

In this work, we have developed a software tool for beam commissioning for Monte Carlo treatment planning. Through previously funded research we have investigated practical methods to derive the parameters used by a multiple-source model for beam phase space reconstruction. Different methods have been implemented for deriving source model parameters for photon and electron beams directly from a set of measured beam data including in-air and in-phantom output factors and in-phantom dose distributions. We have integrated the software for these operations to establish an automated beam commissioning procedure for the clinical implementation of Monte Carlo dose calculation. Our beam commissioning methods were initially developed based on Varian accelerator beams (6-20 MeV electrons, 4, 6, 15 MV photons). We have further improved our methods for Siemens accelerator beams (6-20 MeV electrons, 6, 10, 18 MV photons). The automated beam commissioning procedure has been tested for these accelerator beams and is expected to work for beams of similar characteristics if accurately measured beam data can be provided. Future investigations will involve beam calibration for other accelerator models.