# AbstractID: 8972 Title: Method to Validate the Dosimetric Accuracy of Motion Tracking in Cyberknife Using a CIRS Dynamic Phantom

**Purpose:**
The dose distributions in Cyberknife planning are more conformal with steeper dose gradients than what has been available with gantry based linear accelerators. With the inception of the motion tracking algorithm, these steep dose gradients are delivered to a small moving lesion with sub-millimeter targeting accuracy. The CIRS dynamic phantom will be used to validate the dose accuracy of a moving target and compare to a static target.

**Method and Materials:**
The phantom was scanned with a 4 slice GE HiSpeed helical scanner at 1 mm slice intervals. The treatment regiment for each delivered plan was one fraction at 20 Gy to the 85% isodose line. The exposed gafchromic film was scanned and analyzed with ImageJ to acquire dose profiles in each plane.

**Results:**
The dose profiles showed dips that coincided with lower dose regions in the treatment plan. This was apparent in measurements with the phantom static as well as with the phantom in motion. Treatments delivered to the dynamic phantom yielded results within 5% of the prescribed dose as compared to static deliveries.

**Conclusion:**
The CIRS dynamic phantom provides a method to validate the dosimetric accuracy of Cyberknife when compensating for complex motion. This is a sound method to include in the quality assurance program. Because this can be a lengthy procedure, up to two hours, it may be more feasible to include in a quarterly or annual quality assurance program.

**Conflict of Interest (only if applicable):**