High Speed Strain and Vibration Measurement from Dantec Dynamics

Digital Image Correlation
Strain & Deformation/Vibration measurement

- **Benefits**
  - Full field results
  - 3D measurement
  - Non-Contact
  - Flexible FOV, mm² - m²
  - Suitable for all materials
  - Up to 1 million FPS and 16MP cameras

- **Applications**
  - FEA Validation
  - Vibration analysis:
    - Harmonic excitation
    - Shock excitation
    - Noise excitation
  - Modal shape analysis
  - Impacts, ballistics

- As used by Nottingham, Manchester, Bristol Bradford and Cranfield universities in UK.

- **Features**
  - Integrated support for Phantom, Photron and IDT cameras (no need for OEM software!)
  - One click evaluation
  - Camera timing & triggering control
  - Simultaneous logging of analogue channels
  - Automated calibration procedure
  - Confidence margin for each point in units
  - 2D overlay display linked to 3D display
  - True multi camera support ‘n’ cameras
  - New faster evaluation algorithms
  - Support of windows 7, 64 bit and multi core

Rob Wood - Dantec Dynamics Ltd - www.dantecdynamics.com
The World Leader in Thermal Imaging Systems
High Speed Thermal Imaging
From the World Leaders

SC7500 camera
• Up to 32kHz

Altair Software
GOM – Industrial 3D Measurement Techniques
Measurement Systems

GOM is a global industrial partner for optical 3D coordinate measurement with over 20 years experience.

GOM has comprehensive know-how in 3D coordinate measurement, material and component testing, quality control and analysis, digital image processing:

- material testing
- 3D shape and dimensional inspection
- dynamic structural tests

ATOS
- Full-field 3D Digitizing

TRITOP\textsuperscript{CMM}
- Mobile Optical CMM

PONTOS
- Dynamic 3D Analysis

TRITOP\textsuperscript{Def}
- Vectorial Deformation Analysis

ARAMIS
- Full-field 3D strain measurement

ARGUS
- Deformation Analysis in sheet metal forming
Thank you for your attention

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www.gom.com
Invisible Vision is a global leading UK manufacturer of Ultra High Speed Camera Systems to 1 Billion frames per second.

Stop Motion Exposure times to nanoseconds at ultra high speeds for impact, crack, discharge & shock wave propagation.

Three complimentary product groups – UHSi 200M fps+ ‘Movie’ Camera, UVi intensifier and PiV for maximum resolution.

UVi – Add-On HSV Intensifier.
5ns Shuttering.
UV & Visible Capability.
High Image Intensification.
Many diverse applications.
New Enhanced SUVi version.

PiV – 10ns with Maximum Resolution.
Two 16 Megapixel Images (4872 x 3248).
Each Image Gates down to 10ns.
UV & Visible Capability.
12 bit images, GigE Connection.
IVV Imprint® Control & Analysis S/W

UHSi 12/24
Ultra High Speed Camera.
24 frames, 200 Million+ fps.
5ns Exposures.
Megapixel Resolution.
(400+ TV lines per picture height).
12 bit images, GigE Connection,
IVV Imprint® Control & Analysis S/W

www.invisiblevision.com

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LaVision

We count on Photons

Fully Integrated Systems

Custom - Complex Configurations

DIC - Solids - Point Measurement

Applicable to various Materials

Particle Tracking - Fluids - PIV

Planar - Surface - Volumes

Across Industry & Academia

Auto - Geology - Bio

Aero - Manufacture - Energy

16 MPix - Cameras - 1MHz

Employing Advanced Technology

LaVision

Across Industry & Academia

Employing Advanced Technology

We count on Photons

Full Integrated Systems
DIC using natural patterns

DIC - Solids - Point Measurement

Live gauge with analogue output

Digital to Analogue Conversion

DIC using natural patterns

LaVision

We count on Photons

Digital Volume Correlation

Windows 7 and powerful GPUs for fast processing

16 MPix - Cameras - 1MHz

Aero - Manufacture - Energy
Wide variety of high speed cameras

IDT/ Redlake
AOS Technologies
Fastec Imaging

Specialist Lighting
Cavitar HF Pulsed Diode Laser

Software
ProAnalyst and MiDAS DA

Feature rich, versatile and excellent value for demanding applications
Compact cameras for hostile environments and cost effective battery powered cameras
Handheld cameras and long record systems

For very demanding applications such as welding and explosions and where extremely short exposure times are required.

