

Abstract Submitted  
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**A high-resolution tomograph for the study of thermal-fluids phenomena** TIMOTHY UPTON, University of New Hampshire, DEAN VERHOEVEN, Ancona Research, Inc. — A unique tomographic testbed having the ability to resolve small, three-dimensional structures has been constructed for the study of thermal-fluids phenomena. The twelve-view, high-resolution optical system employs a mirror array to deliver two projections or views to each of six cameras. The herein described tomograph provides a spatial resolution of 250  $\mu\text{m}$  for a field of view 32 mm in the horizontal direction by 64 mm in the vertical direction. To demonstrate the capabilities of the technique, fully three-dimensional measurements of the turbulent flame surface of a premixed, propane-air flame have been made. These whole-field measurements appear to be the first of their kind. The flow field with a mean speed of 11 m/s and rms turbulence of 0.36 m/s is frozen using a 10  $\mu\text{s}$  flash delivered by a uniformly-distributed, high-power flash ring. The light reflected from micron-sized oil droplets seeding the flow is acquired from twelve viewing directions. These projection measurements are used to reconstruct the flame reactants, providing the instantaneous flame surface in three dimensions.

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