**FG-14**

# Real-time control system for the Raman-shifted Eye-safe Aerosol Lidar (REAL)

Denton Scott[1], Shane D. Mayor[2]

The National Science Foundation (NSF) Raman-shifted Eye-safe Aerosol Lidar (REAL) is an instrument that, until now, has been used primarily for atmospheric research. It is capable of remotely measuring wind and atmospheric boundary layer heights using a pulsed infrared laser, 40-cm optics, and an InGaAs detection system. Several applications of the instrument require long-term and unattended operation. A control system is needed in order to transform the REAL from a research instrument into a monitoring device. The control system will stabilize the instrument's performance, inform a person of potentially critical hardware conditions, and initiate a graceful shutdown if a problem that could potentially result in damage to the system is sensed. The control system (software written in LabView) reads data from wired sensors measuring variables such as component temperature, laser power, and movement of mirrors, and takes actions based on defined thresholds and conditions. The actions include optimizing component settings such as laser flash lamp voltage, contacting by cell-phone a person who can respond, or suspending operation of the entire system using a graceful shutdown procedure. The objective of the research is to determine the requirements for such a control system and the goal of the project is to enable continuous, unattended, and fail-safe operation of the lidar to facilitate advancements in meteorological research and wind energy.

This research was sponsored by NSF AGS 0924407.

[1]Department of Electrical and Computer Engineering
[2]Department of Physics