

AbstractID: 9160 Title: Initial Experience with the Monaco IMRT Treatment Planning System

Purpose: To evaluate the commercial CMS Monaco IMRT treatment planning system which employs a Monte Carlo (MC) based dose calculation engine, biological motivated cost functions, multi-criteria optimization, and an efficient sequencing algorithm. **Method and Materials:** For a head and neck, a liver, a prostate and a rectal cancer patient, step-and-shoot IMRT plans were designed using Monaco. The plans were compared to ones generated by the established CMS XiO treatment planning system. The plans were optimized to achieve the same clinical objectives concerning dose to the tumor and to the relevant organs-at-risk. However, whereas the XiO plans were formulated using DVH and minimum/maximum dose constraints, the Monaco plans utilized the biological cost functions offered by the system. DVHs, EUD, mean- and maximum-doses were compared, as well as the number of beam segments and MUs. Finally the plans were delivered on a MapCheck device to verify the agreement between the MC calculated dose distributions and measurements to be less than 3% and 3 mm. **Results:** Plans optimized with Monaco achieved at least similar and in some cases superior dose distributions. The multi-criteria optimization tools and the sensitivity analysis helped to reduce the time needed to optimize the plan. The Monaco plans resulted in fewer segments and lower number of MUs and therefore reduced delivery time. All calculated dose distributions passed the dose verification with the MapCheck device. **Conclusion:** The commercially available Monaco system produces clinical relevant plans, which are dosimetrically equivalent or superior to plans from the conventional XiO system, feature shorter delivery times, and can easily be verified with normal QA procedures using MapCheck. **Conflict of Interest (only if applicable):**