



Data Collection & Product Report for 2024 Seed Project: Hyperspectral-LiDAR Fusion for Tree Water Stress Monitoring

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Data Collection Summary:

Collection Dates, Flights:	2 flights on August 14 & 16, 2025 (DOY 226 & 228)
Aircraft, Equipment:	Aero Commander 500 S (N500HM), RIEGL VQ-580 II-S (H2229296)
Nominal Flight Parameters:	Flying Height: 600 m AGL, Speed: 130 kt, Overlap: 50%
Nominal Equipment Parameters:	Pulse Rate: 600 & 2000 kHz, Scan Rate: 180 & 220 Hz, Scan Angle: $\pm 37.5^\circ$
Collected Area:	64.9 km ² (Dangermond: 43.2 km ² , Sedgwick: 21.7 km ²)

GNSS Reference Station Summary:

Station Name	Operating Agency	Coordinates (ITRF2020 epoch 2025.6178 / Ellipsoid)
FGST	UNAVCO	34°43'58.84496" N, 120°00'33.80130" W, 904.109 m
KPRB	NCALM	35°40'16.21427" N, 120°38'18.74897" W, 213.139 m
ORES	UNAVCO	34°44'20.62842" N, 120°16'42.62842" W, 143.647 m
P514	UNAVCO	35°00'38.58286" N, 120°24'35.12372" W, 140.932 m
P520	UNAVCO	34°37'49.74946" N, 119°36'59.08640" W, 1250.858 m
P521	UNAVCO	34°53'18.85070" N, 119°48'55.30489" W, 1709.093 m
VNDP	UNAVCO	34°33'22.73526" N, 120°36'59.25211" W, -9.791 m

Data Processing Summary:

Trajectory Generation Method:	Applanix POSPac with PP-RTX
Data Adjustments:	RIPRECISION least-squares best-fit adjustment to trajectory
Ground Classification:	Two iterations of moderate ground determination (using TerraScan), manual classification of misclassified ground
Elevation Model Generation:	Bare-earth and first-surface models calculated from Kriging

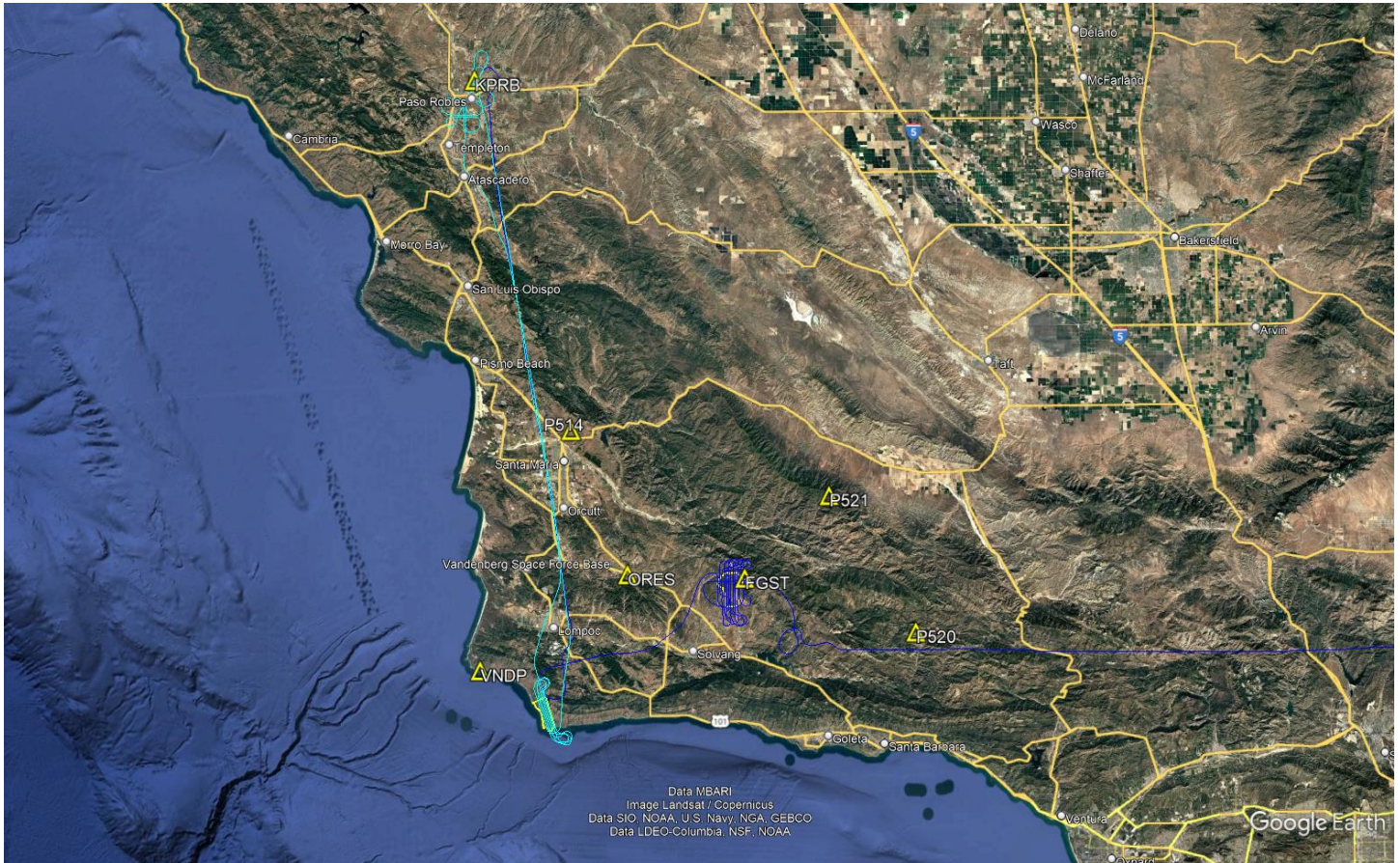
Data Accuracy Summary:

Strip-to-Strip Average Magnitude:	0.020 m (using Measure Match in TerraMatch)
GCP Final Root Mean Square:	0.018 m (GCPs collected in calibration area during concurrent flight)

Data Product Summary:

Horizontal / Vertical Datum:	WGS 84 (based on ITRF2020) epoch 2025.6178 / ellipsoid
Projection / Units:	UTM Zone 10N / meters (EPSG:32610)
Point Cloud Tiles:	1000-m \times 1000-m tiles in LAS format (Version 1.4) with non-ground (1), ground (2), and outlier (7) returns
Bare-Earth Elevation Model:	GeoTIFF @ 1-m resolution from ground surface
First-Surface Elevation Model:	GeoTIFF @ 1-m resolution with canopy and buildings included (from first-return of laser shots)

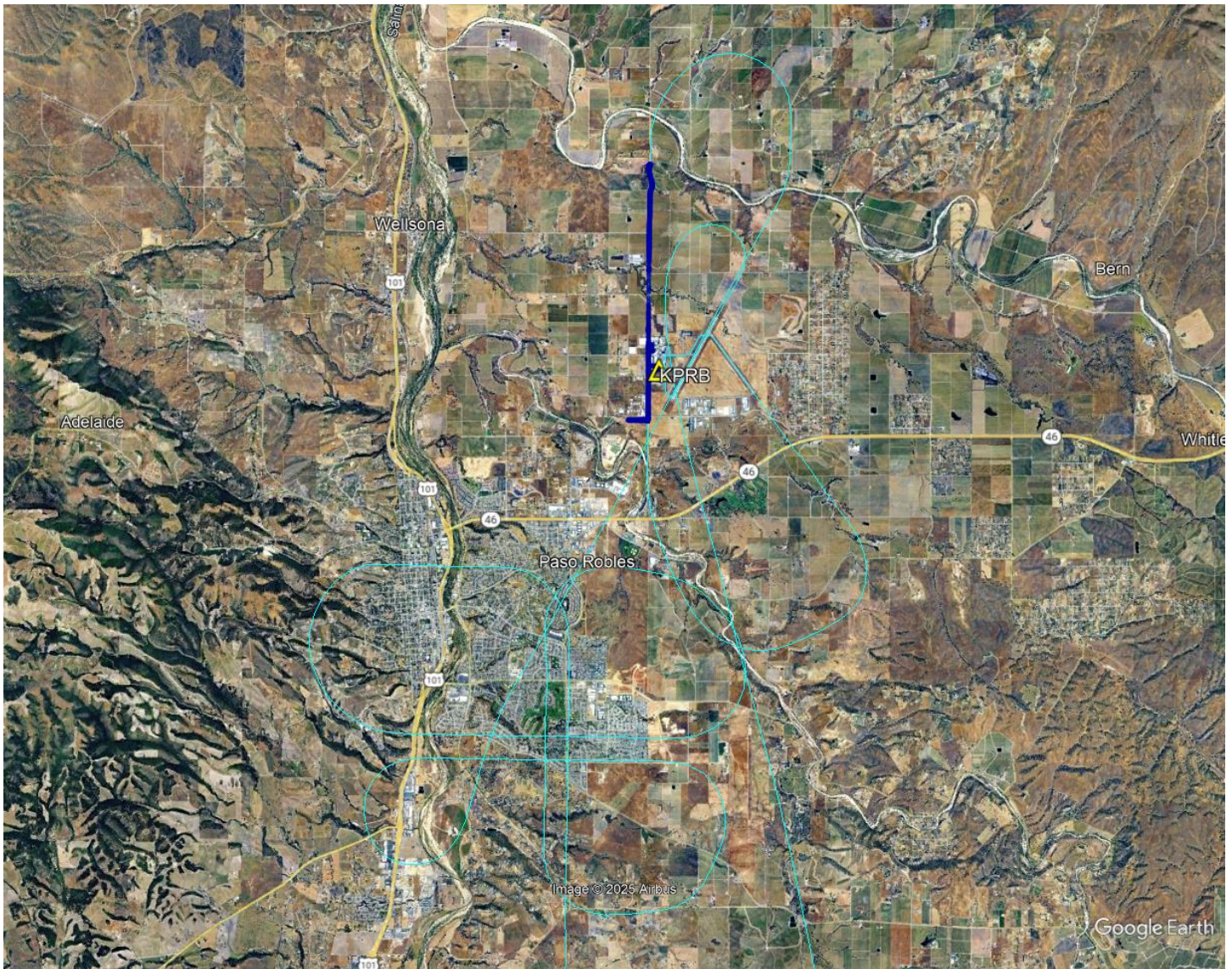
Area of Interest:



Location of survey polygons, aircraft trajectories, and GNSS reference stations

The requested survey area consisted of two polygons located south and east of Vandenberg Space Force Base, CA. The polygons enclosed approximately 39.0 km² (15.1 mi²) total.

Ground Control Points:



Location of ground control points in relation to calibration area and airport

A total of 2,783 kinematic ground control points were collected in the calibration area using a GNSS receiver and antenna mounted on a vehicle. GCPs were used to check for vertical bias in the final dataset.

APPENDIX: “Output Control Report” Comparison to GCPs Results

Average Dz	-0.008
Minimum Dz	-0.057
Maximum Dz	0.037
Average Magnitude	0.013
Root Mean Square	0.018
Standard Deviation	0.016