

Point vs. VAD scans for complex terrain

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WG SBLW

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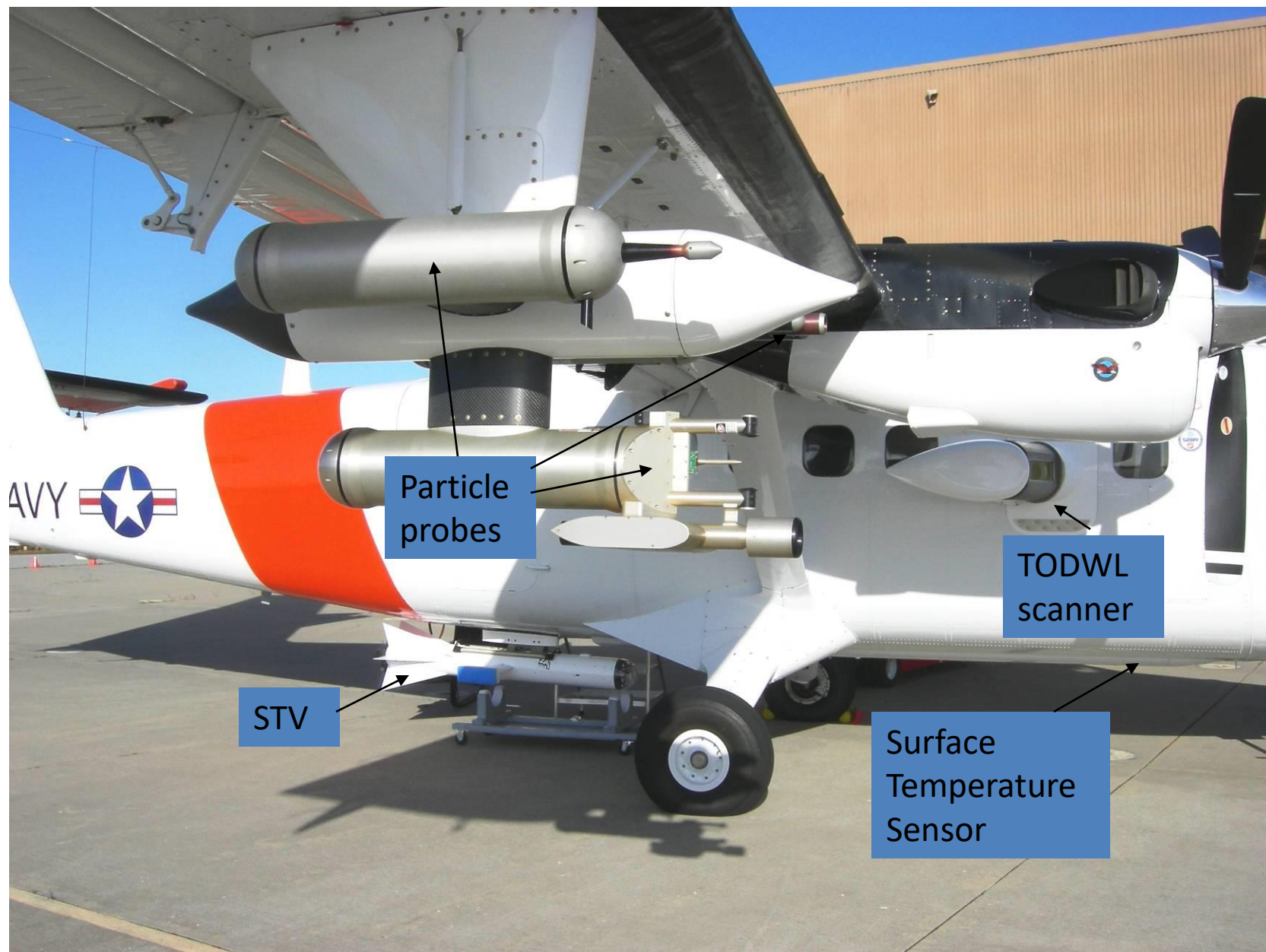
Overview

The conical scan is the traditional pattern used to obtain vertical profiles of the wind field with an airborne Doppler wind lidar. Nadir or zenith pointing scanning wedges are ideal for this type of scan.

A bi-axis scanner has been operated on a Navy Twin Otter for more than 6 years and was installed on a Navy P3 for use in a field experiment to study typhoons.

The bi-axis scanner enables a broad range of scanning patterns. A subset of the possible patterns is critical to obtaining useful wind profiles in the presence of complex terrain or small (~ 100 's of meters) organized atmospheric structures (rolls, updrafts, waves, etc).

Several scanning strategies have been tested in flights over the Monterey Peninsula and within tropical cyclones. Combined with Google Earth (on-board) and satellite imagery overlays, new realtime adaptive scanning algorithms are being developed and tested.



