

COMPOSITE LAMINATE DAMAGE DETECTION METHOD USING AN IN-SITU THERMAL GRADIENT AND EXPANSION DIFFERENCES ACROSS THE DAMAGE

ABSTRACT

5 An example system for in-situ inspection of a composite structure includes a surface-strain
imaging apparatus and a controller. The surface-strain imaging apparatus is configured to image
an area of an outer surface of the composite structure while a temperature of the composite
structure warms to thermal equilibrium with a surrounding environment and a temperature gradient
exists within the composite structure. The controller includes a processor and a memory, and is
10 configured to detect, using data received from the surface-strain imaging apparatus, an out-of-
plane displacement of the outer surface in the area caused by the temperature gradient. The
controller is also configured to determine that the out-of-plane displacement satisfies a threshold
condition and, based on determining that the out-of-plane displacement satisfies the threshold
condition, flag the area of the outer surface for further inspection.

15

FIG. 1