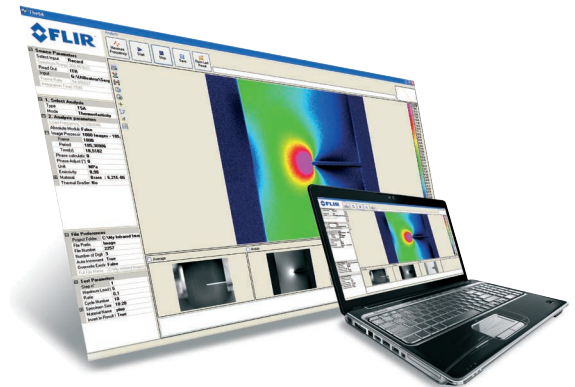


FLIR Thesa

Full Radiometric Software Suite For Lock-in Thermography Applications

- Produces high quality images of stress files in materials and structure under dynamic loading conditions
- Non-contact measurement
- Lock-in thermography processing for Stress Analysis, Electronics and Non Destructive Evaluation
- Fast determination of full field stress
- Complex structures undergoing real loading
- Versatile loading capabilities
- Advanced Large motion displacement compensation
- Fast measurement of fatigue limit
- Temporal stress analysis



FLIR Thesa Features

Non-contact measurement technique

THESA uses a SC5000 Series & SC7000 Series camera which provides thermal images of the scene at fast frame rate. The transformation of these thermal images into stress images is calculated in second by software, without any contact with the material surface.

Full-field stress imaging in real time

THESA 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 & 2 mK for aluminium.

Versatile loading capability even with large displacement

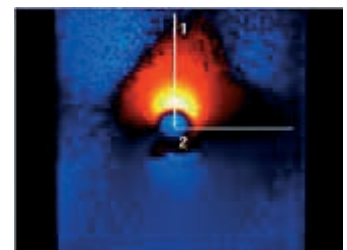
THESA allows testing of structural components undertaking random, transient or dynamic loading. In some applications where there can be large displacement, a software feature is available to provide accurate motion compensation.

Fast measurement of fatigue limit and Dissipated energy measurement

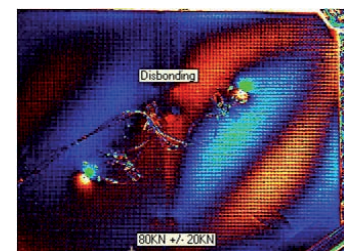
The assessment of heat dissipation on a structure under dynamic loading can give information on the damage mechanism involved. The D-MODE, which is available with THESA, allows measurement of the dissipated energy. A unique application of this technique is the fast determination of fatigue limit in engineering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

Motion compensation

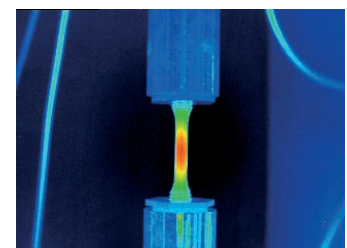
When dealing with real structures, the relative motion of parts can create artefact images. To eliminate these unwanted ghost images, FLIR has developed proprietary software for motion compensation with sub-pixel accuracy. This software allows correction of any displacement within the image plane (in 2D mode), allowing you to achieve a perfect measurement.



Real time map of stress in notched specimen

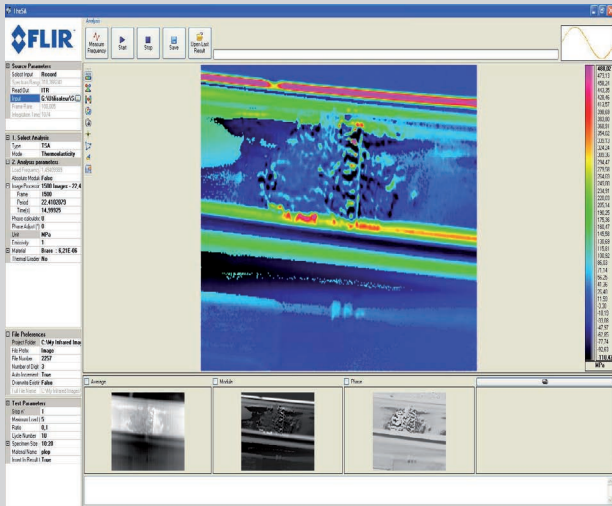


Composite honey comb structure analysis



Material sample analysis

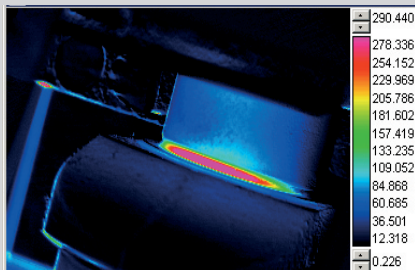
FLIR Thesa Specifications



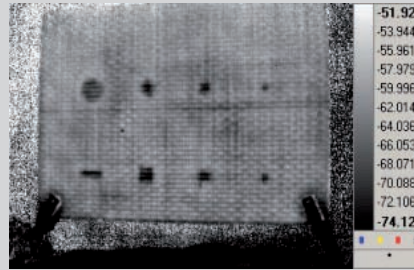
Thesa Main Interface

System	
Lock-In electronic	Embedded in the camera Real Time correlator 3 input signals : 0-10V ; 2x+/-5V
Software	THESA Database of most widely used engineering materials Sine mode Advanced Large Motion compensation mode Temporal stress analysis

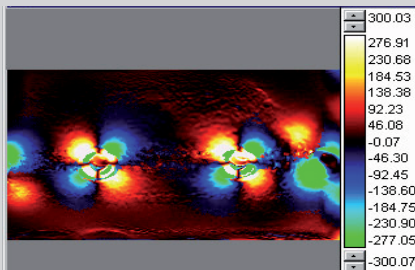
Stress Measurement	
Range	+/- 2000 MPa
Resolution	0.4 MPa on aluminium
Analysis frequency	0.1 Hz to 20000 Hz for Stress Analysis 0.005 Hz to 5 Hz for Non Destructive Testing
Motion compensation	Full field by software Random & Sine
Transient loading	By software from fast frame rate analysis
Spatial resolution	Down to 5 µm
Data output	Absolute temperature up to 1500 °C Amplitude of temperature, phase Data field with stress components Sum of principal stress, comparable stress



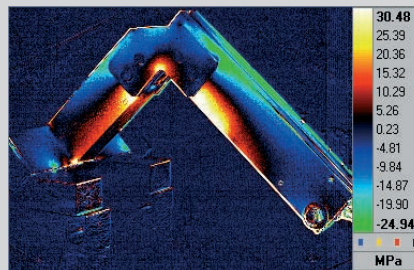
Non contact measurement system



Material evaluation capability



Provide full field stress images in real time



Accept any type of loading even with large displacement

A wide range of applications			
Applications	Typical Use	Applications	Typical Use
Aerospace & aeronautics	Stress measurement Crack detection during fatigue testing High frequency loading Fracture mechanics	Non-destructive testing	Composite materials Thermal materials
Automotive Industry	Stress measurement Finite Element Analysis comparaison Fatigue limit measurement High temperature stress measurement High concentration stress area detection Transient loading	Research centers	Thermo-mechanical studies Dissipated energy measurement Material damage Dislocation analysis
Electronics	Solar cell Quality control on memory chip	Steel industry	Material evaluation Tensile testile Fast loading

