Mike Courtney - WIND LIDARS – NOT THE FINAL ANSWER IN COMPLEX TERRAIN!

Lidar wind profilers are gaining in popularity in the wind industry. The ability to measure a profile of wind speeds without the need for a tower is undeniably attractive, increasingly so as the size of wind turbines get even larger. In flat terrain, lidar wind profilers have been found to measure with a precision comparable to a boom mounted cup anemometer. In particular, pulsed lidars display remarkably high and consistent correlation to cup anemometers in almost all meteorological conditions on flat sites.

In complex terrain, lidars do not measure so accurately since the flow within the sensing volume is no longer homogeneous. Errors of between 5 and 10% are not uncommon.

Additionally turbulence measured by a lidar is not exactly the same as that measured by a cup anemometer. There are several reasons for this; attenuation due to volume averaging and corruption of the apparent horizontal standard deviation by the vertical component of turbulence that inadvertently gets sensed by the inclined beams of the lidar. The ratio between the standard deviation of the wind speed measured by a cup anemometer and a lidar varies and is particularly difficult to predict in complex terrain.