

Detection of defects in aircraft wiring using a novel thermography sensor sub-system

Introduction

Publications

Among the various NDT techniques available, thermography offers many benefits for the inspection of wiring in aircraft. One of the principal advantages of this technique is that it allows to make non-contact measurements of the temperature of the object. Using thermography, an inspection can be carried out providing an image of the heat distribution over the surface of an object and defects can be detected.

Thermography is a type of imaging that is accomplished using infra red radiations. IR covers a portion of the electromagnetic spectrum from approximately 0.9 to 14 micrometers (μm) (light is from 0.38 to 0.75 μm). Although infrared radiations at the far end of this range 8-14 μm (FIR) are not detectable by the human eye, an IR camera can convert it to a visual image that depicts thermal variations across an object and this is why defects can be detected using thermography. IR radiations are emitted by all objects at temperatures above absolute zero, however the amount of radiation increases with temperature, and this is why very often a heating source is used with the thermal camera. Defects in the material can be detected more easily when the material is heated because of the variations of their heating/cooling rates.

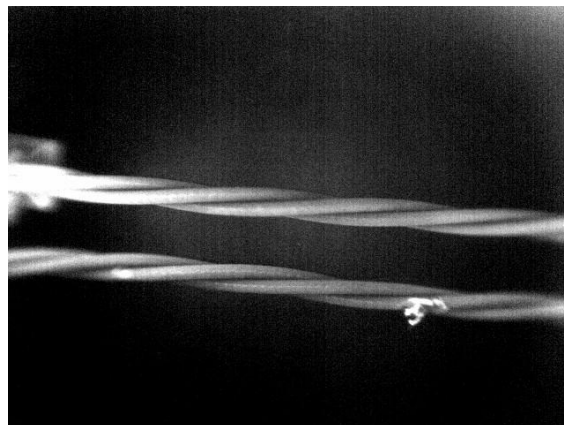
The near IR is very similar to light, and is detected simply by cameras with an extended spectrum, and rear IR illumination can be provided by special LEDs.

As part of one of the objectives of the AWARE project, a thermography system using both near and far IR will be developed. The far IR system will be supported by a heating source. Ideally the near and far IR systems will be able to work simultaneously or/and consecutively.

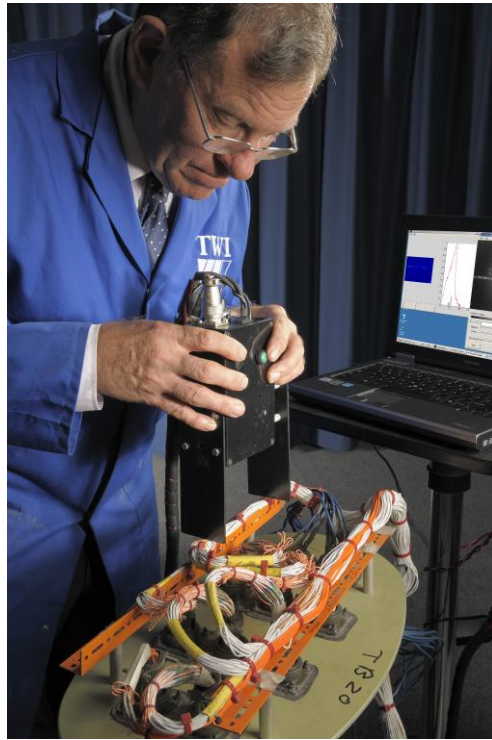
For further information on the far infrared design contact john.rudlin@twi.co.uk

For further information on the near infrared design contact Richard Fitch on enquiries@hortonlevi.co.uk

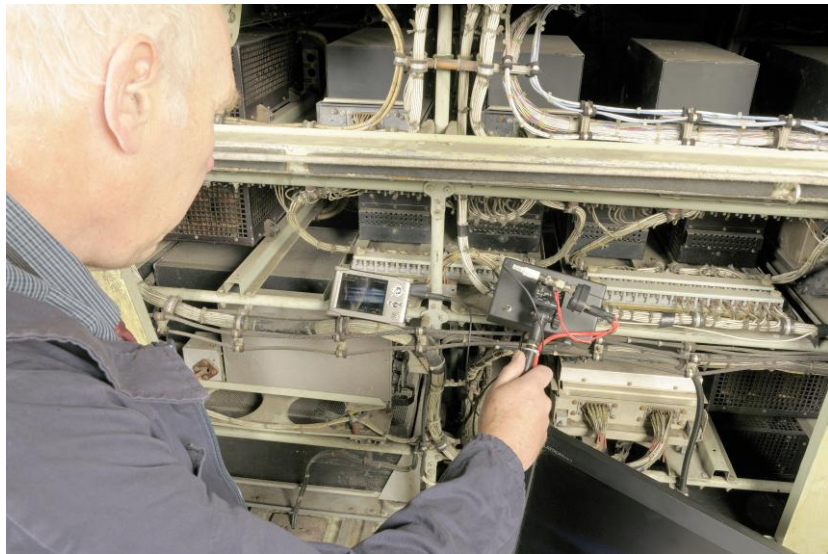
For further information on the software contact Simon Peter Santospirito on SP@kcc.com



Example of detection of insulation abrasion (far infra red)



Developed FIR Device inspecting a test sample



Near Infra Red Instrument



Image from NIR System