ASEN 6519. Lidar Remote Sensing

HW #5 – Temperature and Wind Lidar Technologies

In the HW report, please address the following aspects:

1. Please summarize the various lidar technologies for measuring atmosphere temperatures, from ground to the upper atmosphere. Give the measurement principles of different lidar technologies, show necessary equations to explain if needed, and the instrument requirements.
2. Please summarize the lidar technologies for measuring atmospheric winds from ground to the upper atmosphere. Also give the measurement principles, requirements on instrumentation and compare different technologies for their advantages and disadvantages. What are the major differences between CDL and DDL? What are the major differences between resonance and non-resonance DDL? What is the common point in various non-resonance DDL?
3. Which temperature and/or wind lidar can be applied to the research you are interested in? Please pick one or two to explain how you are going to apply the lidar technologies and what results you will expect.
4. In Dr. Qian Wu's FPI measurements at Resolute Bay, the FPI is pointing to east, west, and zenith sequentially. Could you explain why? How does he determine zero wind point?
5. Recently, in determining gravity wave phase speed from lidar data, we found maximizing the cross correlation between sequential profiles is a good quantitative way. Could you explain how it works?

HW #5 is due on the Halloween 2014 in class.