

## AbstractID: 5594 Title: Packet-Level Quality Assurance of MLC Informatics

### **Purpose:**

To develop a system for real-time auditing and archiving of MLC treatment data, both static and IMRT, through the passive detection and reconstruction of packet-level network traffic between the linac control computers and the central database server.

### **Method and Materials:**

The three computers under observation are the control computers for a Varian 21EX (120-leaf dynamic MLC) and a Varian 2100-2 (52-leaf static MLC) and the central database server running Varis 7 clinical informatics software. The observing system consists of a Linux-based PC connected via Ethernet to modified network segments of the two linac control computers, running the Ethereal and Snort open-source network analysis tools in addition to database and web services. After detailed observation of the computers' data transfer protocols and MLC data formats, the system was configured to passively monitor Ethernet traffic during clinical operations and selectively record only those packets containing specific treatment session, field, and MLC details to a database. Finally, a custom PHP-MySQL script was written to reassemble, convert, and present this binary data in human-readable, web-accessible format.

### **Results:**

The system successfully reconstructs and stores the network-detected MLC configurations for all fields in a treatment fraction, seconds after the patient file is opened at either treatment computer. Its application to IMRT QA is both real-time MLC auditing (e.g. verify that the MLC data received by the server matches that of the previous fraction, 10-15 minutes before treatment delivery) and as an off-line archive of transmitted MLC configuration data.

### **Conclusion:**

This system demonstrates that the examination of network traffic can provide a useful and innovative tool for radiotherapy QA. Its informatics-centered approach to IMRT QA contrasts with and complements the numerous delivery-centered techniques, which focus on dosimetric verification of MLC sequences that are known to have been transmitted to the linac computer without error.