

An ICT-Enabled Approach to Optimising the Reliability of Manual Ultrasonic Non-Destructive Testing

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Manual Ultrasonic Testing (MUT) is the most cost effective NDT method for the in-situ inspection of aerospace structures, in particular composite structures. However, its defect detection reliability is low. Manual Ultrasonic Testing (MUT) reports may vary depending on the operator conducting the test. Its reliability is therefore greatly influenced by human factors. Nonetheless, MUT continues to play a key role in the NDT suite of techniques. Despite its simplicity, it often meets the required performance at a reduced cost. No mechanised system exists which is as dextrous as the human hand for moving a probe over complex shapes while also dynamically skewing the probe to achieve the maximum amplitude from a reflector. It is therefore worth looking at ways to improve the reliability of MUT.

This study describes progress in the ICARUS project which aims to improve the reliability of MUT. The overall motivation of the project is to address the known variability of man-machine interfaces and bring an appreciated degree of reliability to achieving its purpose regarding the detection and the characterisation of component flaws while retaining the attributes of cost, simplicity and portability. The project is developing an ICT computer based system to enable a low level operator to carry out complex NDT tasks. The system instructs an operator to perform a qualified inspection procedure, tracks the 3D probe position in real time in relation to the predefined coordinate frame, evaluating the quality of acoustic coupling and providing feedback on the probability of defect detection. Integration of these functions will provide a training environment to improve the quality of NDT operators.

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Acknowledgement

The research leading to these results has received funding from the European Union's Seventh Framework Programme managed by [REA-Research Executive Agency](#) (FP7/2007-2013) under grant agreement n° 262664