PERFORMANCE BENEFITS OF DIRECT DETECT LIDAR TECHNOLOGY

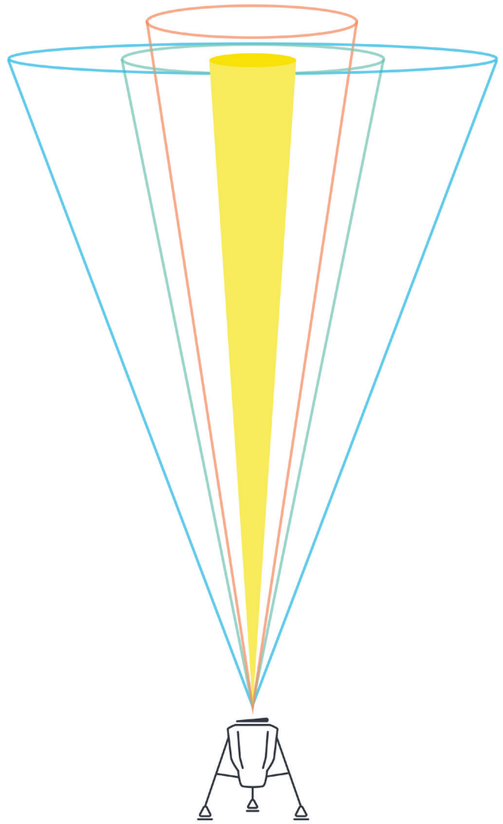
- Consistent performance across simple and complex terrain
- Less affected by rain
- Can be sited within 10m of a 100m met mast or other obstacle

All remote sensors report wind speed data located directly above the unit.

Remote sensors calculate wind speed based on samples taken some distance away from the location of the final reported value.

Of all remote sensors, Spidar measurements are sampled closest to the location where the horizontal wind speed is eventually reported.

This means it is least reliant on the imperfect assumption that wind speed across the measurement volume is constant.



Narrowest Measurement Cone Angle

SEE THE DIRECT DETECT DIFFERENCE

NRG Systems' Spidar Vertical Profiler uses Pulsed Direct Detect Lidar to provide wind measurement data from 30m to 200m.

VERSATILE SOLUTIONS

The Spidar Vertical Profiler is ideal for wind resource assessment, wind farm operations, forecasting, and research. Its small cone angle and portability make it an ideal choice for measurement campaigns with complex terrain. Spidar is available in all regions via NRG's Global Value Added Reseller Network.

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ISO 9001: 2015 Certified
ISO 14001:2015 Self-Certified

NRG Systems

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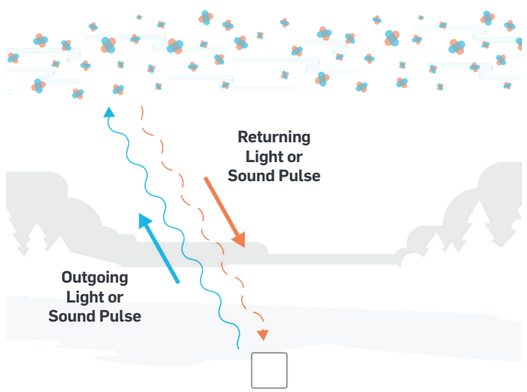
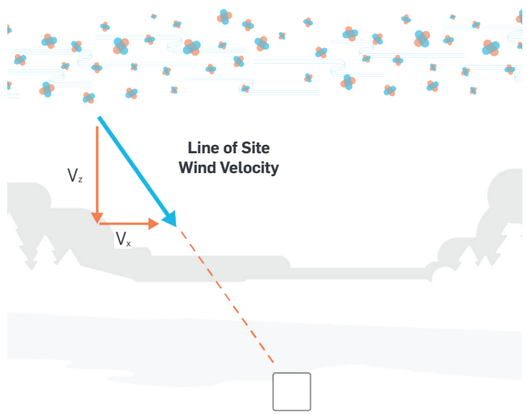
DOPPLER VS. DIRECT DETECT MEASUREMENT PRINCIPLES

Doppler 1



The shift in frequency of the light or sound pulse indicates how fast aerosols are moving along the line of site of that particular pulse.

