

## Field Observation System of Wind Velocity Field in Atmospheric Boundary Layer

### Purpose:

Accurate prediction of the wind velocity and wind conditions, including the intensity of atmospheric turbulence, is extremely important for the locationing and operation of wind power generation facilities, design for wind load of transmission lines and the problem of the diffusion of air pollutants. This device observes the travelling speed of aerosols, i.e. Doppler velocity components corresponding to the wind velocity, by means of blasting a laser beam into space and receiving scattered light from aerosols in the air. Through a combination of 3 Doppler LIDAR devices, it is possible to examine a 3D wind velocity field. As it is easier to clarify the wind conditions at difficult sites for air speedometer installation, it can be used to advance the design for wind load for transmission tower and to develop a wind conditions prediction method for the operation of wind power generation facilities.

### Outlines:

Main usage:

- 1) Observation of wind velocity at sea or mountain range where an air speedometer cannot be installed
- 2) Analysis of the phenomenon of turbulent wind which can be significantly affected by structures and topographical features
- 3) Verification of numerical computation models

### Specifications:

- 1) Large Doppler LIDAR device (one unit)
  - Capable of observing the Doppler velocity within a radius of 2.4 ~ 12 km
- 2) Small Doppler LIDAR device (two units)
  - Capable of observing the doppler velocity within a radius of 0.6 ~ 3 km

Common Specifications:

- Observation range of wind velocity: -37 ~ 37 m/s
- Observation distance resolution: 30 m, 75 m, 150 m

### Location and Date of Installation:

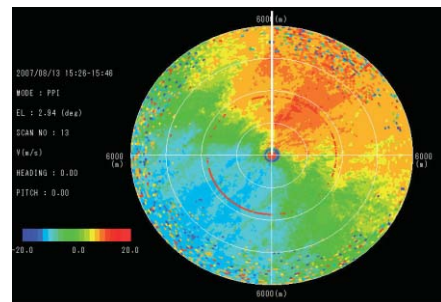
Abiko Campus, March 2007



Large Doppler LIDAR device



Small Doppler LIDAR device



Observation example of atmospheric turbulence fields by a large Doppler LIDAR device