Final Projects for Lidar Class

Background: In the consideration of physical processes, the lidar class covers the aerosol (Mie) scattering lidar, differential absorption lidar (DIAL), Raman lidar, Rayleigh scattering lidar, resonance fluorescence lidar, Doppler lidar, fluorescence lidar, and laser rangefinding lidar (laser altimeter). In term of the application topics, we classify the lidars into 5-6 categories: temperature, wind, constituent, aerosol/cloud, non-gas-phase substances and rangefinding. In the class, we discuss the fundamental principles of lidar, the physical processes involved, the measurement principles of lidar detection, the related lidar technologies, the lidar simulations, error and sensitivity analysis, and considerations in lidar design and trade-off.

Goals: The final projects are to integrate what you have learned in the class to design, characterize, simulate, and analyze a chosen lidar or an application. This will show your overall understanding and knowledge of lidar remote sensing.

Requirements are in the next page.

Design or Characterize A Lidar for A Real Application

Depending on your applications, choose one of the lidars or one of the subject topics as your project. The final project should cover the following contents:

➢ Why is such a lidar chosen? Your rationales based on application needs or other reasons.

➢ Principles, history, and current status of this type of lidar

➢ Design or characterization of a lidar system

➢ Simulation of expected lidar signals

➢ Sensitivity or error analysis

➢ Comparison to real lidar signals if any

➢ Applications

❖ Final project presentations will be given on 12th, 2014 to the class (Friday of the last class).

❖ Written reports are due on December 19, 2014.