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Mapping SEARCH capabilities to Spirit AeroSystems NDE and automation demand for composites

Ehsan Mohseni¹, S. G. Pierce¹, R.W. K. Vithanage¹, C. N. MacLeod¹, G. Dobie, S. McKnight¹, V. Tunukovic¹, M. McInnes¹, A. Hifi¹, R. Gomez¹, M. Shields¹, A. Poole¹, R. Pyle¹, T. O'Hare², G. Munro³, J. O'Brian-O'Reilly³

¹ *SEARCH: Sensor Enabled Automation, Robotics & Control Hub, Centre for Ultrasonic Engineering (CUE), Department of Electronic & Electrical Engineering, University of Strathclyde, Royal College Building, 204 George Street, Glasgow G1 1XW, Ehsan.mohseni@strath.ac.uk*

² *Spirit AeroSystems Belfast, Airport Road, Belfast, Co. Down, Northern Ireland, BT3 9DZ*

³ *Spirit AeroSystems, Aerospace Innovation Centre, Glasgow Prestwick Airport, Monkton, KA9 2RW*

Newly engineered and complex materials and processes such as composite and additive manufacturing are becoming an indispensable part of today's manufacturing economy owing to their potential to reduce material waste and carbon emissions whilst enhancing mechanical performance. To quantify and validate the high quality of manufacturing processes, and ensure safe in-service operation for these components, Non-Destructive Evaluation (NDE) sensor technologies, and their corresponding data acquisition and signal processing routines should evolve to better suit these new materials and processes. Besides, deployment of automated robotic systems has seen an increasing demand in the past decade as the repeatability, consistency, and speed of NDE scans offered through automation can boost the manufacturing throughput significantly. The large volumes of data generated through such automated NDE approaches require new intelligent algorithms for signal interpretation to sustain and match the pace of automated NDE.

The Centre for Ultrasonic Engineering (CUE) has been supporting Spirit AeroSystems through a Royal Academy of Engineering Research Chair to drive the research and innovation in three distinct themes of a) sensor technology, b) automation and robotic sensor deployment, and c) data interpretation through machine learning. This presentation will provide an overview of different NDE challenges in manufacturing of composites at Spirit AeroSystems and discuss the approaches undertaken to tackle these by the team at CUE. This includes proposing a roadmap inspired by the current research efforts for future of NDE in aerospace composite manufacturing.