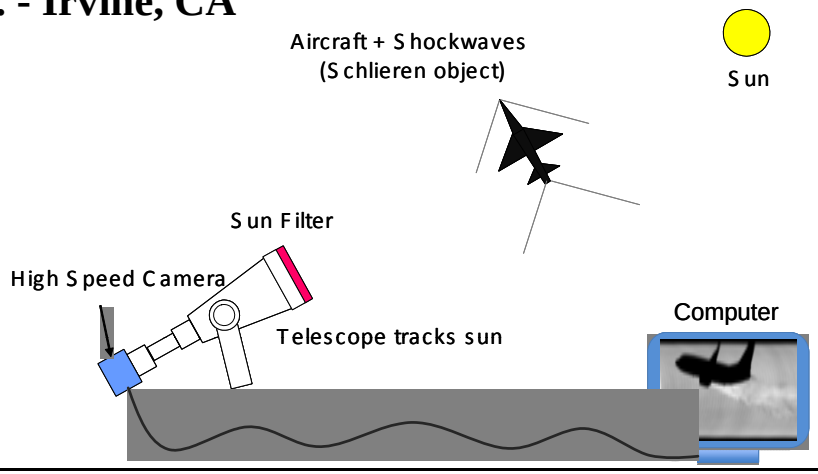
NASA SBIR/STTR Technologies

07-2 A2.08-9753 - All Electronic, Adaptive, Focusing Schlieren System for Flight Research

PI: Drew L'Esperance, Ph.D.
MetroLaser, Inc. - Irvine, CA

Identification and Significance of Innovation: We are developing the next generation of Schlieren for Aircraft in Flight (SAF) systems. In SAF, schlieren images of aircraft are obtained as they transit the edge of the sun. The transit is recorded on high-speed video and then analyzed using the Synthetic Time Delay and Integration (S-TDI) method. S-TDI-based SAF systems are less sensitive to movement of the observation platform and can be used with aircraft whose flight paths and velocities are not known in advance.

TRL Range at the end of Phase 1 (1-9): 6



Technical Objectives: Build prototype SAF systems and use them to obtain schlieren images of supersonic aircraft (or similar objects) and their shock waves. Develop robust and flexible software both for instrument control and for synthetic TDI analysis of video. Demonstrate new applications of Schlieren for Aircraft in Flight that take advantage of the synthetic TDI method.

Work Plan: The Phase 2 effort comprises design and construction of Ground-to-Air and Air-to-Air SAF prototype systems. Instrument control and data analysis software will be developed. System performance will be assessed by capturing a schlieren image of an aircraft in flight.

NASA and Non-NASA Applications: Flight testing is often used as a final check of aerodynamic designs developed by computational and wind tunnel methods. Outdoor schlieren systems using the sun or moon make it possible to examine shock waves from aircraft in flight. Applications exist in all forms of research and development associated with turbulent flow fields, including aero optics, flow control, drag, boundary layer transition, and flow separation. The developments will be important in flight-testing, where few instruments can perform in a flight environment.

Firm Contact: MetroLaser, Inc., 8 Chrysler, Irvine, CA, 92618
Phone: 949-553-0688. E-mail: dlesperance@metrolaserinc.com

NON-PROPRIETARY DATA