Description: Data Acquisition System

NASA has a need for a turn-key optical data acquisition system as part of a multi-camera background-oriented schlieren (BOS) instrumentation system for use in various wind-tunnels at the Langley Research Center. The cameras will be configured to simultaneously observe a model under test and the video data will be transferred and recorded in real-time to a remotely located computer system. This data system is a critical part of the facility instrumentation and provides for the control and synchronization of the camera array as well as the digitization, archiving and post-processing of the video data generated during a test. The following functional and performance specifications for the data acquisition system and cameras are required:

System Specifications
- Shall have a computer system of a rack mountable type design
- Shall utilize three (3) independent cameras simultaneously for image data acquisition.
- Shall be able to control all camera functions remotely by the host computer.
- Shall be able to remotely trigger all cameras to begin image acquisition within 1 microsecond of each other.
- Shall have a frame grabber capable of capturing every frame of video data, from all cameras operating simultaneously in free run mode (full frame rate), at maximum bit depth, for at least 10 seconds continuously.
- Shall include frame grabber with a SDK package to customize acquisition and board level control functions within a Microsoft Windows environment.
- Shall have a Windows 7 x64 (64-bit) OS or better
- Shall include turn-key software for image acquisition from all three (3) cameras simultaneously compatible with a Microsoft Windows 64-bit operating system.
- Shall include a dual-head graphics adapter for extended desktop operation
- Shall include all necessary cables and power supplies.
- Shall be powered by standard 110V 60Hz AC source
- Shall include all necessary operating manuals and documentation

Camera & Lens Specifications
- Three (3) cameras are required
- The camera shall have a full-field spatial resolution of at least 4000 x 3000 pixels (12MP)
- The focal plane of the cameras image sensor shall not be less than 18mm in any dimension and the pixel elements shall not be less than 6 microns x 6 microns in size
- The camera shall have a dynamic range of at least 57dB
- The camera shall utilize a global electronic shuttering algorithm and be capable of a 20 microsecond minimum exposure time or faster
- The camera shall be capable of generating at least 50 frames per second of video data when operating at the highest spatial resolution
- Image bit depth shall be at least 8 bits when operating in full field at the highest frame rate
- Cameras shall be addressable and controllable through a CameraLink connection.
- Shall include three (3) 35 mm fixed focal length, large format, megapixel lenses - one lens for each camera. Each lens should be capable of resolving 120 line pairs/mm (center), 80 line pairs/mm (corners), optical distortion better than +/-0.5%, and f2.8 or lower.
- Shall include three (3) 50 mm fixed focal length, large format, megapixel lenses - one lens for each camera. Each lens should be capable of resolving 120 line pairs/mm (center), 80 line pairs/mm (corners), optical distortion better than +/-0.5%, and f2.8 or lower.
- Shall include all necessary cables and power supplies.
- Shall include all necessary operating manuals and documentation