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Detection and characterisation of disbonds on Fibre Metal Laminate hybrid composites by flying laser spot thermography

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1 **Detection and characterisation of disbonds on Fibre Metal Laminate hybrid**
2 **composites by flying laser spot thermography**

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7 **Keywords**

8 A. Layered structures; A. Hybrid; C. Non-destructive testing; C. Thermal analysis; Laser
9 thermography.

10 **Abstract**

11 In this work a novel data collection and processing is proposed for the Infrared Non-Destructive
12 Testing (IR-NDT) of interlaminar disbonds on Fibre Metal Laminate (FML) hybrid composites.
13 The adopted active IR-NDT scheme uses a pointwise laser heat source that is moved along a raster
14 scanning trajectory over the object surface. A Focal Plane Array IR camera is employed to acquire
15 the thermal field generated by the moving heat source. Disbonds defect signatures are then searched
16 by analysing the perturbations of the temperature distribution over a reference area following the
17 heat source. The proposed methodology has been implemented on a GLARE sample, since this
18 class of FMLs has gained extensive use in aerospace structures. In particular, a sample of GLARE 1
19 3/2 - 0.3 was manufactured in-house, containing triangular shaped artificial disbonds at different
20 interlayers. The novel inspection approach was able to detect the position, size and to some extent
21 the shape of interlaminar defects by recording the changes in standard deviation of the temperature
22 over the monitored area. The sensitivity found in detecting disbonds proposes the presented
23 methodology as a potential alternative to more conventional inspection routes for FMLs.

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