NASA SBIR/STTR Technologies

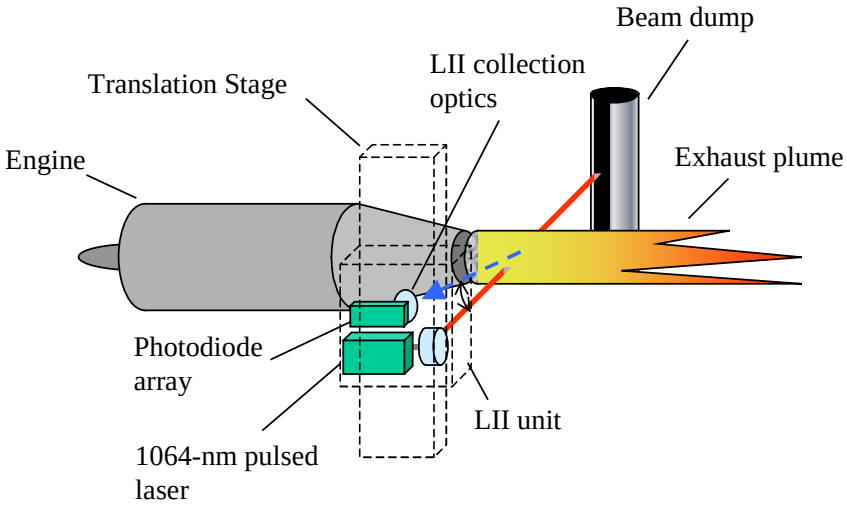
A Versatile Laser-Induced Incandescence System for Non-Intrusive Measurements of Particle Size and Mass in Aircraft Emissions

Dr. Thomas P. Jenkins / MetroLaser, Inc. - Irvine, CA

Proposal No.: 04-A2.01-9605

Identification and Significance of Innovation

Recent studies show that airborne soot is a much larger problem than previously thought. The proposed system will measure primary soot particle size and total soot mass non-intrusively in the exhaust streams of aircraft engines using two innovations that involve laser-induced incandescence (LII). These are: (1) LII decay rate to determine particle size, and (2) Scheimpflug optics to enable measurements from a single vantage point.



Technical Objectives and Work Plan

Objectives:

(1) Define tradeoffs for particle sizing strategies
(2) Determine sensitivities for soot mass
(3) Establish feasibility

Work Plan:

(1) Construct breadboard
(2) Find mass detection limit with soot generator
(3) Find particle size vs. LII decay rate
(4) Select optimum strategies for sizing and mass
(5) Preliminary Phase II design

NASA and Non-NASA Applications

Commercial markets include NASA programs to study the impact of aerosols on air quality and climate, for example INTEX-NA and AVE, both of which seek to understand the transport of gases and aerosols in the troposphere to better model global scale air quality and climate change. Non-NASA commercial markets include testing of diesel automobiles and trucks, jet engines, and stationary sources.

Contact: Dr. Tom Jenkins, P.I., MetroLaser, Inc.
949-553-0688 x 269, tjenkins@metrolaserinc.com