**Progress Towards Inversion Techniques for Low Frequency Eddy Current Non-Destructive Inspections**

**John C. Aldrin1, Trevor Watt2,**

**Doyle Motes3, Chris LaForge3, Cody Morrow3, and David Forsyth3**

1Computational Tools, Gurnee IL, 60031, USA

email: aldrin@computationaltools.com

2AVID R&D LLC, Conifer CO, 80422, USA

3TRI Austin, Austin TX, 78733-6201, USA

ABSTRACT

Low frequency eddy current non-destructive inspection is a commonly used technique to identify the presence of defects around fastener holes in metallic airframes. In recent years, inversion methodologies have been developed that are offering maintainers the ability to extract quantitative characteristics from high frequency (in excess of 200 kHz) bolt hole eddy current signals with high degrees of accuracy. Until this point, technologies and analysis techniques have not existed to allow this type of work to take place for low frequency (on the order of 150 Hz) eddy current inspections. If methodologies/technology existed, its use would permit defect characterization to take place without necessitating the removal of fasteners and through multiple layers (such as to identify defects in a doubler underneath skin layers). In this work, the authors describe progress made in pursuit of developing this capability, including the integration of new sensors, a large-scale simulation campaign, and experimental validation of these results.