

# Hybrid technology Doppler wind lidar: assessment of simulated data products for a space-based system concept

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## Abstract

Global observations of tropospheric wind profiles represent a significant potential for advancing weather research and operational forecasting. Space-based Doppler lidar is considered to be one of the best candidates for providing vertical wind profiles over the entire globe. The traditional issues of accuracy, spatial resolution and global coverage are currently being formulated within the context of modern 4-D data assimilation. However, this is being done without the benefit of space heritage for active Doppler lidars in space. Considerable resources are being directed at developing "roadmaps" that will guide investments in the technologies that will eventually deliver the data products usable by tomorrow's ever more demanding numerical models. Coherent detection and direct detection offer two very different lidar approaches to making wind observations. In some quarters, the issue is which system to choose over the other. However, given that the two detection techniques have complimentary attributes, it may be more cost effective to employ both. This paper describes the merits of a Wind Observing Satellite using Hybrid (WOS/H) Doppler lidar technologies which would involve (1) a conically scanned 2 micron coherent Doppler lidar for cloud and PBL aerosol wind observations and (2) a 4 point conical-step-stare direct detection tripled YAG (.355  $\mu\text{m}$ ) for obtaining mid and upper tropospheric winds from the Rayleigh returns.