

## AbstractID: 1717 Title: Construction, calibration and commissioning of the Integrated Real-time Imaging System (IRIS)

A novel device for image-guided radiotherapy is under development. The Integrated Radiotherapy Imaging System (IRIS) consists of two gantry mounted diagnostic (kV) x-ray tubes and two flat-panel amorphous-silicon detectors. The system has been designed for three main functions: simultaneous orthogonal radiographs for patient setup, cone-beam C.T., and real-time tumor tracking. The IRIS is unique in its designed integration of all three of these functions with the therapy linac. The x-ray tube mountings and imager arms are retractable to allow unobstructed therapist access to the patient when the system is not in use. The generators and imaging panels are controlled by an acquisition software system located in the linac control area that allows the user to request simultaneous, sequential or solo firing of the two x-ray tubes. An imaging phantom and fiducial plate have been designed for initial calibration and commissioning of the system. The phantom will be used to calibrate imaging parameters such as geometry, resolution and photometric response. Radiopaque spherical markers are embedded in a 10" x 9" radio-translucent cylindrical phantom. The fiducial plate will be used to calibrate the positions of the sources relative to the imagers and to determine any mechanical uncertainty in the deployment/retraction of the sources and imager arms. It may be left in place during treatment to facilitate automatic calibration and registration. Results of the IRIS commissioning will be presented, including geometric and photometric uncertainties and limitations.

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