An experimental study of the turbulent development of Richtmyer-Meshkov instability with a random initial perturbation
VLADIMER TSIKLASHVILI, OLEG LOKHACHEV, JEFFREY JACOBS, University of Arizona — Richtmyer-Meshkov (RM) instability is studied in a vertical shock tube experiment. The instability is observed between two gases of different densities accelerated by an incident planar shock wave. The stable stratification of the gases is created by introducing air seeded with smoke through a plenum at the top of the driven section, and SF6 through a plenum at the bottom. The gases are oscillated vertically using two loud speakers, located at the top and bottom of the driven section. Faraday waves created on the interface of the two gases results in a random initial perturbation from which the RM instability develops. The current study focuses on the development of the turbulent mixing layer width following the shock-interface interaction. In past experiments, a variety of growth behaviors has been observed. In some experiments the mixing layer width initially grows rapidly and then saturates later on. Other experiments have more gradual, almost linear growth behavior. In the new experiments views of the initial perturbation are captured along with the growth behavior in order to determine the effects of initial conditions on the mixing layers width’s development.