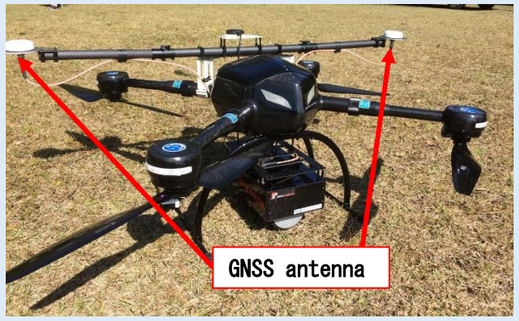
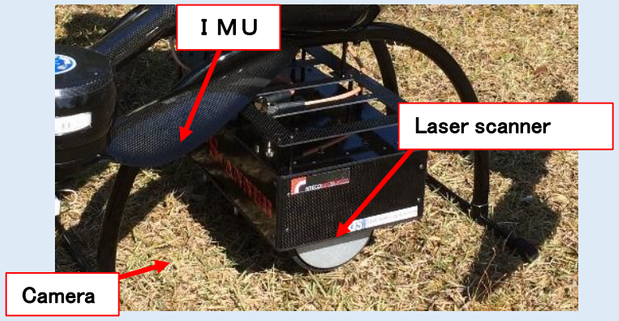




UAV Specifications　BLACKLION-168

Size	Diameter: 1,680mm,　When collapsed: 700mm, Height: 450mm
Max. Payload	4.0kg
Max. Flight Time	Approx. 20 minutes (When mounted the system)
Flight Range	250m (NIPPON INSIEK standard)
Max. Height	150m (NIPPON INSIEK standard)
Sensor	Laser scanner: Velodyne VLP-16
	High-quality digital camera

LiDAR Sensor Specifications　Velodyne VLP-16

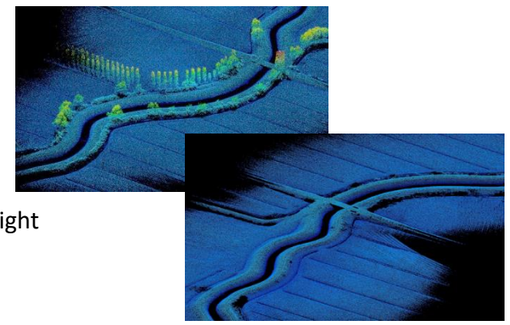
Measuring Range/FOV	Horizontally 360° Omnidirectional/Vertical30°	Weight	830g
Measuring Distance	Approx. 100m (1m～100m)	Size	Height 72mm × Diameter 103mm
Measuring Speed	5～20Hz	Measuring Method	TOF (dual return)
Number of point cloud	Approx. 300,000 points/sec （360°）	Laser Class	Class 1 Eye Safe
Accuracy	±3cm		

INS Sensor Specifications　Applanix AP15

Size/Weight	43mm × 47mm × 12mm ・ 15g
Position Accuracy	Horizontal 5cm Height 10cm （Postprocess only correctable by GCP）
Roll&Pitch	0.025 (deg)
True Heading	0.08 (deg)
Applicable Satelites	220 channels, GPS, GLONASS.BeiDou, Galile, QZSS, SBAS, L-Band

Characteristics of Laser Survey

- Acquiring ground data under trees
- Obtaining ±10cm accuracy without using control point
- Take measurements un-influenced by the brightness of sunlight
- Minimal photographic blur even during strong winds



NIPPON INSIEK
https://www.insiek.co.jp/en/

Please take notice that effective April 1, 2019, ASCO-DAITO CO., LTD. will be changing its name to NIPPON INSIEK CO., LTD.

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■Tokyo Head Office: Sumitomoseimei Nihonbashitomizawacho Bldg. 9-19 Nihonbashitomizawacho, Chuo-ku, Tokyo 103-0006 Japan
TEL +81-3-5641-2181 / FAX +81-3-5641-2187

NIPPON INSIEK

UAV mounted laser measurement system

Air Scanner 1

https://www.insiek.co.jp/en/

NIPPON INSIEK will provide total support for “Air Scanner1”, from sale to maintenance.

