We are modifying a RTP system to deliver static and intensity modulated radiation treatments via a commercial eighty leaf multileaf collimator.

Manual control of individual leaves is possible as well as field autoshaping to a selected target. MLC physical limitations are incorporated into the control sliders and push-button selections. MLC rotation with the accelerator collimator is viewed by a continuous line segment representation in the BEV window. Autoshaping of the MLC is accomplished by intersecting the middle of a leaf with a given beam outline. Where the middle of the leaf will not intersect the beam outline, the nearest leaf edge is used. Manual controls allow for user defined fields or editing autoshaped fields.

IMRT is designed to be delivered to multiple fixed fields using dynamic movement of the MLC leaves. Treatments are developed within the MLC's physical constraints by moving leaves continuously and unidirectionally across the field. Leaf dwell times are calculated from a given intensity map using Stein's method. Leaf trajectories are determined as a function of time and delivered dose from the dwell times. The current model has been confirmed computationally by reconstructing the intensity map from the leaf trajectories.

Conversion of calculations into vendor supplied device parameters and exporting to the accelerator will allow dosimetry tests to begin. Development of this link will allow experimental verification of IMRT dose calculations from a finite sized pencil beam model with the inclusion of MLC penumbra and leaf transmission effects.