

1.3.59. FAAST – FAST AUTOMATED ANGLE SCAN TECHNIQUECoperet Ph.

Since “Phased Array” systems appeared in the field of industrial testing, this technique only consisted in re-forming an ultrasonic beam equivalent to that of a single element transducer, offering however, in addition, the possibility of an electronic control of the ultrasonic beam direction and shape.

These systems thus offer an increased flexibility of use, higher linear or angular scanning speed, together with a considerable advantage in terms of volume of the probe-holder mechanics.

However, such technique did not bring any improvement in terms of defect detection and characterization as the reflected energy is still depending, like with single element probes, on the position of the transducer to the part and on the actual orientation of the defects.

This paper describes a new method for processing the acoustic field received by a multi-element probe, which, at last, brings a solution to this endemic problem, together with the associated electronic device suitable for industrial applications.

This method and system enable to detect and characterize, from a single ultrasonic pulse, all types of defects, plane or spherical, situated in the acoustic field of the probe and whatever their orientation is, allowing, in addition, tolerance of guiding precision.

As an example, the first industrial application being build by SOCOMATE and using this method is an ultrasonic rail testing car providing in-track inspection at a speed of 100 km/h. The most important industrial applications are tube testing in high speed production lines with matrix multi-element probes from which we are able to detect longitudinal, transversal and oblique reflectors all together in one shot.