

AbstractID: 5846 Title: Clinical evaluations of a gantry-mounted laser digital source skin distance (SSD) system

**Purpose:** To evaluate accuracy and reproducibility of an experimental device recently installed in our department to measure the SSD based on laser reflection.

**Method and Materials:** The PICTOR DDI System includes a sensor that determines the SSD. The digital value is recorded on the daily electronic portal imaging (EPI). We evaluated this system for over 4 months including weekly phantom measurement and comparison with ODI measurement. An alignment phantom was constructed to verify measurement values and to check the linearity of the software. The phantom incorporates a leveling plate and a 4 steps phantom. The leveling plate was set to the ODI's 100 SSD and then the phantom was moved so to measure the SSD to the 4 steps. SSD data from 53 patients were recorded to EPI system and compared with manual measurements. Different fields for prostate cancer were combined. For breast IMRT only medial beam was measured. The system was calibrated only once after the installation.

**Results:** The stability of the system obtained by the weekly checking is  $1.3 \pm 0.5$  mm. Mean and Standard Deviation (SD) at the leveling plate and at the 4 phantom's steps were  $0.9 \pm 0.2$ ,  $1.2 \pm 0.4$ ,  $1.7 \pm 0.5$ ,  $1.1 \pm 0.5$  and  $1.4 \pm 0.5$  mm, respectively. Analyzing the patient's SSD, the average difference between manual and laser measurement was  $1.9 \pm 3.1$  mm,  $-1.0 \pm 7.8$  mm and  $1.5 \pm 2.8$  in prostate, breast and other cancers, respectively.

**Conclusion:** The device appears accurate within 2 mm in 95% confidence level. The use of this device reduces manual measurement time. Recording SSD data directly into the EPI allows more frequent measurements. It can potentially be integrated into the Linac as a replacement for ODI.

**Conflict of Interest (only if applicable):** The system was provided by LAP of America.