Mining in a day

Seminar 2015

Novotel Hotel Balikpapan
1 September 2015

Andy Gusty Rangga

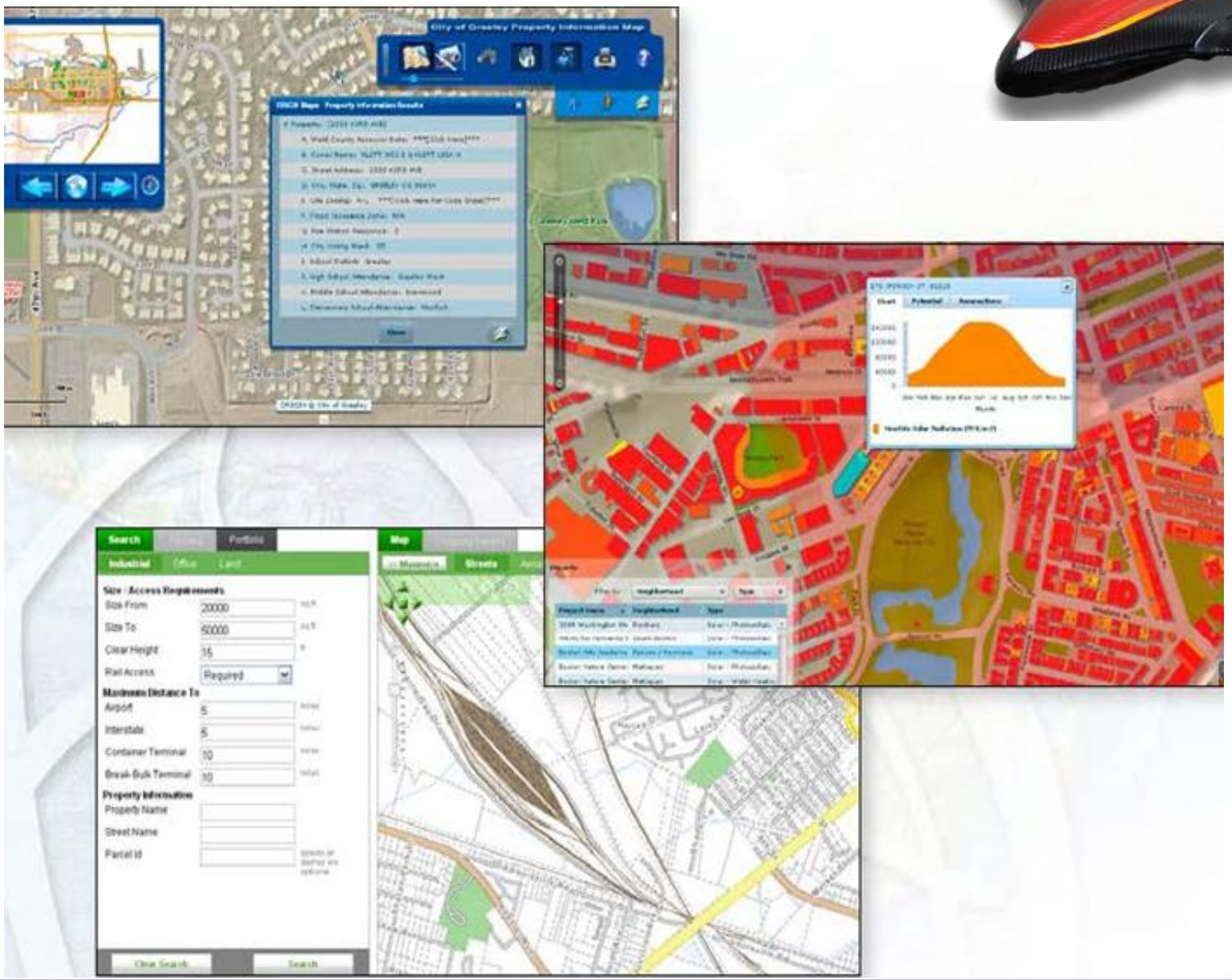
BRITMINDO
★ 10 YEARS ★

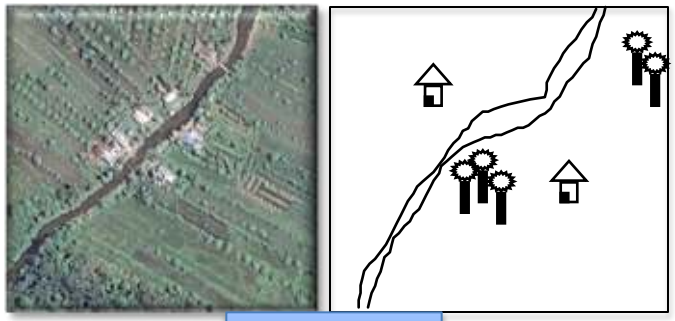
BRITMINDO GROUP

Professional Mining Services

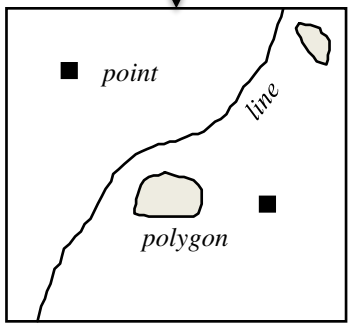
ISO 9001
BUREAU VERITAS
UKAS

Mining in a day
Seminar 2015



