A New Phased-Array Instrumentation for Advanced and Versatile TFM and PA Solutions to Meet the Requirements of Industrial Applications

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Imaging techniques based on ultrasonic Total Focusing Method (TFM) are more and more applied to industrial applications. Realistic high-resolution imaging brings significant improvement to data analysis. Manual and semi-automated field applications have already been improved, such as the detection of hydrogen damage and corrosion measurements that require high focusing capabilities in different directions. For in-line automated manufacturing, where high productivity is required, phased-array techniques remain the preferred solution. The capability of phased-array systems to process the acquired data at very high speed offers fast in-line inspection with an excellent probability of detection. In addition to high-speed inspection, TFM is now expected to be the best characterization tool when returning to an indication location after its detection. The ability to use both techniques with the same system is an important advantage for the deployment of TFM high-resolution techniques to in-line applications. Eddyfi Technologies has been developing phased-array systems dedicated to in-line industry for many years. A large variety of systems have been successfully installed and commissioned in factories since 2006. After reviewing the different techniques available and the different applications, recent improvement in TFM techniques and the use of Graphics Processing Units (GPU) are described and a focus on speed increase is presented. Keywords In-line ultrasonic testing, Phased-Array, TFM, NDT