-sided properties are detected automatically by Istra4D via QR-code recognition.
Double-sided targets are distinguishable from front/back via visual indicators. The projection calibration protocol itself is automated in that as soon as the %-of detectable grid intersection points have been found, in any number of cameras, an image will be acquired automatically.
Motion blur is not possible since Istra4D has active shutter time adaption. During the online projection calibration, the calibration parameters are computed and updated as a live feedback of the calibration quality. This approach is quick & simple and introduces less possible errors associated in selecting the target for calibration.



Live calibration and feedback of a projection calibration

Technical specifications

HSpeedDIC			
Number of Cameras		1, 2 or 3	
Sensor, Frame Rate & Interface		1 Mpx (1280 x 800 px) SpeedSense 10GigE (Burst)	4 Mpx (2560 x 1600 px) SpeedSense 10GigE (Burst)
Standard Lens Focal Length		35 mm	
Camera Setup Configuration		Adjustable	
Standard Field-of-View (FoV)		400 mm (H) x 250 mm (V)	
Standard Distance-to-Object (DtO)		550 mm	
Measurement Performance			
Standard Spatial Resolution	2-Cameras 3-Cameras	313 µm/px 164 µm/px	156 µm/px 83 µm/px
Standard In-Plane Resolution	2-Cameras 3-Cameras	5 µm 2 µm	2 µm 1 µm
Standard Out-of-Plane Resolution	2-Cameras 3-Cameras	9 µm – 47 µm 5 µm – 25 µm	5 µm – 23 µm 2 µm – 12 µm
Strain Resolution		15 µstrain	

Order information

HSpeedDIC (Non-Standard Configuration)	
Cameras	**1x OR 2x OR 3x** Any high-speed SpeedSense camera from product portfolio
Lenses	Any F-mount lens from product portfolio
Hardware	1x DSM 24200: Laptop PC & 1x DSM 24640: Dual-Port 10GigE/Thunderbolt OR 1x DSM 24210: Tower PC 1A & 1x DSM 24640: Dual-Port 10GigE/Thunderbolt Adapter OR 1x DSM 24210: Tower PC 1A & 1x DSM 24610: 10GigE Network Card
DAQ	1x DSM 25030: DAQ Controller OR 1x DSM 25055: DAQX Controller
Software	1x DSM 32000: Istra4D Software Platform & 1x DSM 32023: Istra4D SpeedSense Camera Acquisition Module & 1x DSM 32050: Istra4D Advanced DAQ Triggering Module & 1x DSM 32010: Istra4D 3D & 2D Correlation Evaluation Module & 1x DSM 32060: Istra4D Graphical Visualization Module
Calibration Targets	Any calibration target from product portfolio
Illumination	1x DSM 47130: SXR-LED Illum. System (Red) OR 1x DSM 47134: SXR-LED Illum. System (Blue)
Mounting	1x DSM 60010: Mounting Rail (0.7m) & 1x DSM 60030: Standard Tripod OR 1x DSM 60017: Long Heavy Duty Mounting Rail & Brackets 1.5m (Except VEO) & 1x DSM 60015: Heavy-Duty Tripod (for Heavy HS Cameras - Except VEO)
Optional	
Software	1x DSM 32040: Istra4D Import Wizard Module
Lens Filter	Any F-mount lens polarization or bandpass filter from product portfolio
Illumination	1x DSM 47250: X-Illumination Controller (incl. 600W Power Supply)
Illumination Polarization Filter	1x DSM 47190: SXR/SXB-LED Polarization Filter & 1x DSM 47195: SXR/SXB-LED Polarization Filter Mounting Bracket
Speckle Patten Kit	DSM 50650: Speckle Pattern Kit – Stamp Rollers DSM 50600: Speckle Pattern Kit - Airbrush (Professional)

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