Full-field Thermoelastic Stress Measurement System

The *DeltaTherm*, by Stress Photonics, is a unique IR differential thermography system suited to Thermoelastic Stress Analysis (TSA) and Thermal Nondestructive Evaluation (TND-E). By coupling special high-speed image processing electronics with a high-performance infrared array detector, it is now possible to image stresses in just seconds!

**Applications**

- Thermoelastic Stress Analysis
- Lock-In Thermography
- Standard Thermography
- Forced-diffusion Thermography
- Coating Tolerant Thermography
- Fracture Mechanics
- Crack and Flaw Detection
- Structural Integrity Assessment
- Composite Material Damage Evolution
- Composite Material Fatigue Life Prediction

**Fast**

*DeltaTherm* is remarkably fast. The detector array contains thousands of on-chip integrators which collect data simultaneously, producing a near-live full-field stress image.

The high-speed digital electronics correlate load and stress induced temperature changes for immediate video presentation of stress patterns.

**Portable**

When portability is required, *DeltaTherm*’s small size and light weight make set up quick and easy.

- The camera head weighs less than 3.5kg (8 lb).
- A rugged portable computer with integral display and keyboard is available.
- Complete system fits in two hand-carried cases.

**Robust**

- Closed-cycle cooling (*DeltaTherm* can be operated in any position in a wide range of environments.)
- Long camera cable for safe and convenient operation
- Padded shipping and storage case
- Multiple hard mounting points on camera

**Versatile**

- Simple optics feature interchangeable lenses.
- Camera operates over wide temperature range.
- Constant or variable amplitude loading accepted.
- Microsoft Visual Basic control software provides user integration capability.
- Customizable software can be tailored for special applications.

*Stress Photonics*

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*Stress Photonics*
## Technical Specifications

### System Performance

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame Rate</td>
<td>&gt; 1000 frames/s standard thermography. Stress image processing speed depends on processing options purchased.</td>
</tr>
<tr>
<td>Specimen Temperature</td>
<td>Room temperature to more than 1000°C.</td>
</tr>
<tr>
<td>Frequency Range</td>
<td>Thermoelastic loading: 0.6 - 1000Hz. Lock-in thermography for TNDE heating control: No limit</td>
</tr>
<tr>
<td>Attainable Thermal Resolution</td>
<td>1mK full-field (30s acquisition time)</td>
</tr>
<tr>
<td>Cooler Life</td>
<td>5000 Hour MTBF Closed-cycle Cooler</td>
</tr>
</tbody>
</table>

### Camera Head and Optics

<table>
<thead>
<tr>
<th>Detector</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DELTA THERM 1350</strong>:</td>
<td>$128 \times 128$ InSb, 3-5µm sensitivity</td>
</tr>
<tr>
<td><strong>DELTA THERM 1450</strong>:</td>
<td>$256 \times 256$ InSb, 3-5µm sensitivity</td>
</tr>
<tr>
<td><strong>DELTA THERM 1550</strong>:</td>
<td>$320 \times 256$ InSb, 3-5µm sensitivity</td>
</tr>
<tr>
<td>Available Lenses</td>
<td>25mm, 50mm, 100mm, f/2.3 Two Position-Zoom Lens with better than 15µ/_pixel</td>
</tr>
<tr>
<td></td>
<td>Other lenses available upon request.</td>
</tr>
<tr>
<td>Cooling Method</td>
<td>Closed-cycle Cooler</td>
</tr>
<tr>
<td>Overall Size</td>
<td>11.4cm. (4.5in.) $\times$ 11.4cm. (4.5in) $\times$ 21.6cm. (8.5in)</td>
</tr>
<tr>
<td>Weight</td>
<td>3.5 kg (8 lb)</td>
</tr>
<tr>
<td>Best Spatial Resolution</td>
<td>0.19mm (0.007in.), better than 15 micron with Two Position Zoom Lens</td>
</tr>
</tbody>
</table>

### Computer and Electronics

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processing Cards</td>
<td>PCI processing card, PCI digital interface card, PCI A/D card</td>
</tr>
<tr>
<td>System Support Electronics</td>
<td>21.6cm. (8.5in.) $\times$ 30.5cm. (12in.) $\times$ 13.3cm. (5.25in.)</td>
</tr>
</tbody>
</table>

### DELTA THERM Includes

- IR camera head with optics
- High-speed image processor
- Computer
- DELTAVISION Software
- Tripod
- Instrument shipping/storage case

### DELTAVISION Software

- Controls all aspects of system operation
- Receives and stores images
- Provides a full suite of post-processing capabilities
- Presents and reports image data
- Windows NT operating system
- Compatible with TSA, PSA & TNDE instruments

Specifications subject to change without notice.

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Learn more about DELTA THERM as well as other exciting full-field stress and strain measurement products at StressPhotonics.com