

AbstractID: 12591 Title: Faster IMRT Delivery on a Siemens Primus with a Novel High Performance MLC Controller

**Purpose:** In this prototype clinical installation (first one in the US) the 82-leaf MLC controller was modified to drive the 58-MLC system on a Primus, aiming to decrease the delivery time for IMRT. We evaluated the effects of upgrading to the High Performance Controller (HPC) for the 58-leaf MLC system of the Siemens Primus Linac. The HPC uses the same drive electronics and control system used for the 82-leaf MLC system which is typically on the Siemens Oncor Linac. Preliminary factory testing suggests a speedup of 25% to 40% for the 58-leaf system. The purpose of this study is first to validate the mechanical and dosimetric performance of the upgrade and then to evaluate the gain in speed for typical IMRT treatments of various sites. **Methods and Materials:** Six IMRT QA plans (three of which were used for TG-119) were chosen for comparisons between treatments before and after the upgrade. The treatments were timed and dosimetric evaluations were done with an ion chamber and film. MLCs were calibrated and standard QA tests were performed before and after the upgrade to validate the performance of the MLCs. **Results:** The measured reduction in treatment time ranged from 13% to 28%, with an average of 17% among the six plans. The reduction in the estimated average segment-change times ranged from 23% to 38%, with an average of 28% among the six plans. The average time per segment change was reduced from 11.6 sec to 8.4 sec. Dosimetrically, no significant differences were observed between treatments before and after the upgrade. **Conclusions:** The Siemens HPC controller upgrade for the Primus provides a significant benefit in terms of reducing treatment time for IMRT treatments. The dosimetric effect of the upgrade was insignificant. We will describe a concise QC procedure for these types of upgrades.