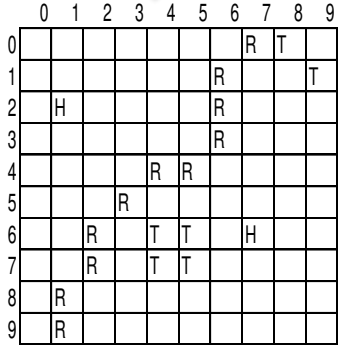


Real World



Vector Representation

- Concessions
- Forestry Status / IPPKH
- Land Cover
- Regional Geology
- Haulroad
- Administration



Raster Representation

- Topography
- Satellite Images
- Aerial Photo (Airborne)

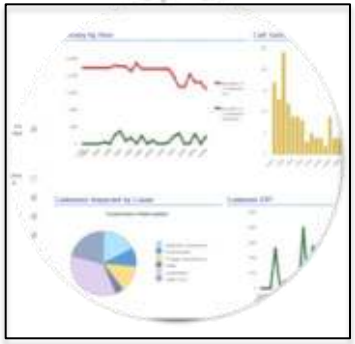
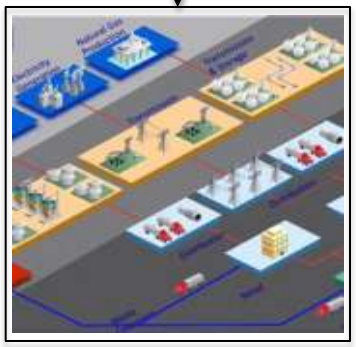


