

Purpose: To present a performance evaluation for a unique transrectal ultrasound probe for use in prostate seed implants. The ultrasound probe transducer moves inside the probe case while the case remains stationary. This allows imaging in different planes without moving the prostate. Sagittal and transverse plane imaging is available. Electronic longitudinal stepping and sagittal plane rotation of the transducer replaces manual/mechanical movement.

Method and Materials: The ultrasound probe evaluated was the TargetScan[®] System from Envisioneering Medical Products (St. Louis, MO). Proper alignment of the needle template and software grid was verified, as well as electronic stepper position accuracy. Image quality was evaluated using a Multipurpose Tissue/Cyst Ultrasound Phantom (Nuclear Associates Model 84-317). Tests included, maximum scanning depth, axial distance calibration accuracy, spatial resolution, high scatter resolution, low scatter resolution, superficial low scatter resolution, and dead zone region limit. All tests were performed with the probe immersed in a water medium. Both axial and sagittal scanning modes were tested.

Results: Needle template/software grid coincidence (axial mode) was within 2mm, with most measurements being less than 1 mm. Longitudinal stepper accuracy was within 1mm. The following results apply to both sagittal and transverse scanning modes. Maximum scanning depth was approximately 60 mm in the medium. Axial distance accuracy was within 1 mm. Spatial resolution was 2mm axial, 3mm lateral. The 4 mm high and low scatter targets could be resolved. The 2 mm low scatter superficial targets could be resolved at the 2.2 cm and 4.4 cm depths for both sagittal and transverse modes. The dead zone limit was 2mm for both sagittal and transverse modes.

Conclusion: The TargetScan[®] System has high image quality and transducer placement accuracy which makes it suitable for both diagnostic scanning as well as image guided prostate brachytherapy.