

AbstractID: 13068 Title: A simple technique for generating respiratory signals with lasers in radiotherapy

One of the challenging problems in radiotherapy is the treatment of mobile tumors. The usual method is to give a large clinical target volume (CTV) to planning target volume (PTV) margin to accommodate the movement of the tumor within the treatment field. In recent years, several new concepts such as tracking, gating, breath-hold techniques have been developed to combat the movement of tumor during treatment which are very useful in the treatment of mobile tumors such as lung, liver, breast, pancreas etc., Most of these methods uses respiratory signal generated by different methods. In this study, a simple technique has been devised to generate the respiratory signal pattern with the help of lasers. Two lasers, red and green are mounted on the collimator head of a Clinac 2300 C/D linac along with the camera for generating the respiratory signal pattern. A software written in visual basic 2005 .net was developed to read the images from a 12-megapixel camera mounted below the collimator. The projection of the laser images on the chest of a subject was acquired during breathing. Multiple frames of laser images are acquired from the camera mounted on the collimator head and each frame was analyzed with the SSDLas software to generate the respiratory signal. As the patient breathes, the separation between the projected lasers on the skin surface also changes. The changes in the lasers separation are converted to produce a respiratory signal with the SSDLas software. The technique described for generating the respiratory signals using lasers is cost effective and easy to implement. The generated respiratory signal based on the laser position on the patient surface will be useful for acquiring 4D images and also for treating mobile tumors.