

In-room radiographic imaging systems is being rapidly implemented in routine clinical operations for target localization. A typical system consists of a kV x-ray source and an amorphous-silicon flat panel detector mounted orthogonally to the MV-beam axis. The available clinical imaging capabilities from this configuration are 2-D radiographic or fluoroscopic imaging and 3-DCBCT. These techniques may have potential limitations either on not sufficient anatomical information for positioning verification (such as 2-D technology) or long imaging time (several breathing cycles), mechanical constraints, and excessive dose to the imaging volume (such as CBCT technology). Therefore, limited-angle digital tomosynthesis (DTS) is being investigated as an alternative 3-D imaging technique. Much of the investigations have been focused on the clinical feasibility and efficacy of using DTS for on-board target localization and comparison between DTS technology with 2-D radiographic and CBCT technologies. This talk will summarize emerging clinical research to develop the DTS technology for on-line patient positioning and target localization for image guided radiation therapy, specifically for anatomical sites of head and neck, abdomen, breast and prostate.

Educational Objectives:

1. Brief review of DTS imaging technique in the treatment room
2. Clinical feasibility and efficacy of using DTS for in-room target localization