We present the results of our characterization of a prototype a-Si:H (amorphous silicon) array detector for real-time dosimetric verification in dynamically shaped beam radiotherapy. This work is aimed at providing real-time dosimetry verification during patient treatment. The system consists of a 9.6 x 9.6 cm^2 a-Si:H array detector, a frame grabber board and a personal computer. Our studies to date have verified the system's performance with respect to the manufacturer's specifications and that it meets the requirements necessary for real-time dose verification of dynamically shaped beams. Key performance criteria examined are minimum scan time and its relation to delivered dose, spatial resolution, image noise, image distortions, beam attenuation, dose linearity and saturation. Results indicate that the device meets the manufacturer's specifications in most aspects. Line spread function measurements found the spatial resolution to be 2.6 mm. Due to its performance and current small array area, this system is well suited for dosimetric verification of a linear accelerator fitted with a micro-multileaf collimator.

To allow for rapid verification of proper system performance for small irregular fields, an accelerator source model has been developed to generate the photon intensity profiles in the detector plane. Calculated and measured profiles show correlation within 2 percent. Work is currently underway to compute and verify static and dynamic fields defined by the leaf configuration file and the micro-multileaf collimators.