

## AbstractID: 1138 Title: Ultrasonic Device for SSD Measurement

Linear accelerators (LINACs) used in radiotherapy are equipped with an optical distance indicator (ODI) for the measurement of the source to skin surface distance (SSD). To make patient setup easier, faster and more accurate, we have developed a new ultrasonic device for SSD measurements that gives a real-time digital reading. The device is comprised of two main parts: a probe plate with ultrasonic transducer on the center that can be inserted into the block tray accessory slot of a treatment machine at the time of the SSD measurement and a control unit which displays the SSD. These parts connect to each other via a cable. The prototype has been tested with a SIEMENS PRIMUS accelerator and a full size female phantom (PIXY RS-102, Radiology Support Devices Inc., CA). The SSDs were measured for her forehead, nose bridge, cheek, lip, neck, clavicle, breast, abdomen, pelvis and leg by the prototype, ODI and front pointer. The comparison study shows that the ultrasonic device can give an accuracy of  $< \pm 1.5$  mm for most of the areas. Variation with room temperature changing by  $\pm 2$  °C is  $\pm 1$ mm. This appears to be easier to interpret and more accurate than the current visual standard. It also eliminates human error associated with misreading the visual scales.