ASEN 6365. Lidar Remote Sensing

Syllabus, Fall 2020

Lecture: Meets Remotely @ 2:20 3:10 pm on Monday, Wednesday, and Friday
(available for distance learning)
via Zoom meeting: https://cuboulder.zoom.us/j/9574891713

Canvas course: ASEN 6365-001, 001B at https://canvas.colorado.edu/

Instructor

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Office Hours: Monday 3:10—5pm over Zoom https://cuboulder.zoom.us/j/9574891713

Course Objective

Course Content

1. INTRODUCTION

      A. Concept and classification of remote sensing

      B. Overview of lidar remote sensing

      C. Laser Basics

2. FUNDAMENTALS OF LIDAR REMOTE SENSING

      A. General picture of lidar remote sensing

      B. General lidar equation

      C. Physical processes involved in different lidars

      D. General lidar architecture

      E. General solutions of lidar equation

      F. Classification of lidars

3. LIDAR EQUATION, DATA INVERSION AND ERROR ANALYSIS

      A. From photon counts to physical parameters using lidar equation

      B. General data inversion procedure

      C. General error analysis procedure

4. TOPICAL LIDARS AND THEIR APPLICATIONS

      A. Lidars for Aerosol/Cloud Measurements

      B. Lidars for Constituent Measurements

      C. Lidars for Temperature Measurements

      D. Lidars for Wind Measurements

      E. Lidars for Solid Target Detection

      F. Laser Range Finding / Laser Altimeter

      G. CW-Laser Imaging Lidars

5. LIDAR DESIGN AND PERFORMANCE ANALYSIS

      A. Overall Considerations

      B. Transmitter Considerations

      C. Receiver and Data Acquisition Considerations

      D. Lidar Performance Analysis and Simulation

6. LIDAR FUTURE OUTLOOK

      Where will we go from here? Open discussions with students and experts will provide an overview for possible future development and application of laser remote sensing technologies.