The 4 services for Air Scanner1

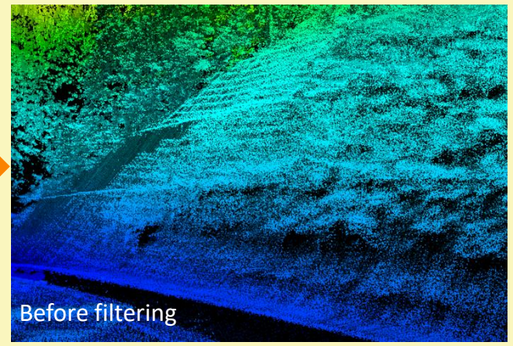
- Sales
- Planning and analysis service
- Education support
- Maintenance

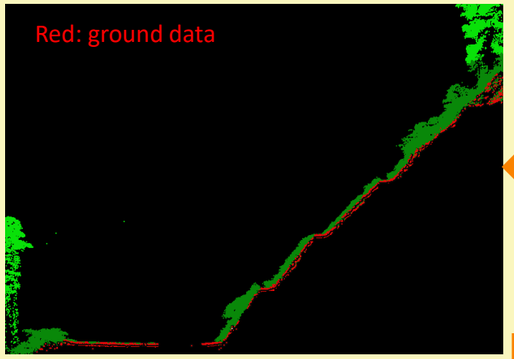
Application

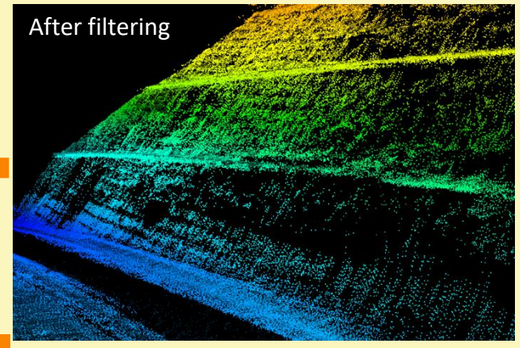
In a 3D model generated from photographs, it is only possible to create the surface of the grass and trees. With laser scanning, it is easier to observe past grass and trees and capture hidden structures on the ground and plants.

Filtering *Laser*

It can acquire the ground data which could not be acquired with the photographs.

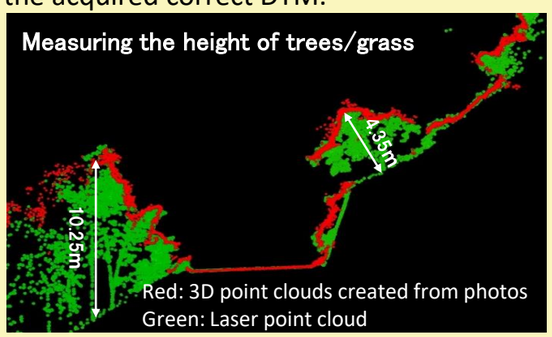


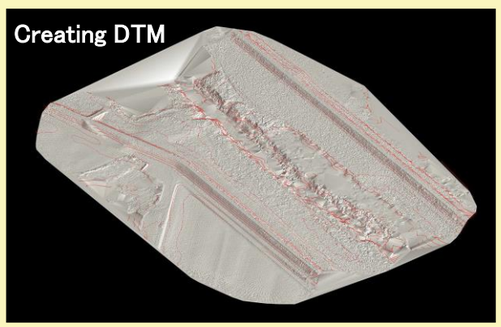


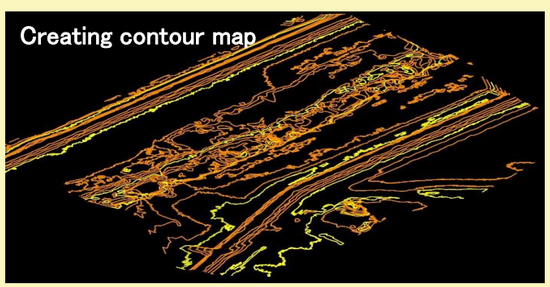


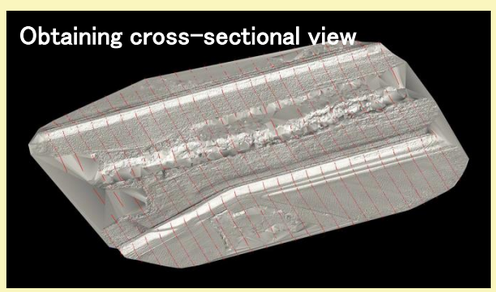
Survey/DTM→ Longitudinal/Cross-sectional view and Contour maps *Laser*

It is possible to generate images of tree height, contour maps, longitudinal and cross-section views from the acquired correct DTM.







