FLIR

The Global Leader in Infrared Cameras

ALTAIR LI

Infrared imaging software suite for Research and Development applications

- Non-contact measurement
- Full-field stress imaging in real time
- Versatile loading capabilities
- Advanced Large motion displacement compensation
- Fast measurement of fatigue limit
- Temporal stress analysis

Camera systems for non-contact imaging of stress in materials and structures

Based upon a high performance focal plane array camera and digital image processing software the ALTAIR LI system produces high quality images of stress field in materials and structures under dynamic loading conditions.

Non-contact measurement technique

ALTAIR LI uses a JADE or SILVER camera which provides thermal images of the scene at fast frame rate The transformation of these thermal Images into stress Images is made by software, without any contact with the material surface.

Full-field stress imaging in real time

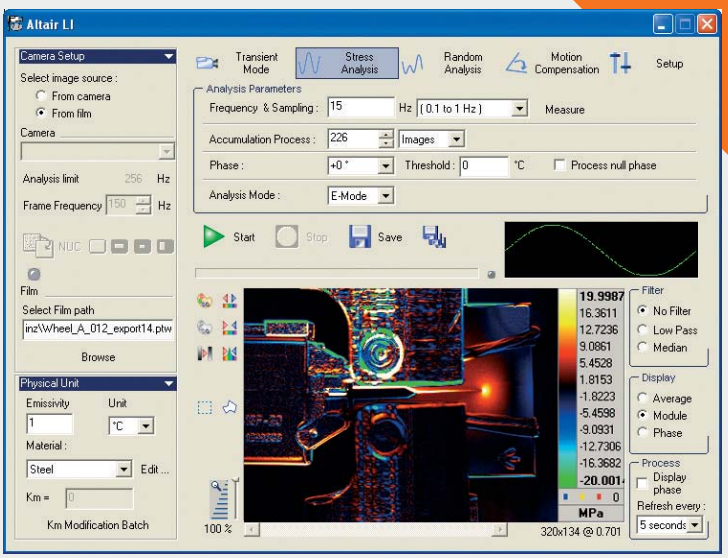
ALTAIR LI provides full field stress images in real time by using the thermoelastic effect which states there is a linear relationship between the temperature changes induced by loading and the stress at the material surface. The required thermal resolution to achieve a resolution of 1 MPa depends on the material properties, it is typically equal to 1 mK for steel and 2 mK for aluminium.

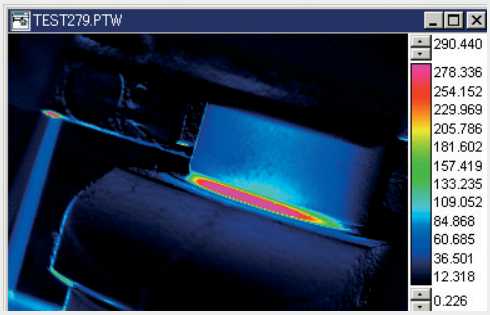
Versatile loading capability even with large displacement

ALTAIR LI allows testing of structural components undertaking random, transient or dynamic loading. In some applications where there can be large displacement, a software feature is available to provide accurate motion compensation.

Fast measurement of fatigue limit

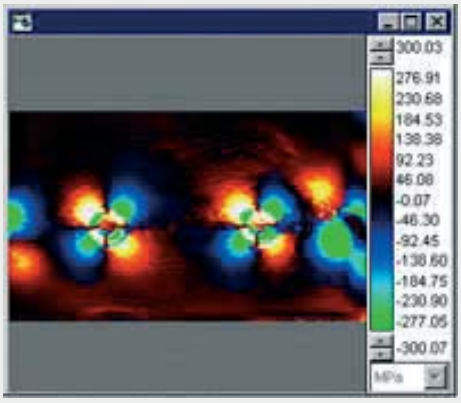
The assessment of heat dissipation on a structure under dynamic loading can give information on the damage mechanism involved. The D-MODE, which is available with ALTAIR LI, allows measurement of the dissipated energy. A unique application of this technique is the fast determination of fatigue limit in engineering materials.

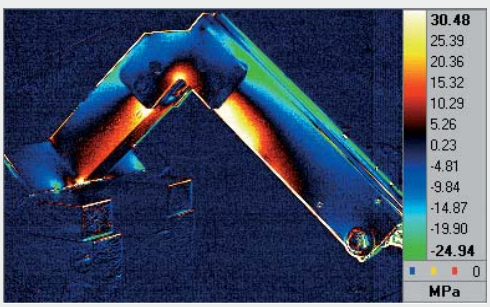




Non contact measurement technique

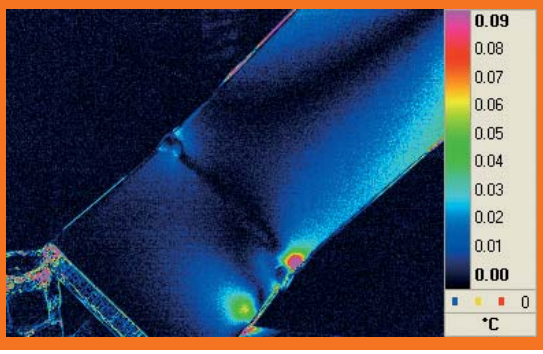
Provide full field stress images in real time