Particle probes

STV

TODWL scanner

Surface Temperature Sensor

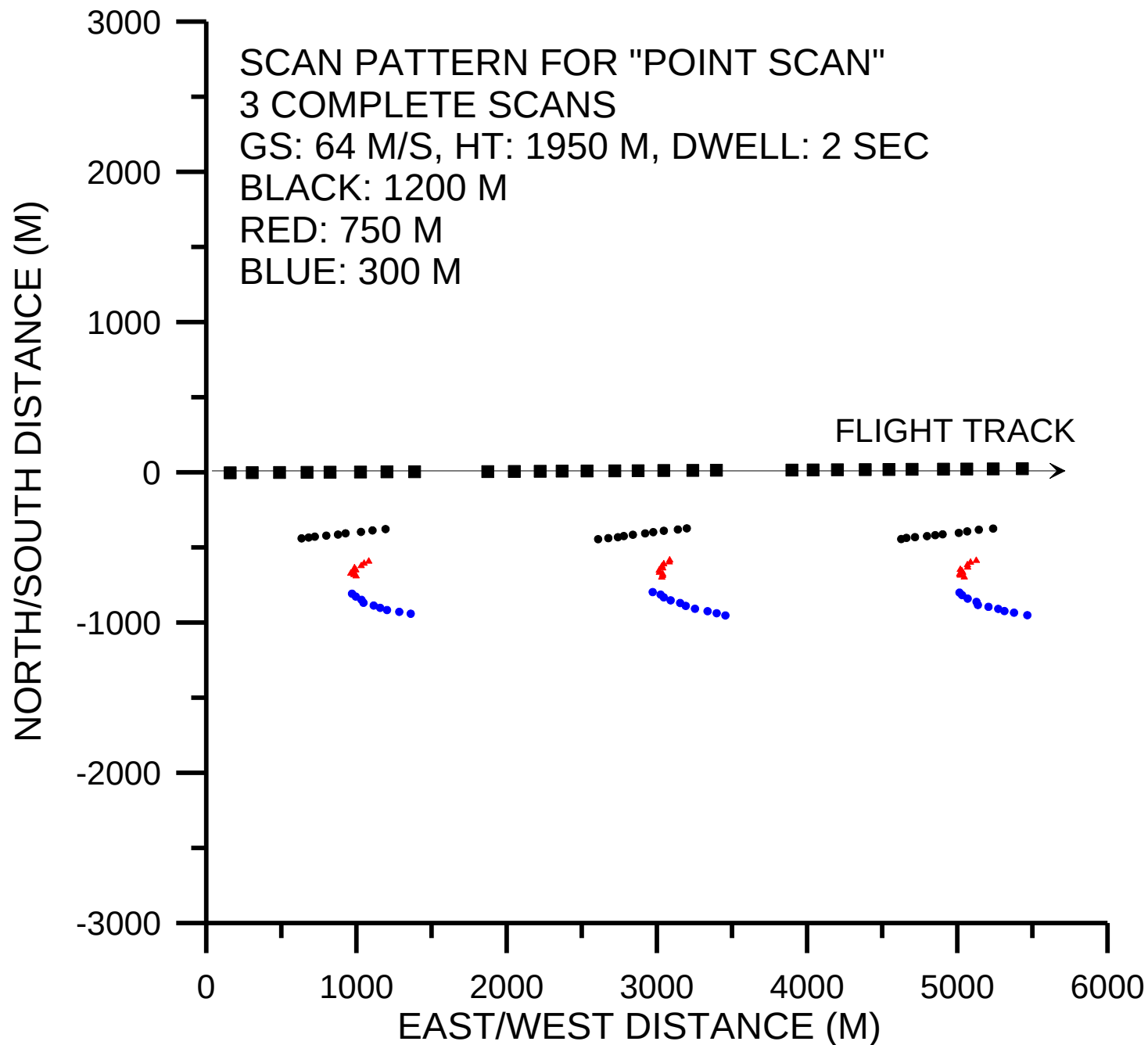
The instrument

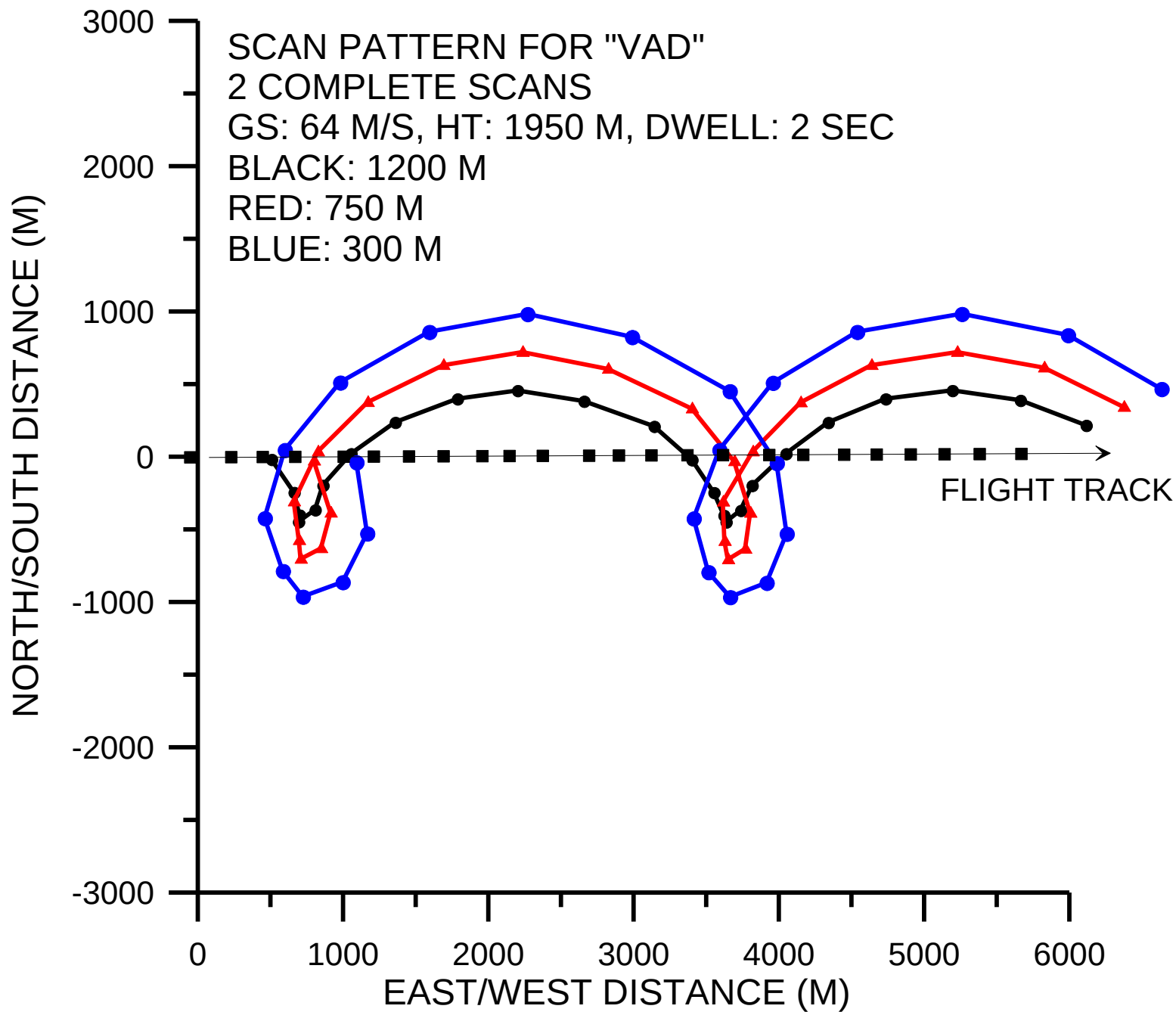
- 2 μ m coherent detection (CTI MAG1A)
- 2 mJ ; 500 Hz
- 10 cm two axis scanner, side door mounted
- GUI with realtime instrument control and data display
- Range: .3 – 21km depending upon aerosols
- Accuracy: < .10 m/s in three components
- Weight: 700lb Power: 700 W



