Ryan Mohammed

EET 3132

Reflection

 With the use of websites devoted to environmental remote sensing, the slides provided by Prof. Vladutescu, and our trip to the City College of New York, we were able to learn about various different sensing instruments and their applications. These instruments were the lidar, microwave radiometer, sun photometer, and shadowband radiometer. These instruments have specific roles that contribute to the research done in the optical remote sensing laboratory of City College.

 The instrument that interested me the most and the one we spent the most time discussing was the lidar, an acronym for light detection and ranging. An active remote sensor, the lidar’s main function is to measure distances to the Earth’s surface, aerosol and planetary boundary layer detection, and temperature profiles. It does this by sending a beam of light from a laser and recording the light scattered by the atmosphere as a function of time. This time is later converted to distance using the equation$ R=c\*\frac{∆t}{2}$, c being the speed of light$ 3\*10^{8}$. The first thing to do is create the beam, this is done with the use of Nd:YAG, a crystal used as a lasing medium for solid-state lasers. The beam is then separated into three beams with different wavelengths, 1064, 532, and 355nm. These beams can either be sent to the telescope with the use of mirrors or they can be discarded with the use of a beam dump if not needed. The beam is then shot into the atmosphere and the data received is converted using an analog to digital converter. The information gathered can be used in conjunction with other instruments to create precise, high-resolution maps of the Earth ad its surface characteristics.

 Another instrument we spent time looking at and discussing during the trip was the shadowband radiometer, which takes spectral measurements of direct normal, diffuse horizontal, and total horizontal solar irradiances, sunlight, at six wavelengths, 415, 500, 615, 673, 870, and 940nm. Although we didn’t spend much time talking about the shadowband radiometer the sky and air CCNY websites provided a lot of information about the instrument itself, how and where its deployed, and archives of raw data gathered with the shadowband. The microwave radiometer, which was positioned near the shadowband radiometer, produces high-resolution temperature, relative humidity and water vapor profiles, along with low-resolution liquid profiles, according to the sky.ccny.cuny.edu website. This radiometer measures energy emitted at microwaves, low wavelengths at frequencies of 1-1000GHz. it is mainly used for measuring atmospheric radiation, used in meteorological and oceanographic remote sensing.

 Our trip to the City College of New York was very informative and allowed us to see first-hand various remote sensing instruments. When combined with the information provided from the slides and websites we are able to get a greater understanding on how these instruments look and function. All together it was a very enjoyable experience that gave me a greater appreciation of the remote sensing course, the equipment, and knowledge that goes into it.