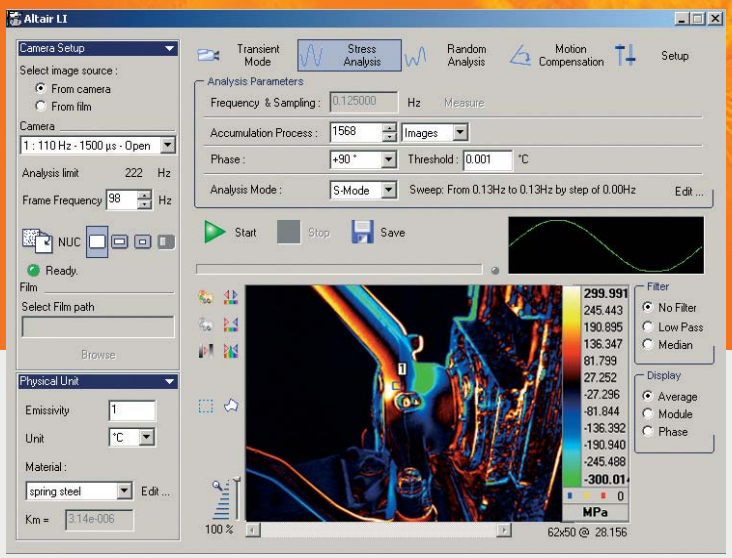




Accept any type of loading even with large displacement

ALTAIR LI
Advanced Features



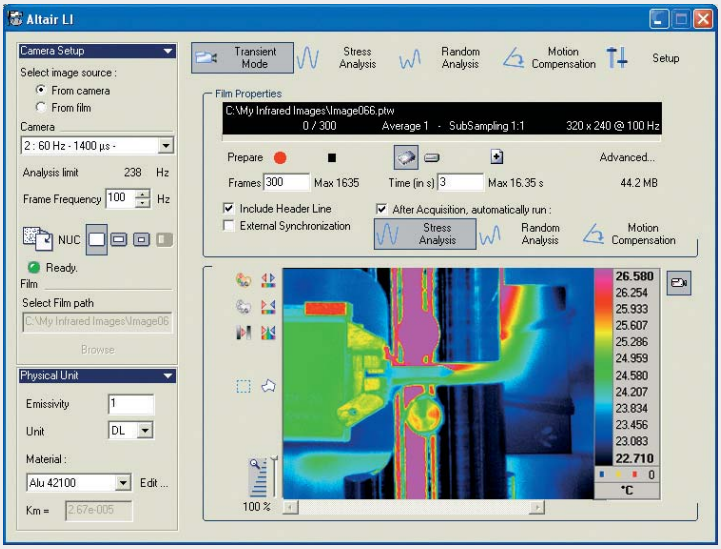


Random loading

Real structures are not only subject to harmonic or sine loading but also to real loading signals (including fully random multi axis signals) commonly known as random loading. The ALTAIR LI system is capable of analysing any type of loading, as a result of real time image correlation that processes the incoming thermal images.

Transient loading

The transient analysis mode allows producing a stress maps a single load shock by recording and processing the thermal behaviour of the structure induced by the shock.



Dissipated energy measurement

The assessment of heat dissipation on a structure under dynamic loading can give information on the damage mechanism involved. The D-MODE, which is available with ALTAIR LI, allows measurement of the dissipated energy.

Motion compensation

When dealing with real structures, the relative motion of parts can create artefact images. To eliminate these unwanted ghost images, Cedip has developed proprietary software for motion compensation with sub-pixel accuracy.

This software allows correction of any displacement within the image plane (in 2D mode), allowing you to achieve a perfect measurement.

A wide range of applications

Application	Typical use
Automotive Industry	Stress measurement Fatigue limit measurement High temperature stress measurement Transient loading
Aerospace & aeronautics	Stress measurement Fatigue loading High frequency loading Fracture mechanics
Researhc centers	Thermo-mechanical studies Dissipated energy measurement Dislocation analysis
Non-destructive testing	Composite materials Thermal materials
Electronics	Solar cell

ALTAIR LI is compatible with Silver, Jade and Emerald cameras

System	
Lock In electronic	Real Time correlator 0-10V ; 2x+/-5V 3 input signals 80-240VAC input power Portable with Silver camera
Software	ALTAIR LI Database of most widely used engineering materials Sine mode Random mode Advanced Large Motion compensation mode Transient mode Temporal stress analysis
Computer	Operating system Windows 2000/XP
Stress Measurement	
Range	+/- 2000 Mpa
Resolution	0.4 Mpa on aluminium
Analysis Frequency	0.1Hz to 20000Hz Sine mode Random mode
Motion compensation	Full field by software / Random & Sine
Transient loading	By software from fats frame rate analysis
Dissipation analysis	By software from sine loading

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