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Application of contrast optimisation autofocus to flexible ultrasonic arrays for non-destructive testing

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Flexible ultrasonic arrays are used for imaging within objects with complicated geometries for non-destructive testing and evaluation (NDT/NDE), e.g., thick-walled pipes, weld caps, etc. We consider the application of autofocus techniques (routinely used in synthetic aperture sonar (SAS)) to this engineering problem. A flexible ultrasonic array is functionally similar to a wide-beam, stripmap SAS with a single transmitter and receiver. Unfortunately, there are few autofocus algorithms available for this configuration. Popular algorithms, such as echo/image correlation, PGA, DPCA, etc., are better suited for use with a narrow-beam or multiple-receiver SAS. However, contrast optimisation is a more general technique that is well suited to the single transmitter/receiver geometry. In this presentation, we describe our implementation of contrast optimisation autofocus and show experimental results using a flexible array prototype.