

## AbstractID: 2091 Title: Acceptance Testing and Commissioning of CMS Ultrasound Based Prostate Localization System (I-Beam)

There is a vast literature demonstrating intra-fraction variations of prostate position due changes in GI system. Computerized Medical Systems recently introduced a 3D-ultrasound based localization system called I-Beam. Ultrasound image localization is accomplished using unique Coordinate Positioning Technology based on machine vision and pattern recognition software. A digital camera, fixed to a Terason 2000 US probe, sees the light box with a unique pattern, which is placed in the gantry head. The pattern recognition software localizes the live US images to the isocenter. As this technology is relatively new, several commissioning tests were conducted to validate the system. An US phantom mimicking the patient's anatomy was used for testing. The alignment accuracy was tested by translating the phantom to a known location and recording the shifts predicted by the I-beam system. Alignment accuracy was also tested for the presence of wrong gantry/collimator angles. For further testing, a special US phantom with a movable internal structure (prostate) was constructed. This structure can be moved on the axis of inferior-posterior to superior-anterior direction, mimicking typical prostate motion. Implanted radio-opaque markers help to localize this structure under portal imaging. The I-beam alignments were verified against the port films. The alignments performed on these phantoms show that, the I-beam system predicts the prostate position within 3 mm. The results of the acceptance and commissioning tests along with some precautions and quality assurance procedures will be presented in this paper.