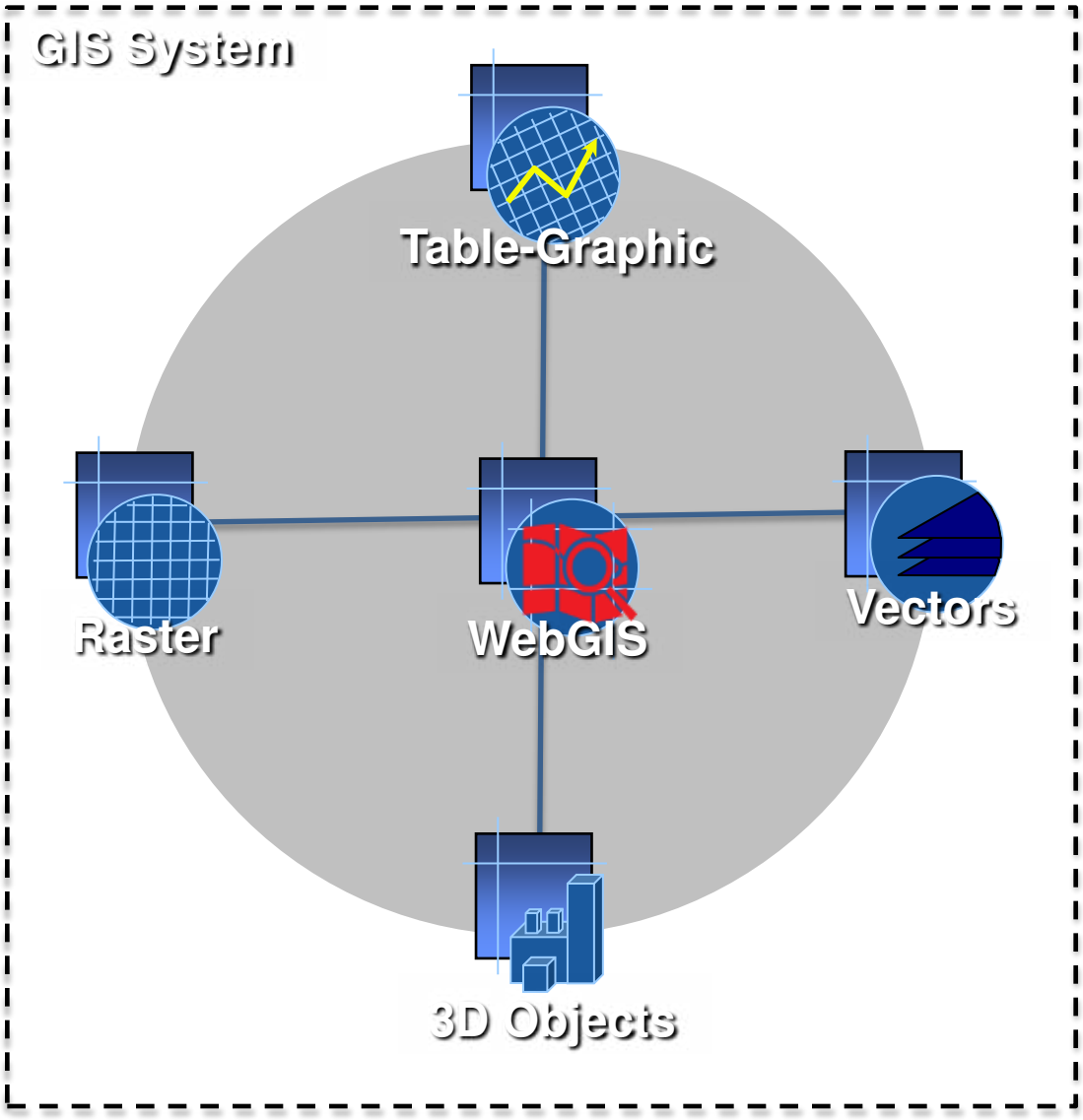
Table & Graphic

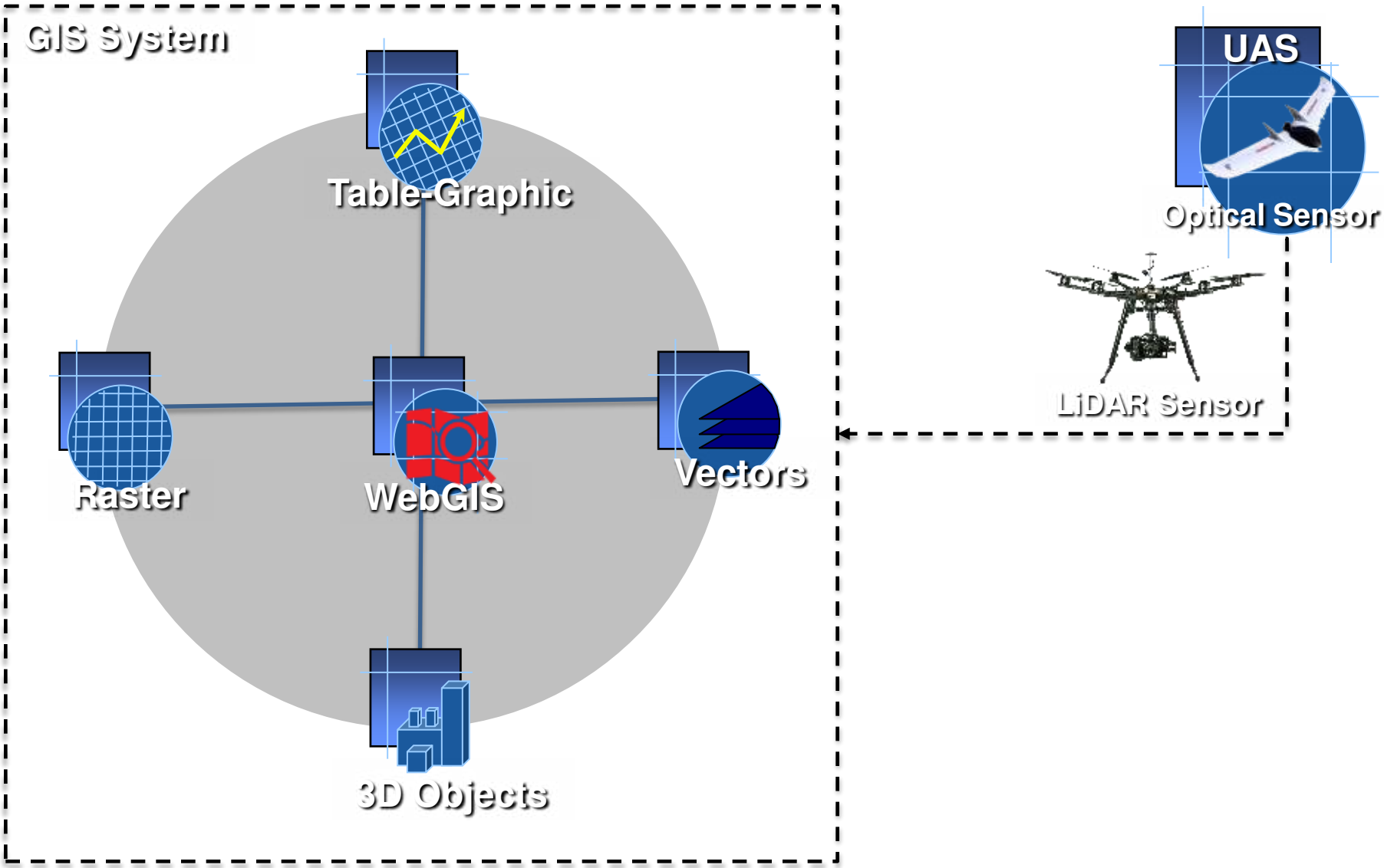
- Clean & Clear (CNC) Status
- Coal production
- Coal Export & Domestic Sales
- Coal Price
- Coal Resources & Reserves