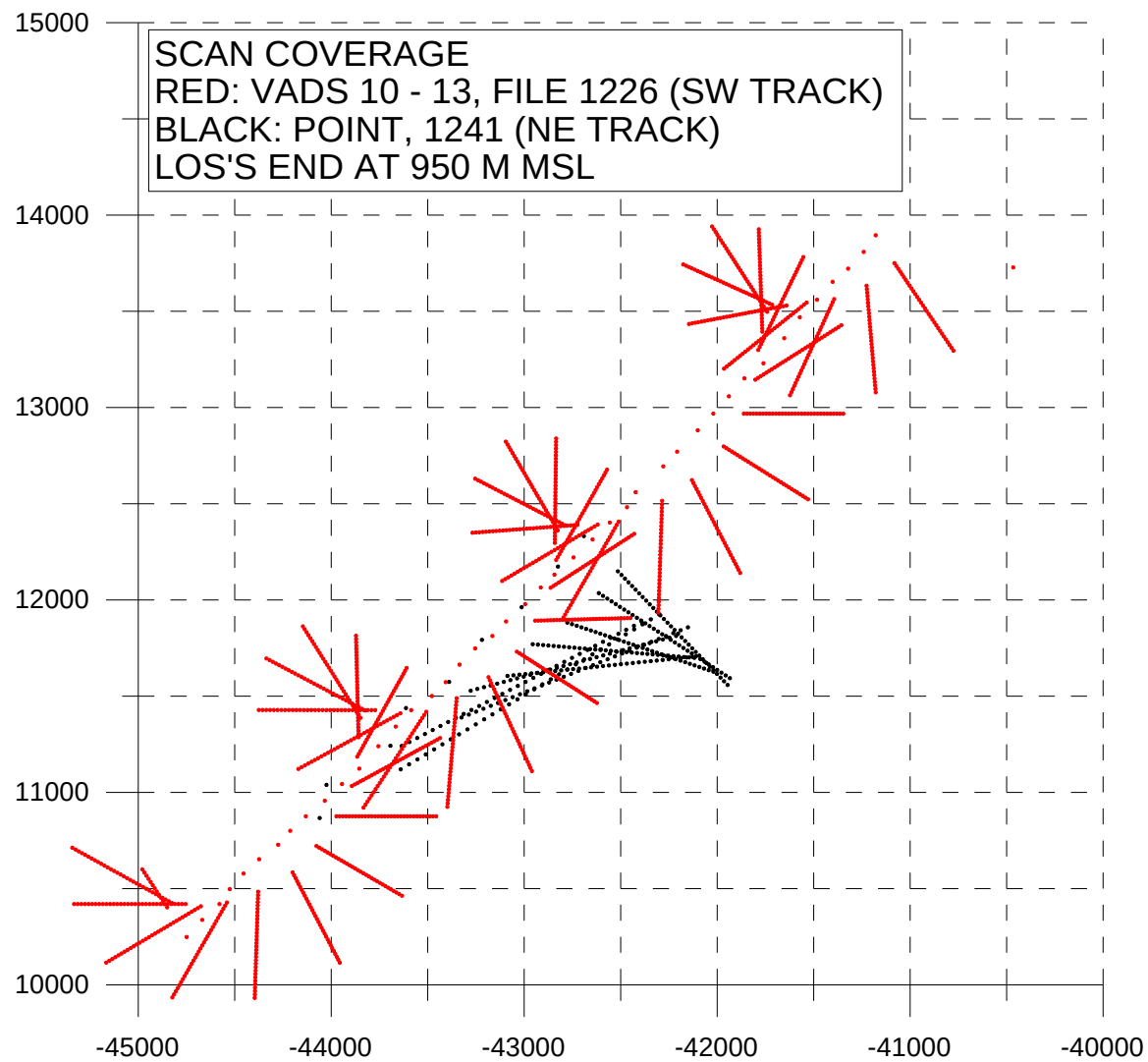
Scanning options

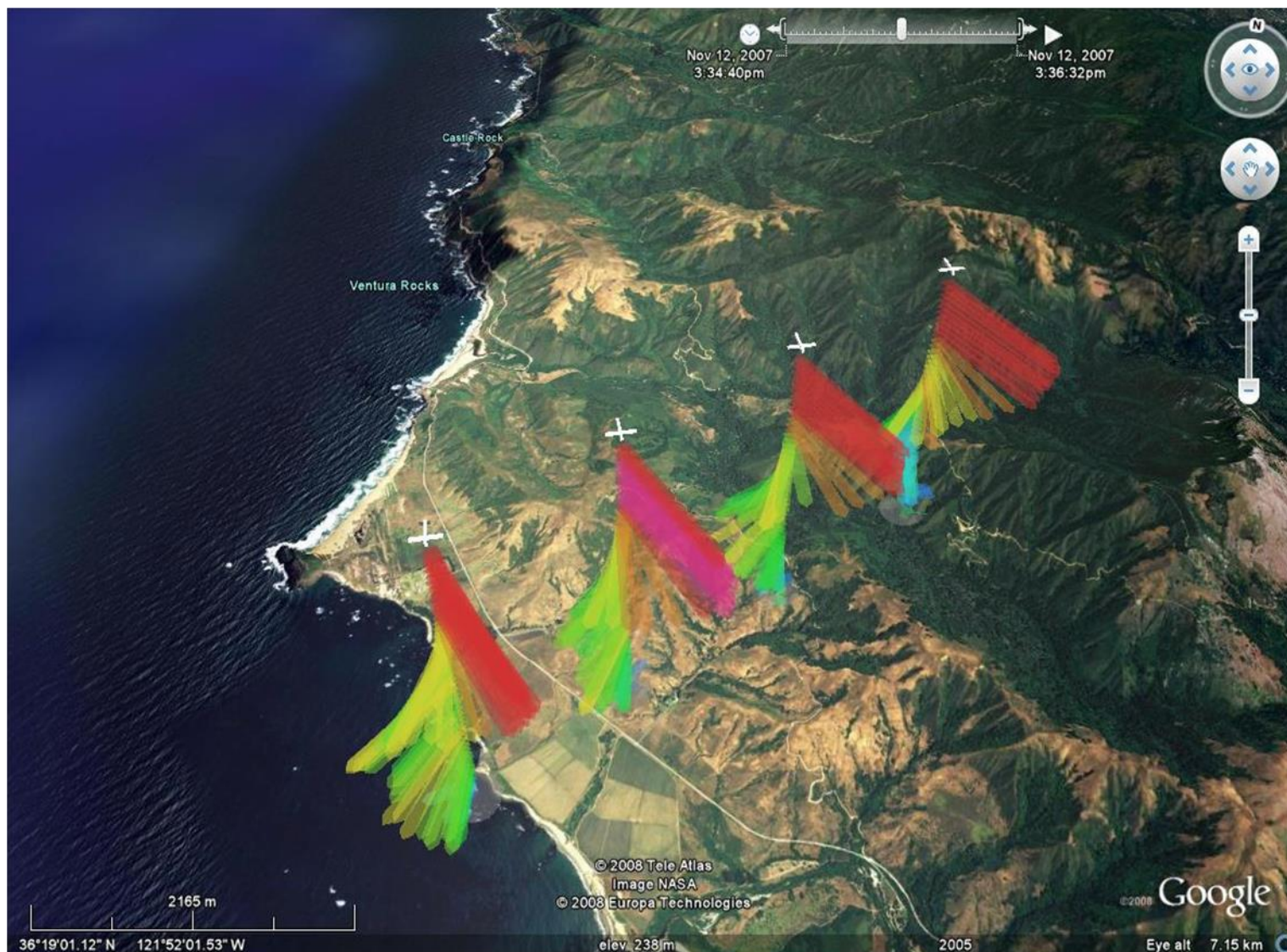
- Nadir step-stare conical (3 – 12 positions) for vertical profiles for u , v , w & aerosols
- Zenith step-stare (u , v , w)
- Forward sweeping (prospecting for OLEs and shear layers ahead of aircraft)
- Nadir point scans (u, v, w) in complex terrain and organized flows (e.g. OLEs)