Turn your camera into a powerful scientific tool

High Speed Cameras - Specialist Accessories - Data Acquisition - Motion Analysis
Offices in Japan, USA, Germany and UK
Distribution Network worldwide
Since 1958 – More than 50 years experience in Imaging Technology

Memrecam GX8
- 2900fps full res
- 600k fps
- 0.5us shutter
- ISO5000 color; ISO20,000 mono
- 1.3 mega pixel resolution
- 250ns Straddle Time
- < 15ns Jitter
- Synchronisation with Phase shift

Ballistics, combustion, flow visualization, PIV, etc

Memrecam GX1 & GX3
- Mega Pixel Resolution 1280 x 1024
- 2000 fps full res
- 200k fps
- 1μ sec shutter
- ISO 5,000 colour; ISO20,000 Mono
- HyGe / none HyGe
- Affordable price

Car crash, airbag, welding, etc

Memrecam GX5
- Upto EIGHT Heads per recorder
- Small, light camera heads (25mm Cube)
- 1000 fps
- HyGe
- 3 camera head options

On-Board, Crash & Sled testing

www.nacinc.com
Nick Paris
UK High Speed Video Specialist

Range of cameras reaching 1,000,000 fps
minimum shutter of 200nS

Ease of use
Controller Display Unit
Instant playback

Olympus software
Auto tracking analysis
External data logging
Photo-Sonics International Ltd.
Leaders in specialised instrumentation products.

Image Analysis software

Rugged, light weight and portable

Standard and intensified cameras
Up to 5000FPS at full resolution
Fast and reliable Ethernet interfaces

Matthew Wilkins
High-Speed Imaging Cameras for Research and Development
in the field of Experimental Mechanics

With more than 30 years experience designing and manufacturing high speed imaging systems for research and industry, Photron has become known for the performance, reliability and ease of use of its products, backed up by excellent support in Europe and overseas.

In addition to capture of high quality images Photron cameras can also be integrated with 3rd party software and hardware and used with measurement techniques such as Motion Analysis and Digital Image Correlation (DIC).

Applications:
• Automotive Safety Testing
• Split Hopkinson Bar Tests
• Dynamic Tensile Testing
• Drop testing
• Impact Tests
• Ballistics
• Vibration analysis
• Material Characterisation

Fastcam SA-X New for 2011
Worlds highest performance system
1 Mega Pixel @ 10,000fps

Products:
Fastcam SA3
- 1024 x 1024 pixels @ 2,000fps

Fastcam SA4
- 1024 x 1024 pixels @ 3,600fps

Fastcam SA1
- 1024 x 1024 pixels @ 5,400fps

Fastcam SA5
- 1024 x 1024 pixels @ 7,000fps

Fastcam SA2
- 2048 x 2048 pixels @ 1,080fps

Fastcam MC2
- 512 x 512 pixels @ 2,000fps

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British Society for Strain Measurement (BSSM)
Showcase on High Speed Imaging and Application to Strain Measurement

Ultra High Speed Imaging Systems
Framing Cameras

- 330Mfps with 3ns gating
- 1380(H)x1024(V) resolution with 12 bit dynamic range
- Up to 16 optical channels
- Up to 32 images (double shot mode)
- Intensifier uses highly efficient P43 phosphor or fast decay P46 phosphor
- Typical system resolution >50lp/mm
- Innovative beam splitter design
  - Uniform resolution across X and Y axis
  - No parallax or shading
  - f2.8 aperture
- Auxiliary optical port for interfacing HS Video, streak camera or spectral-analyzer.
- Laptop computer control via standard Ethernet
- All metal construction, RFI/EMI and CE approved

Application:
- Ejection of spalled layers from laser shock-loaded metals
  - Exposure: 10ns
  - Interframe: 1.425μs

Application:
- Hypervelocity Impact. Projectile travelling at 1000m/s
  - Exposure: 70ns
  - Interframe: 40μs

Application:
- Material Research
  - Exposure: 100ns
  - Interframe: 28.55μs

Application:
- Hopkinson Bar experiment to study crack propagation
  - Exposure: 100ns
  - Interframe: 7.5μs
HPV-2 Ultra high speed video camera

- Up to one million frames per second at full resolution
- Peltier cooled ISIS CCD sensor (312 x 260 pixels)
- 250 nanosecond exposure time
- Rolling memory with pre and post trigger
- Synchronised recording for up to 4 cameras
V710 – 1.4M picture/second
300nS exposure

V12.1 – 1.0M picture/second
300nS exposure

Jo Cleaves - Stand 7