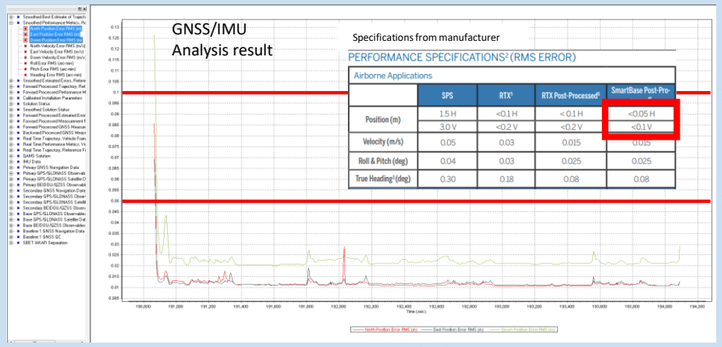


Accuracy

Using the Inertial Navigation System (GNSS/IMU), post-processing kinematic analysis of the trajectory ensures absolute accuracy without the need for control point.

Inertial Navigation System(GNSS/IMU) *Laser*

Flight test for accuracy verification （Flight height: approx.30m・60m）



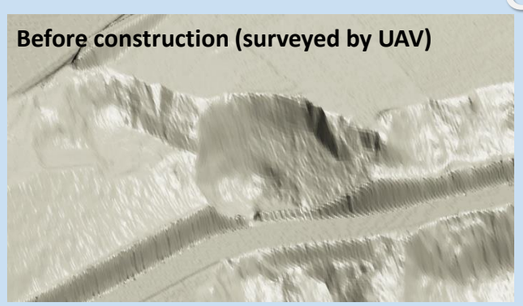
3 courses were surveyed at altitudes of 30m and 60m, and the absolute accuracy Z value was verified at 9 beacons.
Max. error: 0.055m
Minimum error: 0.000m

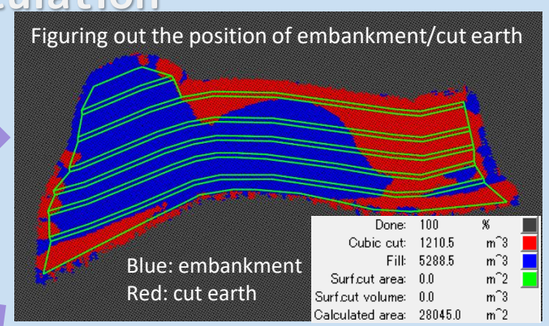
※This is the result of analysis using GNSS/IMU. Correction using antiaircraft beacons were not done.

Residuals table for absolute elevation （m）

C1	Al=30m |ΔZ|	Al=60m |ΔZ|	C2	Al=30m |ΔZ|	Al=60m |ΔZ|	C3	Al=30m |ΔZ|	Al=60m |ΔZ|
P1	0.019	0.026	P1	0.06	0.054	P1	0.029	0.034
P2	0.02	0.024	P2	0.057	0.055	P2	0.005	0.024
P3	0.001	0.023	P3	0.058	0.039	P3	0.016	0.003
P4	0.002	0.027	P4	0.036	0.052	P4	0.029	0.007
P5	0.022	0.031	P5	0.012	0.016	P5	0.037	0.018
P6	0	0.002	P6	0.013	0.001	P6	0.005	0.032
P7	0.037	0.024	P7	0.014	0.041	P7	0.032	0.02
P8	0.014	0.027	P8	0.026	0.035	P8	0.014	0.02
P9	0.007	0.025	P9	0.009	0.042	P9	0.014	0.032
Avg. value	0.013	0.023	Avg. value	0.031	0.037	Avg. value	0.02	0.021
Max. value	0.037	0.031	Max. value	0.06	0.055	Max. value	0.037	0.034
Standard deviation	0.012	0.008	Standard deviation	0.022	0.018	Standard deviation	0.012	0.011

Soil Amount Calculation *Laser*





It is possible to grasp the position and range of the embankment/cut earth in advance by superimposing and analyzing the 3D measurement data by the UAV before the construction work and the data created from construction plan drawings.