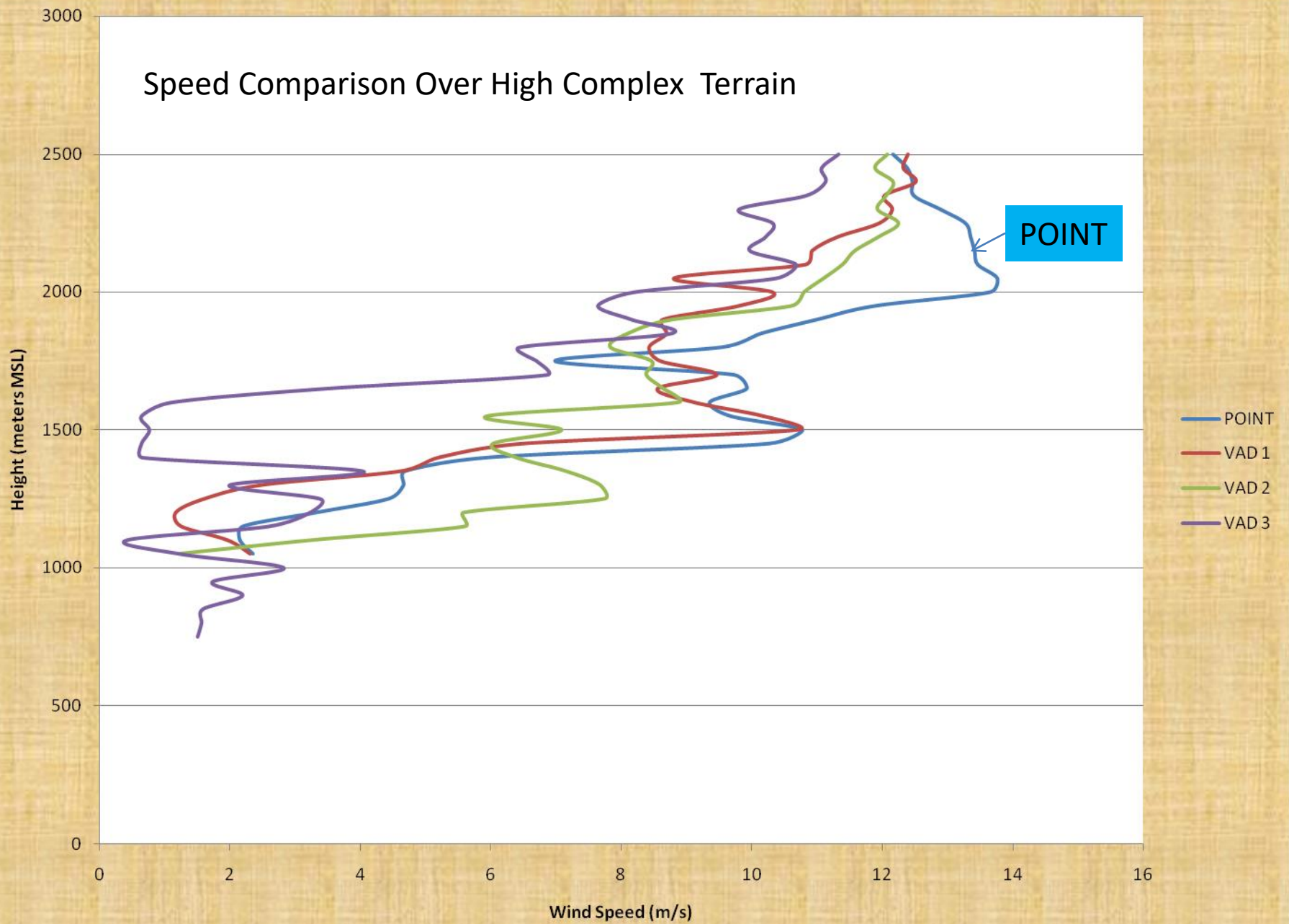


Ridge and Valley

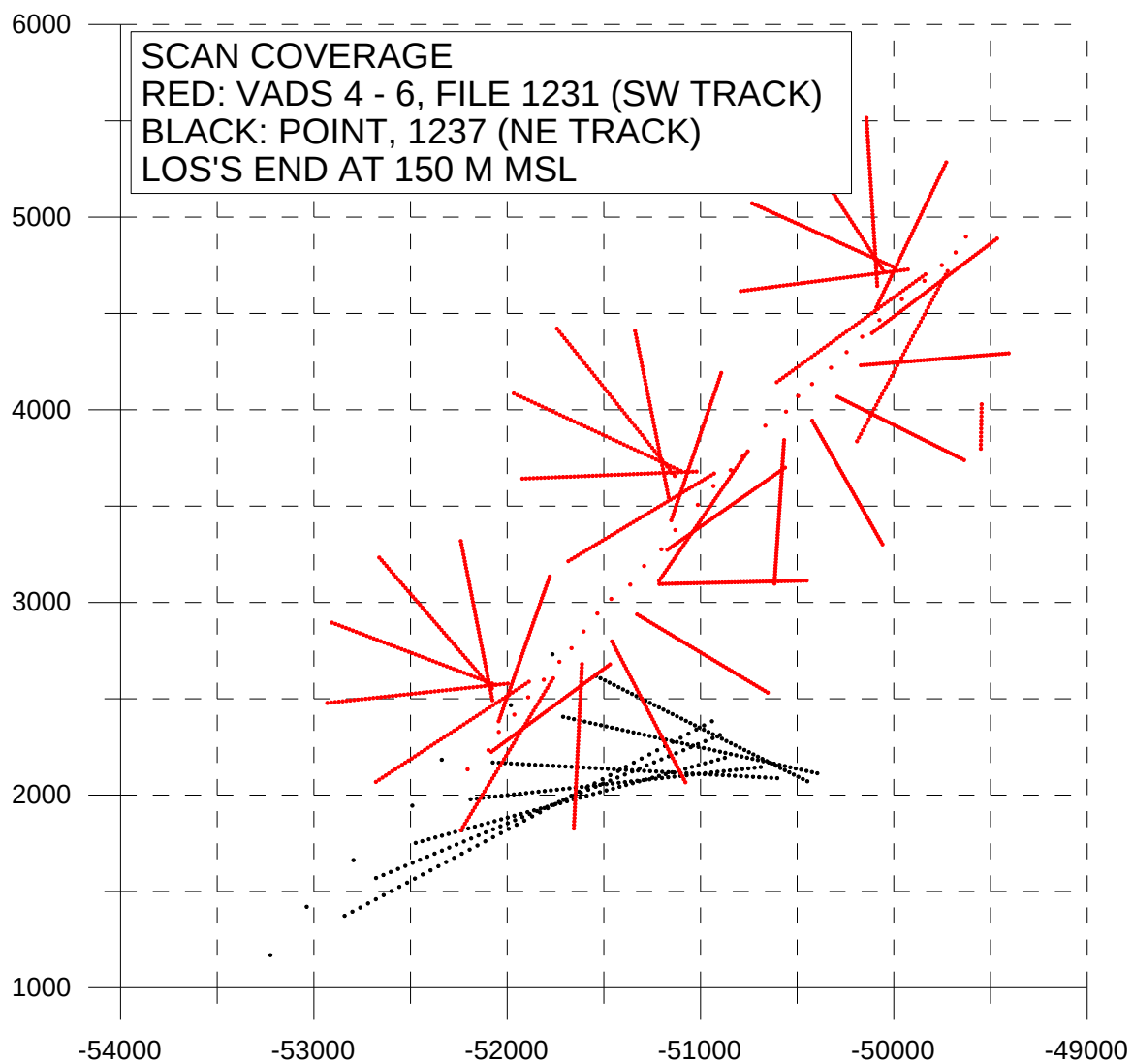