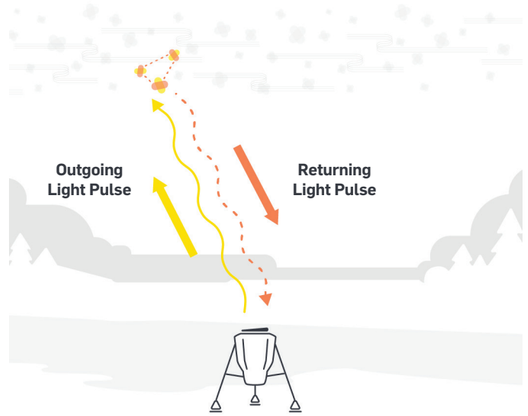
Doppler 2



The line of site wind speed is reduced to two components:

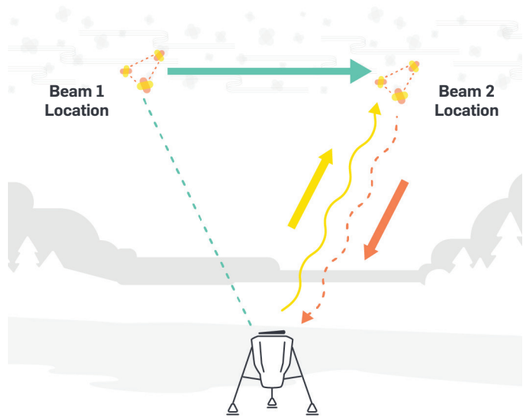
- Vertical wind speed vector (V_z)
- Horizontal wind speed vector (V_x)

Direct Detect 1



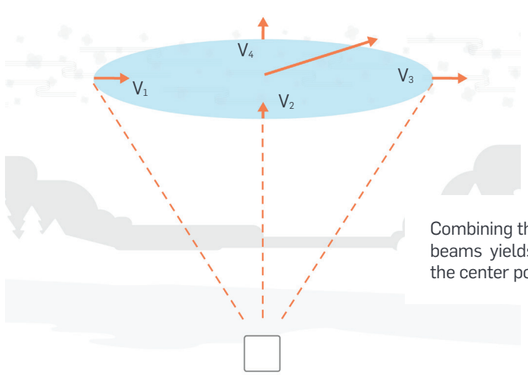
Signal intensity pattern of returning light pulse indicates density of aerosols at the location of interest.

Direct Detect 2



Once intensity pattern passes an additional beam, time and distance of flight are known, indicating wind speed and direction.

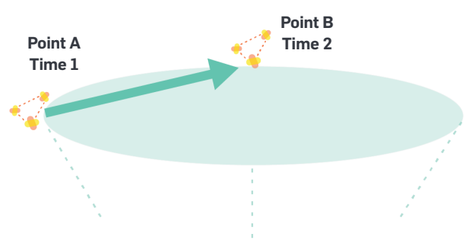
Doppler 3



Combining the horizontal wind velocities from multiple beams yields horizontal wind speed and direction at the center point.

Direct Detect 3

In this example, kernels first seen at beam location A tend to show up again at location B, indicating that the wind is moving in that direction.

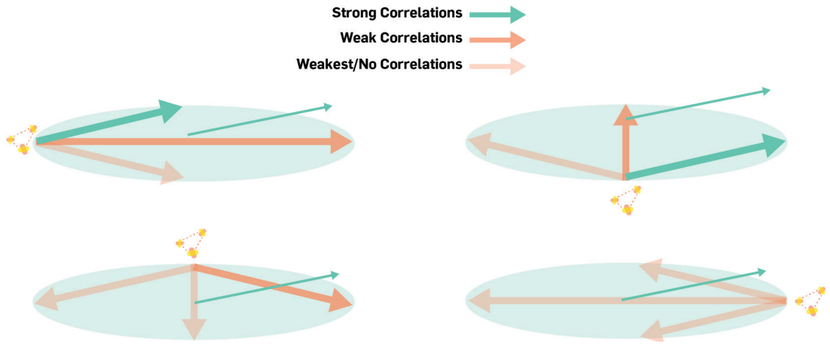


Velocity = Distance Traveled/Time of Flight

Wind speed is determined by dividing the distance between the two locations by the time it took to travel between them.

"Kernel" is shorthand for a pocket of aerosols that has a recognizable density signature.

Direct Detect 4



Tracking aerosol kernels as they traverse multiple beams yields wind speed and direction at the center point.

WHY IS DIRECT DETECT LIDAR INHERENTLY LOWER COST?

- Lasers are lower cost. Wavelength range of laser source does not have to be as narrow or consistent over time as Doppler Lidar.
- Optical chain does not have to be controlled as tightly. Minor misalignments that affect all beams cancel out.
- Receivers are lower cost. Spidar only measures how much of its initial pulse makes it back to the system, and does not have to measure the light's wavelength.