AN ANALYSIS OF THE MEASUREMENT OF THE WIND VECTOR BY MEANS OF A MODULATED DOPPLER LIDAR TECHNIQUE

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ABSTRACT

A theoretical and experimental analysis has been made of the feasibility of the measurement of the wind vector by means of a modulated Doppler Lidar. In this system a relatively broad band laser is modulated so that a carrier wave and a single sideband are transmitted through the atmosphere. The atmosphere effects the two components in a nearly identical manner and consequentially the modulation component of the sideband can be recovered independently of the distortion of the carrier wave. Since the modulated portion of the sideband is Doppler shifted by aerosols imbedded in the atmosphere, air motion can be sensed. Experiments have been performed which verify the essential concepts involved in this process.