3D Objects

- Infrastructure
- Electricity
- Smelter
- Coal Plant
- Building


GIS System
Table-Graphic
Raster
WebGIS
Vectors
3D Objects

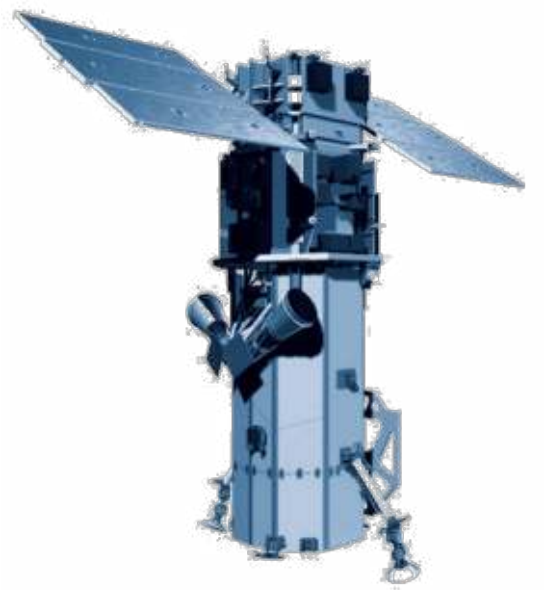

GIS System
Table-Graphic
Raster
WebGIS
Vectors
3D Objects
UAS
Optical Sensor
LiDAR Sensor

Comparison

Terrestrial survey

- Time consuming
- Labor cost
- High risk
- No imagery produced

Satellite image



- Have to waiting if not available in archive
- Cloud cover & others atmospheric constraints
- 60 cm imagery resolution

UAS

?

The Power of UAS (Unmanned Aerial System)

(1) Time,

Surveying that once took days or weeks utilizing conventional surveying systems is currently conductible in only a couple of hours, with very short time

(2) Safety,

With UAS, we can survey areas that were previously too dangerous to be observed directly by surveyors

UAS (Unmanned Aerial System)

(3) Cost,

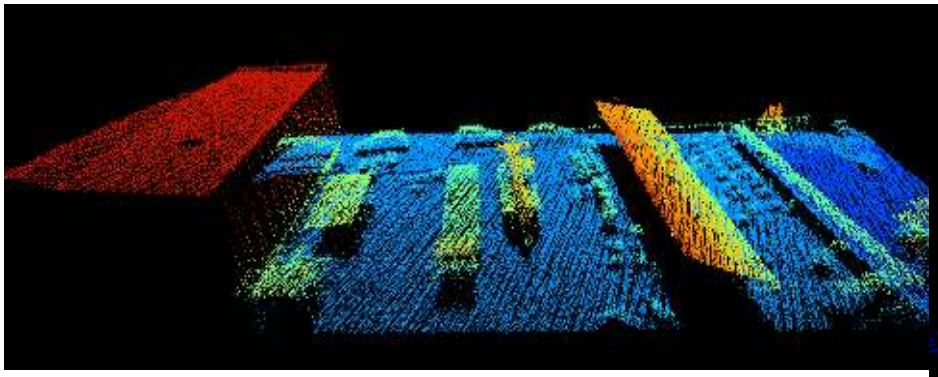
The costs of one airborne LiDAR scanner is similar to *twenty* units of UAS that our company operates

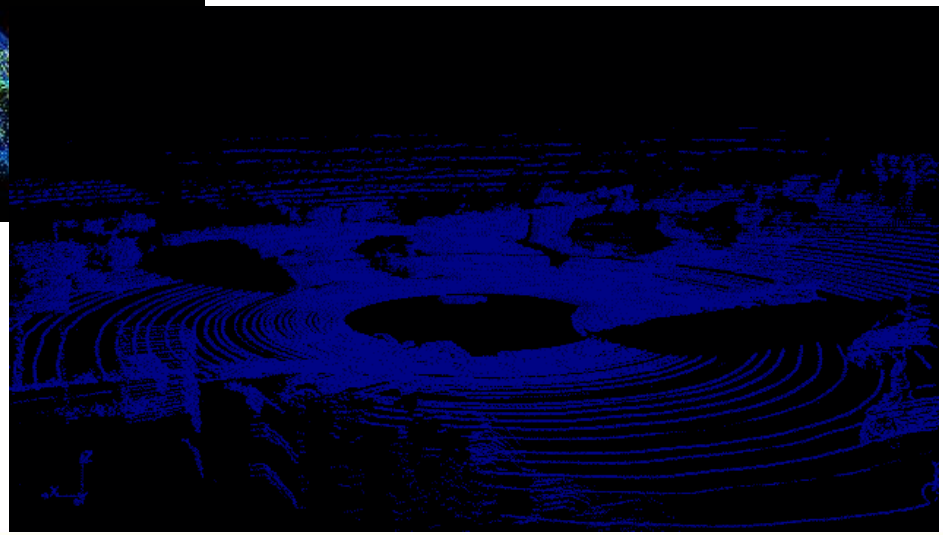
(4) Accuracy,

Provides high accuracy GPS blended with Real Time Kinematic (RTK) system that mounted in the UAS

