System for nondestructive testing of composite materials using active thermography

Application

Fast, integral examination of large surface areas for detection of concealed flaws.

- Detection of impact damages in composite materials for aviation components and wind power plants
- Detection of cracking and delaminations for high-load materials, e.g. turbine blades

Utilization of low-cost and durable uncooled infrared cameras; improvement of resolution and detail sharpness using “lock-in” pulse thermography.

Bright field thermography

The infrared emitter produces a heat wave that penetrates into the test sample. Cavities, inclusions and delaminations are detectable by their influence on the thermal conductivity characteristics of the material.

- Inspection of carbon and glass fibre reinforced plastics, sandwich plates with honeycomb structures, and material coatings of aviation components and wind power rotor systems

Dark ground thermography

An ultrasonic wave, generated by an ultrasonic crystal, propagates into the sample under inspection.

- Inspection of carbon and glass fiber reinforced plastics for impact damage that may lead to fiber cracking and delaminations of sandwich layers

Heat flux thermography of a sandwich plate with aluminium honeycomb structure

Principle of the dark ground thermography

Principle of the bright field thermography

Components

- PYROVIEW 380 compact, uncooled infrared camera
- Ultrasonic excitation for “dark ground” thermography
- Thermal excitation for “bright field” thermography
- Acquisition & analysis software

Project Partners

Fraunhofer IZFP Dresden, Maria-Reiche-Str. 2, 01109 Dresden
DIAS Infrared GmbH, Pforzheimer Str. 21, 01189 Dresden,
Werner Industrielle Elektronik GmbH, Alte Str. 2, 01731 Kreischa
HTS GmbH, Am Glaswerk 6, 01640 Coswig

The “Active Thermography Inspection Systems using un-cooled IR-Camera” project was sponsored by the European Funds for Regional Development (EFRE 2000-2006) and the Free State of Saxony.

Contact

Fraunhofer-IZFP, Institutsteil Dresden, www.izfp-d.fraunhofer.de
Dr. Lothar Haupt, +49 351 88815521, info@izfp-d.fraunhofer.de

DIAS Infrared GmbH, www.dias-infrared.de
Dr. Manfred Zimmerhackl, +49 351 896 74-0, info@dias-infrared.de

Components

- PYROVIEW 380 compact, uncooled infrared camera
- Ultrasonic excitation for “dark ground” thermography
- Thermal excitation for “bright field” thermography
- Acquisition & analysis software

Project Partners

Fraunhofer IZFP Dresden, Maria-Reiche-Str. 2, 01109 Dresden
DIAS Infrared GmbH, Pforzheimer Str. 21, 01189 Dresden,
Werner Industrielle Elektronik GmbH, Alte Str. 2, 01731 Kreischa
HTS GmbH, Am Glaswerk 6, 01640 Coswig

The “Active Thermography Inspection Systems using un-cooled IR-Camera” project was sponsored by the European Funds for Regional Development (EFRE 2000-2006) and the Free State of Saxony.

Contact

Fraunhofer-IZFP, Institutsteil Dresden, www.izfp-d.fraunhofer.de
Dr. Lothar Haupt, +49 351 88815521, info@izfp-d.fraunhofer.de

DIAS Infrared GmbH, www.dias-infrared.de
Dr. Manfred Zimmerhackl, +49 351 896 74-0, info@dias-infrared.de

Components

- PYROVIEW 380 compact, uncooled infrared camera
- Ultrasonic excitation for “dark ground” thermography
- Thermal excitation for “bright field” thermography
- Acquisition & analysis software

Project Partners

Fraunhofer IZFP Dresden, Maria-Reiche-Str. 2, 01109 Dresden
DIAS Infrared GmbH, Pforzheimer Str. 21, 01189 Dresden,
Werner Industrielle Elektronik GmbH, Alte Str. 2, 01731 Kreischa
HTS GmbH, Am Glaswerk 6, 01640 Coswig

The “Active Thermography Inspection Systems using un-cooled IR-Camera” project was sponsored by the European Funds for Regional Development (EFRE 2000-2006) and the Free State of Saxony.

Contact

Fraunhofer-IZFP, Institutsteil Dresden, www.izfp-d.fraunhofer.de
Dr. Lothar Haupt, +49 351 88815521, info@izfp-d.fraunhofer.de

DIAS Infrared GmbH, www.dias-infrared.de
Dr. Manfred Zimmerhackl, +49 351 896 74-0, info@dias-infrared.de

Components

- PYROVIEW 380 compact, uncooled infrared camera
- Ultrasonic excitation for “dark ground” thermography
- Thermal excitation for “bright field” thermography
- Acquisition & analysis software