

## AERIAL IMAGING VENDOR COMPARISONS - AERIAL IMAGERY WORKSHOP, LODI CA, AUGUST 2, 2018

AREAS FOR COMPARISON	VENDOR						
	TerrAvion	Simplot Grower Solutions - SmartFarm®	Ceres Imaging	HAWK AERIAL	VineView	Precision Imagery Corp	GeoG2
<b>Attending today's workshop?</b>	yes	yes	yes	no	yes	no	no
<b>Platform</b>	Fixed Wing Aerial, Subscription based	Satellite	Aerial (fixed wing aircraft)	Drone, multirotor	Airplane or drone (Hawk Aerial)	Manned Aircraft	Aerial (high altitude)
<b>Typical uses</b>	Scouting, irrigation planning & monitoring, directed sampling, canopy management, differential harvesting	Season long health of crop, issue monitoring	<5m analysis; Irrigation uniformity (leaks, pressure loss, soil drainage issues), early problem detection, targeted sampling + field checks metric of success for ranch managers	Block Data Maps, Vigor Uniformity. In development: Canopy Volumes, Water Status, Gopher Tracking	Scouting, sampling, amendments, irrigation, pest/disease management, harvest planning	Vigor, Photochemical, Water Absorbition, Disease	Grower/Ag Service/ Processor
<b>Spectral bands</b>	RGB, Infra-red, NDVI (Vigor), Thermal, Zoning feature	4-band (blue, green, red, IR)	multispectral (5-8 bands)	R, G, B, NIR, TIR, 3D model/point cloud	Multispectral and hyperspectral	Hyperspectral (360+ bands) - Color (RGB), Near Infrared (NIR), Short Wave Infrared (SWIR), Long Wave Infrared (LWIR)	Color/Green/Red/Red-Edge/NIR
<b>Resolution</b>	18-22 cm in reflectance bands, 2 m thermal	50 cm post sharpening	<0.5 m (20-30 cm)	5cm to under 1 cm ground sampling distance	20 cm to 50 cm	8 cm	.75 m
<b>Timing (when, how often)</b>	Weekly or bi-weekly	Any time; weekly, biweekly, monthly, one off	1-18x / season; weeks chosen by grower	Budbreak to first hedging for block vigor uniformity (3 to 4 imaging sessions)	1 to 10 flights per season	Monthly	28 Days through growing season
<b>Turnaround time</b>	11.2 hours mean delivery	24-48 hours from collection date	24-72 hours	48 hours for multispectral, 72 hours for 3D models	Varies with product (2 to 7 days)	24 hours	12-24 hours
<b>Software required</b>	None	Simplot Advisor or Manual Deliveries	No	Adobe Acrobat, ArcMap 10.x/ArcGIS Pro	None required, Free app and online database	None	None to GIS (that supports raster data)
<b>Form the data is presented (PDF, JPEG, Interactive, proprietary viewer, vendor's website, computer, tablet, phone)</b>	.pdf, geo TIFF, open API, vendor's website, computer, iOS and Android mobile	PDF, Interactive - Computer, Tablet, Phone	Georegistered images (GeoTIFFS); Printable JPEG/PD; interactive imagery on tablet/phone	PDF for multispectral, web-based gCMS for 3D model, GIS (if client has internal GIS program and expertise)	Free app, online database, Geotiff download	Web based & PDF	Any
<b>Interpretation (easy, hard, learning curve, done by vendor)</b>	Easy	Done by vendor	Moderate - Ceres-assisted interpretation if needed	Done by Vendor with input from Vineyard Manager or viticulturalist	Easy for Viticulturists, support for app	Collaborative data reviews	From visual to full GIS integration
<b>Cost</b>	18 flights - \$10/acre for the season, 28 flights \$20/acre for the season	\$1.00 per acre per image (typically)	\$2-3/ac/flight	\$6-\$15/ac, volume discounts available; block data maps are \$150/map plus an additional \$35/block for more than 3 blocks on one map	Varies with product and acreage	\$8-\$11 (property dependant)	\$1-\$2 for individual images/\$4-\$8 for series of imagery through season

\*\* Vendors were asked to fill out these Excel sheets with their information prior to today's AERIAL IMAGERY WORKSHOP; compiled by the VINEYARD TEAM and the LODI WINEGRAPE COMMISSION