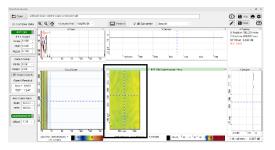
In a collaborative effort with TWI in Wales and Utex in Canada, Advanced Microwave Imaging (AMWI) have developed a new inspection technique and equipment geared for inspecting complex fiberglass components. The inspection of these thick complex parts presents a problem for standard NDT methods, such as UT, because of noise and signal attenuation associated with sound waves in this material. Microwaves interact differently with fiberglass and are less impacted by attenuation. Using the AMWI field ready inspection system known as the Motorized Axis Portable Scanner (MAPS), TWI personnel collected data on a complex fiberglass hull section provided by RNLI (UK). The hull was all fiberglass



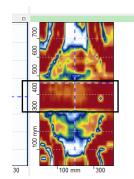
construction with a 15mm thick fiberglass plate with two 200mm wide by 400mm deep (approx) rectangular spar sections attached to the underside of the plate, and run vertically and horizontally to add strength to the hull. The data set was captured in about 10 minutes time and focused on the area of intersection of the vertical and horizontal spars. The multi-frequency data set allows for the image to be isolated at various depths

IFFT Wfn

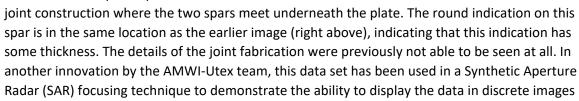
(395.000mm, 387.500mm) = -4.384dB

using post-processing and the gating features in the AMWI-Utex software.

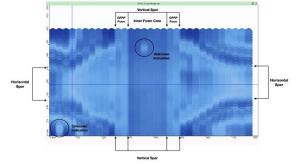
The C Scan image at left (in the box) shows the plate with the underlying features just coming into focus. The technique can be used to isolate locations deeper into the part by moving the gate in time. In the C scan image at right, excerpted from the software, you can see the vertically oriented spar (boxed) and several round indications. This part had been inspected using UT and other techniques, but these details were only visible using the AMWI system. This is the result of the precise data collection system



and the focusing ability of the AMWI inspection antenna, which is only available on the AMWI system. In the image at left, which is further into the part, the horizontal spar now comes into view (Boxed). Also visible are the details of the



focused at depth in the part. The image below, believed to be the first ever SAR focused microwave image using field acquired data, was done using the same dataset. The image was focused at 25mm below the antenna, which puts it just



below the hull plate at the spar intersection. The image shows both the vertical and horizontal spars and also a rounded indication. Another feature of the SAR package software is the ability to gather the images together and create a complete 3D rendering of the part that can be rotated and viewed from all sides. This process can be viewed here: (https://www.linkedin.com/posts/robert-j-bob-stakenborghs-msme-pe-570a107_ndt-ndtinspection-ndttesting-activity-6943039679822786560-512U?utm_source=linkedin_share&utm_medium=member_desktop_web)

The SAR feature is expected to be added to the AMWI-Utex

Microwave Analysis package later this year.

This technique will allow for reasonably short inspection times and increase the ability to analyze and detect flaws in thick, complex fiberglass sections, such as boat hulls and wind turbine blades. The equipment and software are available from AMWI (www.advancedmwimaging.com)

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