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Autonomous and Targeted Eddy current Inspection from UT Feature Guided Wave screening of Resistance Seam Welds

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Ultrasonic and eddy current testing are two of the most common inspection modalities, with many benefits being derived from leveraging their respective advantages. Ultrasonic Feature Guided Waves (FGWs) that have their energy confined to a topological feature within a component's geometry have been shown to exist and can provide screening of key structural features such as welds. Furthermore, it is common to use a localised NDT modality in combination with guided wave testing when attempting defect characterisation.

To realise the benefits of using multiple inspection modalities, the authors present the use of a robotic system to flag defective regions within resistance seam welded (RSW) components via an ultrasonic FGW. Subsequently, targeted raster scans are performed using an eddy current array on the identified defective regions. A robotic arm deployed the eddy current array and both ultrasonic and eddy current data was gathered automatically in the LabVIEW software environment.

RSW plates with EDM notches representing transversal cracks of ≥1mm depth were manufactured. By performing targeted and untargeted raster scans on these samples, the time taken to perform the overall NDT procedure was decreased by >5 times providing screening and defect characterisation of a component in a time and cost-effective manner.