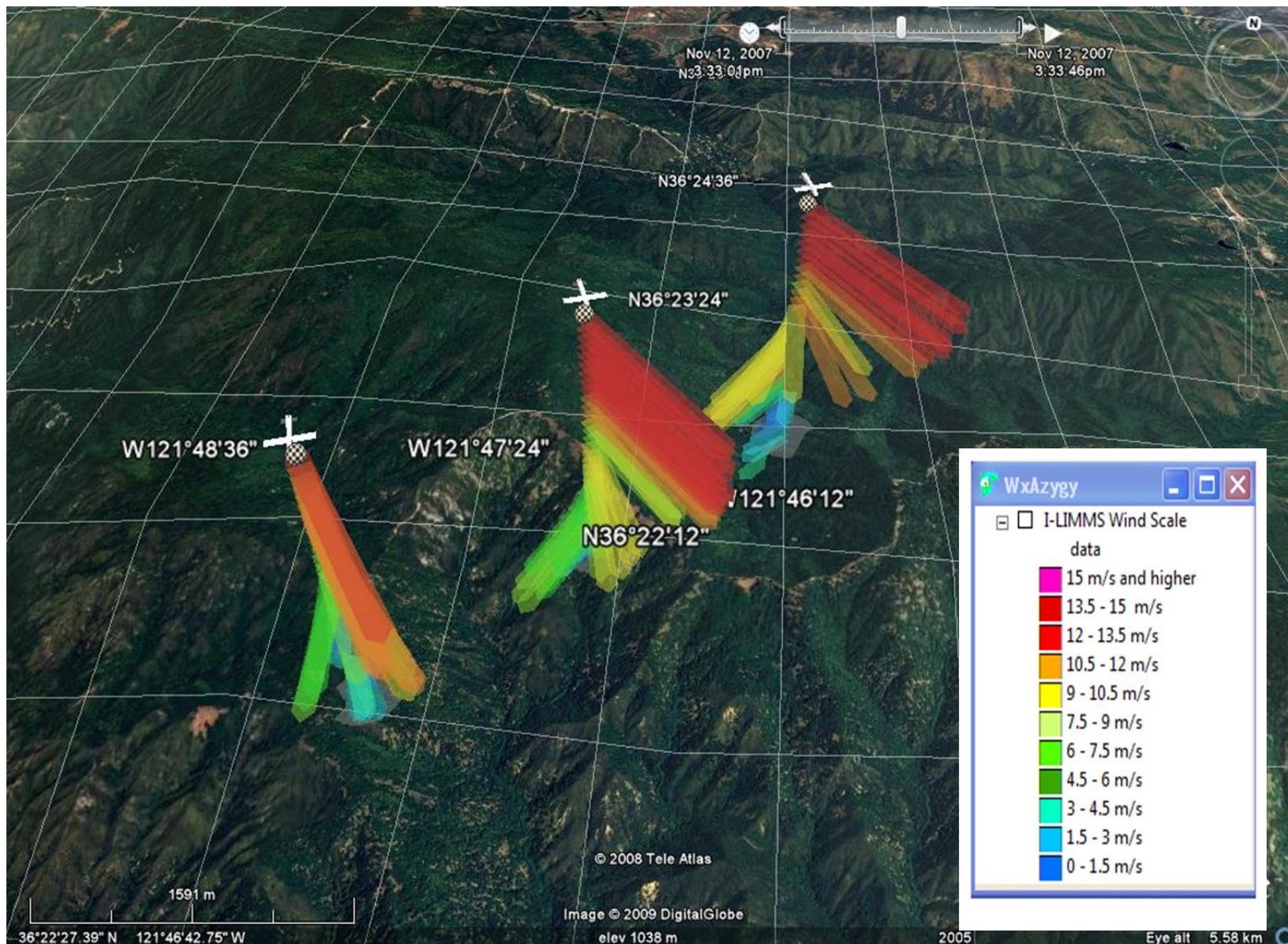


Speed Comparison Over High Complex Terrain

