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Arctic Implementation and Status of the New AMF3 Raman Lidar System

ARM

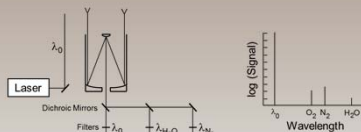
CLIMATE RESEARCH FACILITY

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We are currently building a new Raman lidar system that will be one of the instruments of AMF3 (the third ARM Mobile Facility). The capabilities and instrumentation in this new system, and the resulting datastream and Value Added Procedure codes, will be identical to the SGP and TWP systems. However, unlike the two previous Raman lidar systems (which were housed in "stand-alone" 20' shipping containers), the container housing this new system must be integrated with the AMF3 structure, and must operate in the NSA environment. The design of the system is complete, and procurement of the major components is underway for fall 2014 installation.



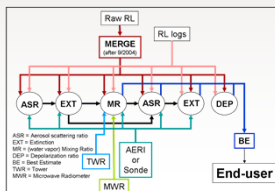
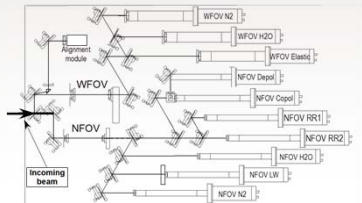
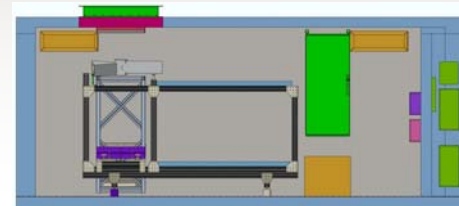
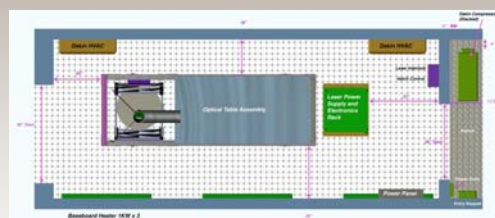
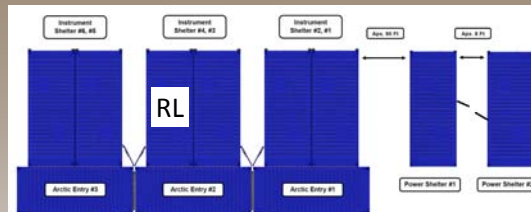
$$S_i(z) = \frac{h\nu}{2} O(z) \sigma_i(\pi) n_i(z) q_i(\lambda_{i,2}) q_i(\lambda_{i,1})$$

$$\text{Water-Vapor Mixing Ratio} \propto \frac{S_{H_2O}}{S_{N_2}}$$

$$\text{Aerosol Backscatter Ratio} \propto \frac{S_a}{S_{N_2}}$$

- Vertical profiles recorded with 7.5 m spatial and 10 s temporal resolution
- Either or both can be traded off for improved S/N during post-processing
- Other atmospheric parameters obtained from various combinations of lidar signals

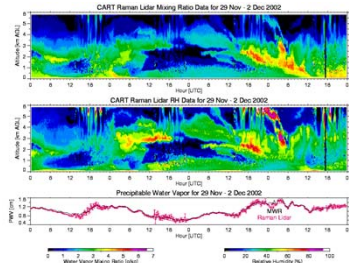
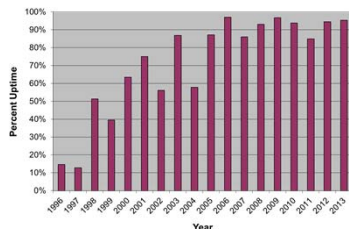
AMF3 Raman Lidar System Configuration



Value-added Products (VAPs) include time resolved profiles of:

- Water Vapor Mixing Ratio
- Relative Humidity
- Aerosol Scattering Ratio
- Aerosol Volume Backscatter Coefficient
- Aerosol Extinction Coefficient
- Aerosol Optical Depth
- Linear Depolarization Ratio
- Cloud Mask and Cloud Base Height
- Temperature

SGP Raman Lidar



TWP Raman Lidar



Oliktok Point

