

# **A TFM Intermodal introduction applied to the weld inspections**

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The introduction of total focused imagery (TFM) in the none-destructive testing fields has improved many procedures and it will still carry a few more. This new technique opens the door of the ultrasonic imagery domain for the non-destructive technique industry. Yet this domain is quite common now in the medical industry and has improved many examination results. Most of the current phased array and TFM techniques are based on single mode sweeps which solve specific scenarios of inspections. Among the propagation mode sets, each TFM scan is likely amplitude sensitive in regards to the nature of its recorded defects. TFM indeed advances the resolution and amplitude response when the appropriate mode has been opted for. By deploying the latest electronics and software technologies, it is possible to combine several TFM scans and construct an inter-mode image from one acquisition frame. This approach is supported by common mathematical algorithms and existing TFM strategies. To point out this new type of inspection, we will call it TFM Intermode (TFMi). The article contains its proof of concept and a study on natural defect welds, namely lack of fusion, cracks, and porosities. There are recognized advantages of the technique, but also additional considerations that will be brought to light.