



Wind Measurements from a High Energy, Pulsed, 2-Micron, Coherent-Detection Doppler Lidar and Intercomparison with other sensors deployed during Field Campaign

Upendra Singh (1), Grady Koch (1), Michael Kavaya (1), Jirong Yu (1), Jeffrey Beyon (1), and Belay Demoz (2)

(1) NASA Langley Research Center, Hampton, VA 23681, USA (Upendra.N.Singh@nasa.gov), (2) Howard University, Washington D.C., 20059, USA

This paper presents an overview of 2-micron laser transmitter development at NASA Langley Research Center (LaRC) for coherent-detection lidar profiling of winds. The novel high-energy, 2-micron, Ho:Tm:LuLiF laser technology developed at NASA Langley was employed to study laser technology currently envisioned by NASA for future global coherent Doppler lidar winds measurement. The 250 mJ, 10 Hz laser was designed as an integral part of a compact lidar transceiver developed for future aircraft flight. Ground-based wind profiles made with this transceiver will be presented. NASA Langley is currently funded to build complete Doppler lidar systems using this transceiver for the DC-8 and WB-57 aircraft. The WB-57 flights will present a more severe environment and will require autonomous operation of the lidar system. The DC-8 lidar system is a likely component of future NASA hurricane research. It will include real-time data processing and display, as well as full data archiving.

The LaRC mobile lidar was deployed at Howard University facility in Beltsville, Maryland as part of NASA HQ funded (ROSES-2007, Wind Lidar Science Proposal entitled "Intercomparison of Multiple Lidars for Wind Measurements). During the campaign, testing of the lidar was combined with a field campaign to operate a 2-micron coherent lidar alongside a 355-nm direct detection lidar to demonstrate the hybrid wind lidar concept. Besides lidar, many other meteorological sensors were located at the campaign site, including wind measuring balloon sondes, sonic and propeller anemometers mounted on a tower, and a 915-MHz radio acoustic sounding system. Comparisons among these wind measurement sensors will be presented at the conference.