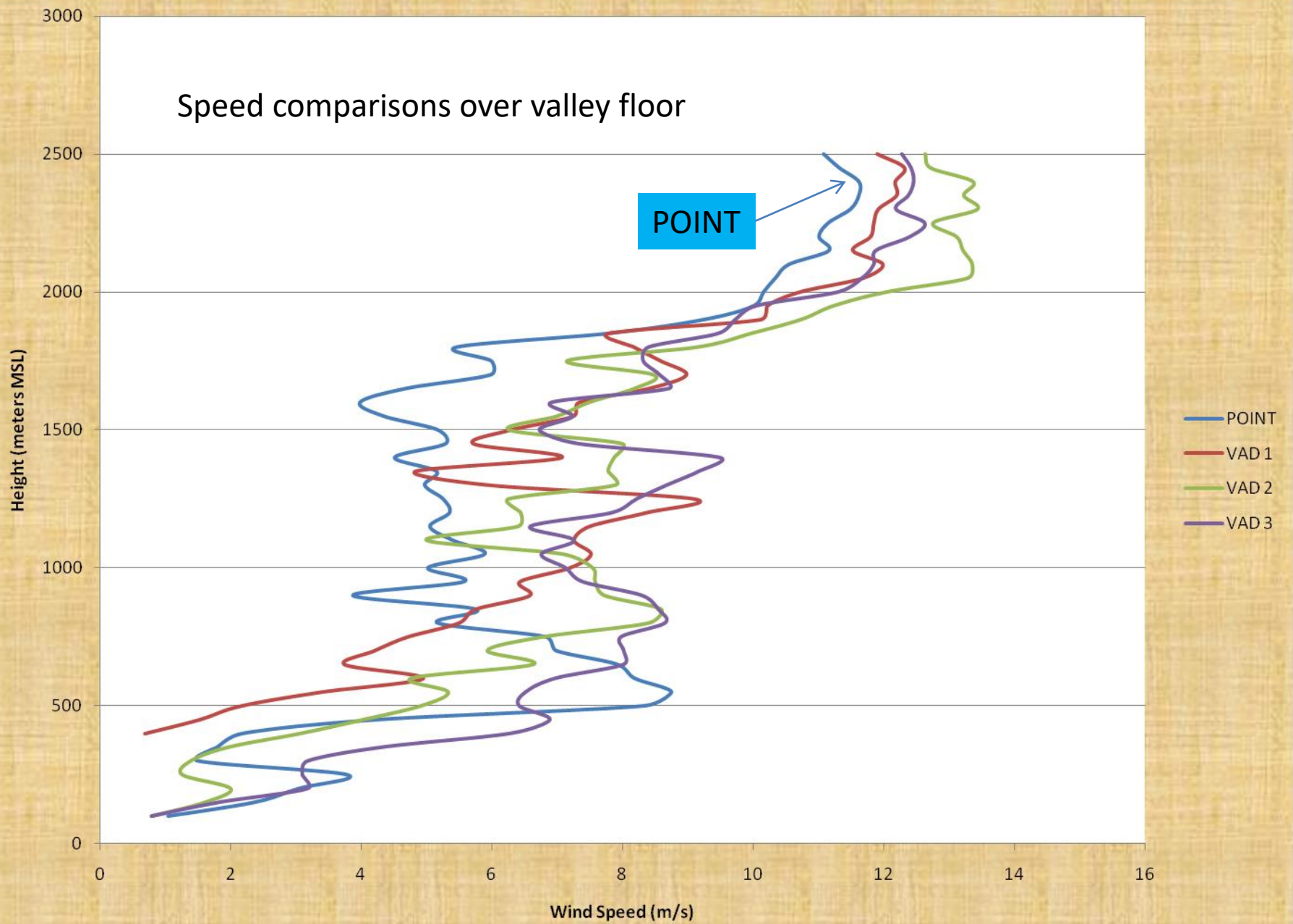


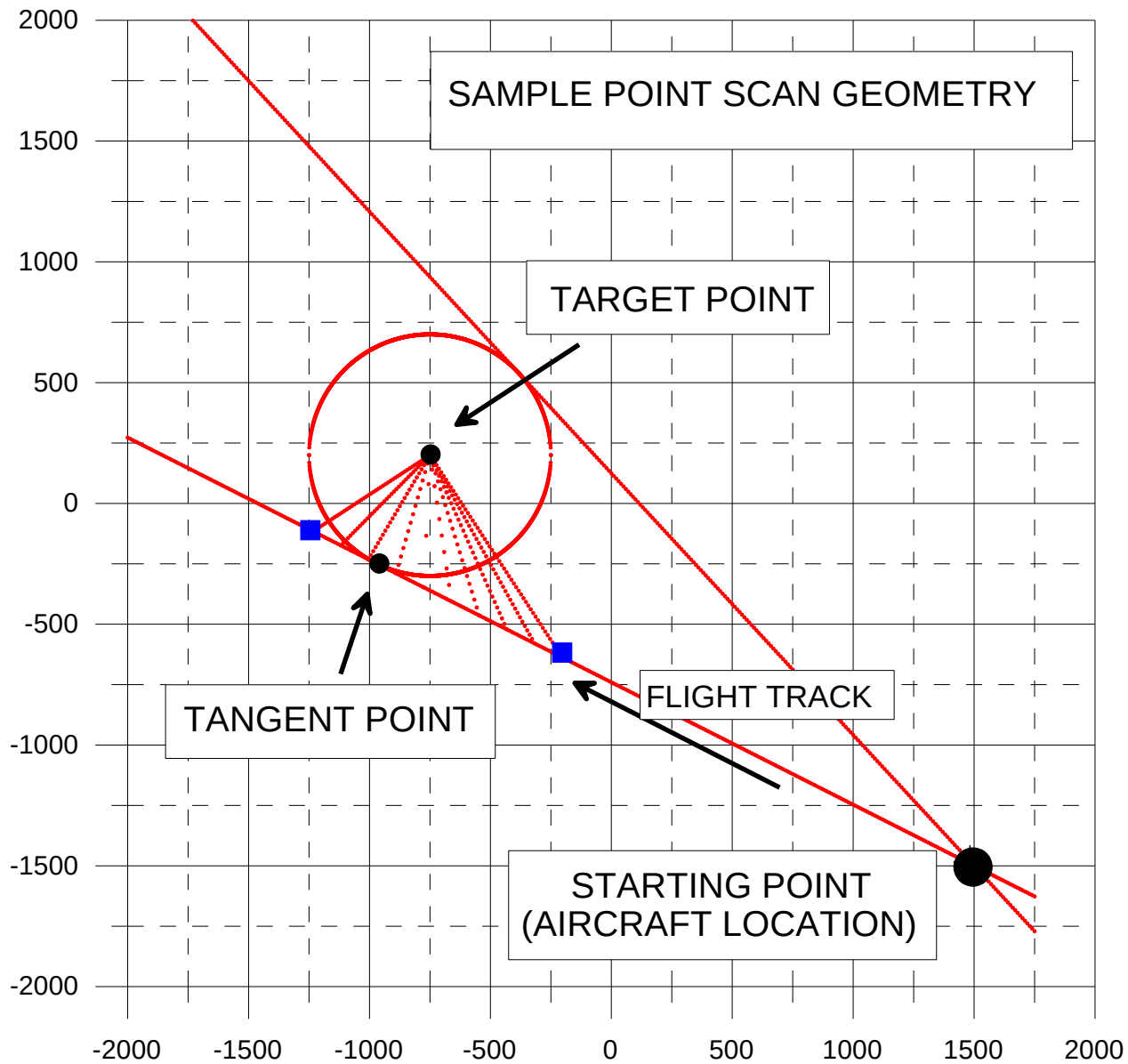
Valley Floor





Speed comparisons over valley floor





Acknowledgements

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