Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Planar spray visualization processing techniques and considerations KYLE M. BADE, RUDOLF J. SCHICK, Spraying Systems Co., SPRAY ANALYSIS AND RESEARCH SERVICES TEAM — Techniques to visualize and characterize spray distributions include mechanical and optical methods. Planar laser illumination presents a non-intrusive and direct method to visualize and quantify the size, shape, and distribution of a spray across a known cross-section. The nuances of processing and interpreting the light intensity from polydisperse sprays can have a significant effect on the resulting relative distribution of the scattered light. Mie scattered light is proportional to the surface area of the droplet, while laser induced fluorescence (LIF) emits an intensity proportional to the spray volume. As a result, processing of instantaneous droplet fields using both techniques may recover an effective Sauter Mean Diameter (D32), this process is explained and demonstrated. It is well understood that collected scattered light intensity is proportional to the number of droplets as well as the size of those droplets, with increasing numbers and diameter deliver a higher intensity. Additionally, the scattering angle and position of a droplet relative to the illumination source and collection device (camera) effect the perceived local concentration. The effects of these, and other details, are demonstrated and explained in the context of the Spraying Systems Co. SprayScan^{TM} mPT instrument as well as for general experimental setups.

Kyle Bade
Spraying Systems Co.

Date submitted: 31 Jul 2019 Electronic form version 1.4