AbstractID: 7221 Title: Automated Ultrasound QC Tests: A method that does not require perfect transducer alignment

Purpose: The purpose of this project is to develop an approach to automatic quality control testing of ultrasound equipment without the requirement to have perfect alignment of the image plane with the test objects in the phantom.

Method and Materials: A standard commercial ultrasound phantom is used to acquire images using a typical clinical ultrasound scanner. The phantom used here is one that employs a set of cylindrical voids to evaluate spatial resolution. The ultrasound scanner is configured to acquire a series of images in a clip file and the data is sent via a DICOM connection. A clip is stored as the transducer is swept across the plane of the test objects(An alternative method would be to use a frame-grabbing system that can acquire a video signal and store data as a multi-image file.)
A program has been written in MATLAB to open the DICOM multi-image file and store the images. Statistical properties of this set of images are used to create a "composite" image that represents a perfect alignment of the transducer. This image may be used for a series of quantitative evaluations of image quality that have previously been described in the literature. These would include lesion detectability (lesion signal to noise ratio) measures as well as sensitivity measurements (maximum depth of penetration).

Results: This approach to image acquisition has the potential to save time and effort (and frustration) for either a technologist or a physicist in the ongoing effort to simplify the manual aspects of computerized quality control for ultrasound.

Conclusion: This approach is under evaluation against other computerized ultrasound quality control procedures.