GreenValley International

Map the World in 3D

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3D Mapping Systems. Software. Solutions.



Basic Info

- Founded in 2012 (Merced, CA)
- 60%+ staff is on R& D
- GPN across 40 countries/territories, including reseller like Trimble in Japan
- Global partner for Riegl
- 5087.43% growth in the past three years .





LIAIR LIGHTWEIGHT UAV LIDAR SYSTEM

GreenValley International (GVI) hardware and software solutions for aerial 3D mapping and surveying provide the right tools for job. GVI's LiAir systems have all been field-tested to near perfection. Our UAV payloads are put to work every day by topographic surveyors, foresters, hydrologists, public safety providers, archeologists, critical infrastructure managers, and many other professionals that need accurate and reliable 3D measurement data.

The LiAir Lineup

Quality is incorporated into every LiAir system produced by GVI. We offer multiple LiAir model types with each one promising to deliver high-resolution LiDAR measurement data.

	LiAir V	LiAir 50	LiAir 220	LiAir 250
Laser Sensor	LIVOX mid-40	VELODYNE VLP-16	HESAI Pandar-40P	RIEGL miniVUX -1UAV
Range Accuracy	2 cm	3 cm	2 cm	1.5 cm
Max. Range	260 m @ 80% ref.	up to 100 m	up to 220 m	250 m @ 60% ref.
FOV	38.4°	360°	360°	360°
Scan Rate	100,000 pts/s	300,000 pts/s	700,000 pts/s	100,000 pts/s
Returns	up to 3	up to 2	up to 2	up to 5
POS/NAV Attitude Azimuth Svstem	0.008° 0.038°	(S50) 0.1°, (P50) 0.015° (S50) 0.1°, (P50) 0.08°	(S220) 0.1°, (P220) 0.015° (S220) 0.1°, (P220) 0.08°	0.006° 0.019°
Accuracy	5 cm	5 cm (S50)	5 cm (S220), 4cm (P220)	3 cm
Storage	128 GB	128 GB	128 GB	128 GB
Max. Power Consumption	16 W (no more than 45 W)	24 W	24 W	30 W
Payload Weight Size	1.0 kg 125 * 70 * 116 mm	3.4 kg excl. battery & camera 1170 * 181 * 19 ¹ 7 mm	4.24kg excl. battery & camera 1170 * 208 * 123.5 mm	3.78 kg excl. battery & camera 1105* 145 * 148 mm
Camera Module	Optional	Sony a6000	Sony a6000	Sony a6000
Resolution		24 megapixels	24 megapixels	24 megapixels

LIBACKPACK BACKPACK LIDAR SCANNING SYSTEM

LiBackpack LiDAR scanning system is the multi-sensor integrated system, it is user-friendly to customize your own equipment. There are different types of backpack products. The horizontal and vertical LiDAR sensor, the high-resolution panoramic camera and the precise GNSS module is available to choose in your order. With integrated SLAM and GNSS navigation technology, it can obtain georeferenced high-resolution panoramic image and high-precision 3D point cloud data even with high accuracy (\leq 5cm). LiBackpack is a powerful tool for powerline inspection, forest management and survey, mining industry, underground space information acquisition, BIM, and so on.

	Laser Sensor	System Accuracy R	Max. ange	Scan Rate	Number of Returns	Field of View	POS Performance	Storage	e Data O Format	peration Time	Typ. Ground Speed
	Velodyne	2	3(00, 000			Integrated		las, laz,		
LiBackpack	VLP-16	5 cm 1	00 m	pts/s	2	360°	SLAM System	512 GB	ply, lidata	~2 h	1 m/s
			1		1		I				
	Single-Laser (SL)					Dual-Laser (DL)					
		50	C	50			D50		DG50		DGC50
Weight		5.8 kg	6.4	4 kg	We	ight	8.0 kg		9.3 kg		10.3 kg
Dimensio	n	850 * 250 * 160 mm	950 * 250)* 160 mm	Dime	ension	985 * 300 * 150 r	nm 1	085 * 300 * 150 mn	n 1010*	* 344 * 252 mm
Single-Las	er				Single	e-Laser					
Dual-Lase	er				Dual	-Laser					
Camera					Car	nera					
GNSS					GI	ISS					

GVI Received Special Coverage from NHK Japan In 2019









- Transform
- Classify
- Model
- Segment
- Measure
- Manage
- Discover
- Scale



Data Management Classify Surface Model Forest Metrics LiMapper Strip Adjustment Viewers Display Windows Help



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Framework

- Data management
- Measurements
- Point cloud classification
- Rectify and stitching
- Vector editing

Terrain

- DEM, DSM, TIN
- Hillshade
- Slope
- Aspect
- Roughness
- Profile analysis



ALS & TLS Forestry

- Forest metrics
- Individual metrics
- Tree segmentation
- Regression analysis



Aerial LiDAR Data





Terrestrial LiDAR Data



Aerial + Terrestrial





Terrain and Infrastructure Information



- Bare-earth elevation model (DEM)
- Hillshade
- Slope
- Aspect







Forest Structure Information

- Tree Height
- Crown Diameter
- Crown Area
- Crown Volume

TreeLocationX	TreeLocationY	TreeHeight	CrownDiameter	CrownArea	CrownVolume
272418.028	2420107.788	9.577	3.428	9.228	16.728
272439.602	2420106.871	13.274	2.925	6.719	31.174
272444.615	2420106.163	12.520	6.455	32.730	127.530
272442.253	2420104.980	13.245	2.448	4.708	23.578
272436.064	2420104.549	14.193	3.262	8.358	41.501



Forest Structure Information

• Diameter at Breast Height (DBH)







Forest Structure Information

• Biomass

Linear Regression Support Vector Machine Fast Artificial Neural Network Random Forest Regression







GVI End-to-End Solution

GVI Forest Solutions has served **US Forest Service, Korea Forest Service and Japan forest organizations** with great feedback.



LiAir





GreenValley International



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LiAcquire/LiGeoreference Georeferencing software





		4LS	S/T	ĽS		
	TreeLocationX	TreeLocationY	TreeHeight	CrownDiameter	CrownArea	
1	418338.55	4691615.53	20.93	5.05	20.00	
2	418344.55	469 511 53			20.00	
3	418328.55	469,605.53	16.85	1082	92.00	
4	418346.55	4691603.53	22.63	6.38	32.00	
5	418312.55	4691599.53	26.19	7.48	44.00	
6	418322.55	4691599.53	25.59	6.38	32.00	
7	418338.55	4691595.53	21.27	7.14	40.00	
8	418350.55	4691595.53	19.02	8.14	52.00	
9	418316.55	4691589.53	24.13	8.44	56.00	
10	418296.55	4691593.53	25.15	10.34	84.00	
11	418332.55	4691591.53	22.29	8.44	56.00	
12	418330.55	4691591.53	23.21	7.14	40.00	

Data Processing & Analysis

Case Study 1 – Eucalyptus Forest Inventory



Data acquisition: 1km² / 20 mins Data processing: 1 hours

Sample S	lite	Area (n	n²)	Tree c ons	ount – site	c	Γree count – p loud segment	oint ation		Accuracy
Site 1		1800)	36	65		304		83%	
Site 2		8160	0	58	43	6242		94%		
Site 3		660		11	18		100			85%
TreeID	Tree	eLocationX	Treel	ocationY	TreeHeig	ght	CrownDiameter	CrownA	rea	CrownVolume
838	27	2418.028	2420	107.788	9.577		3.428	9.228	3	16.728
848	27	2439.602	2420	106.871	13.274	-	2.925	6.719	9	31.174
849	27.	2444.615	2420	106.163	12.520)	6.455	32.73	0	127.530
850	27	2442.253	2420	104.980	13.245	5	2.448	4.708	3	23.578
851	27	2 <mark>436.06</mark> 4	2420	104.549	14.193	;	<mark>3.2</mark> 62	8.358	3	41.501
852	27	2 <mark>448.</mark> 467	2420	105.343	10.979)	3.431	9.244	1	25.461
853	27	2434.103	2420	104.379	14.233	;	2.980	6.973	3	39.305
854	27	2448.755	2420	104.381	10.251		0.335	0.088	3	0.081
855	27	2450.056	2420	103.930	10.178	3	5.754	26.00	4	62.247







Biomass Estimate (m³)

Case Study 2 – Biomass Inventory



Field Measureme nt	Randon Regre	n Forest ession	Re	Linear Regression		
884289.94	8502	94.39	90	909688.75		
Area (ha)	Field (m ³)	Random For	est (m ³)	Error		
0.75	162.8	162.691	3147	0.07%		
28.84	139.8	139.684	9909	0.08%		
27.08	135.3	133.836	133.836358			
21.97	135.3	133.843	133.8430801			
13.25	141	142.569	142.5697413			
16.62	145.6	147.426	7108	1.25%		
9.61	159.8	157.457	157.4577848			
22.79	157.2	154.853	154.8533207			
12.71	105.7	107.294	4676	1.51%		
29.47	122.1	120.171	2431	1.58%		
27.88	194.3	191.214	9832	1.59%		
14.29	143.2	145.740	0109	1.77%		
0.96	109.8	111.811	1769	1.83%		
13.43	121.8	119.415	119.4158331			
0.81	198.8	202.707	7757	1.97%		