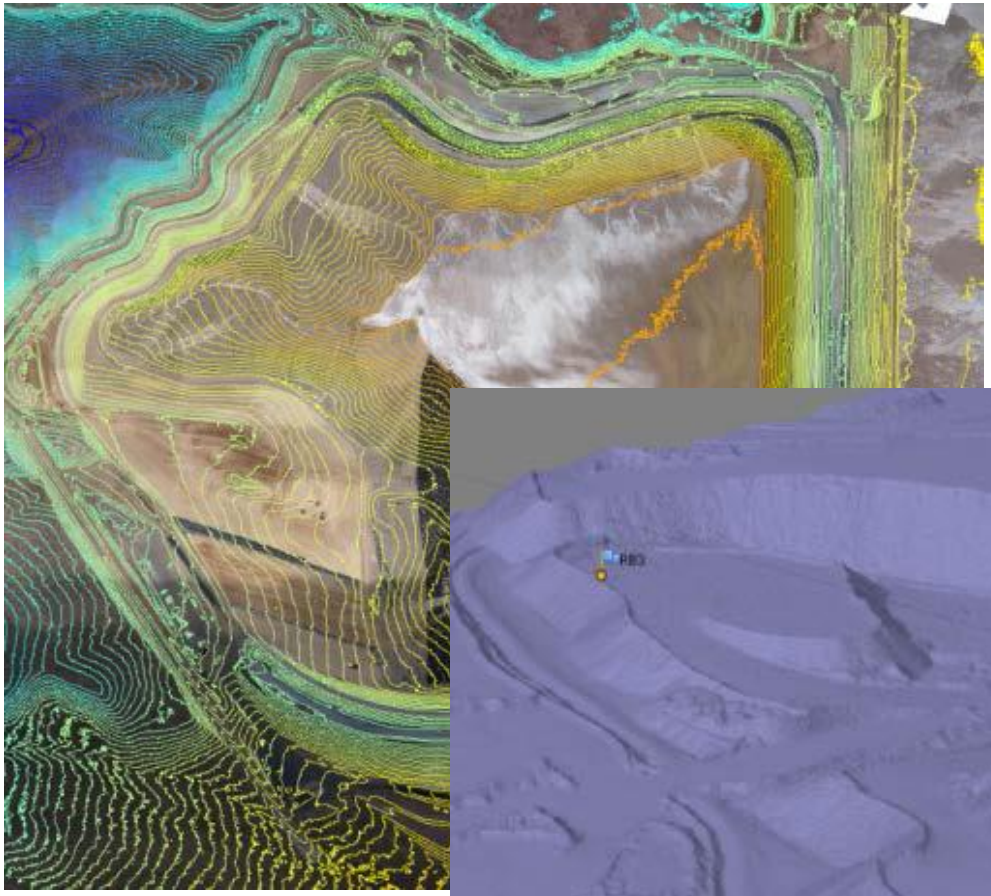
Result

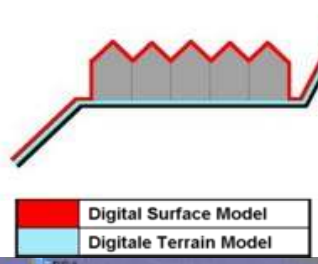
Sample of UAV with LiDAR sensor
(300,000 Points per Second - 360° Horizontal FOV)

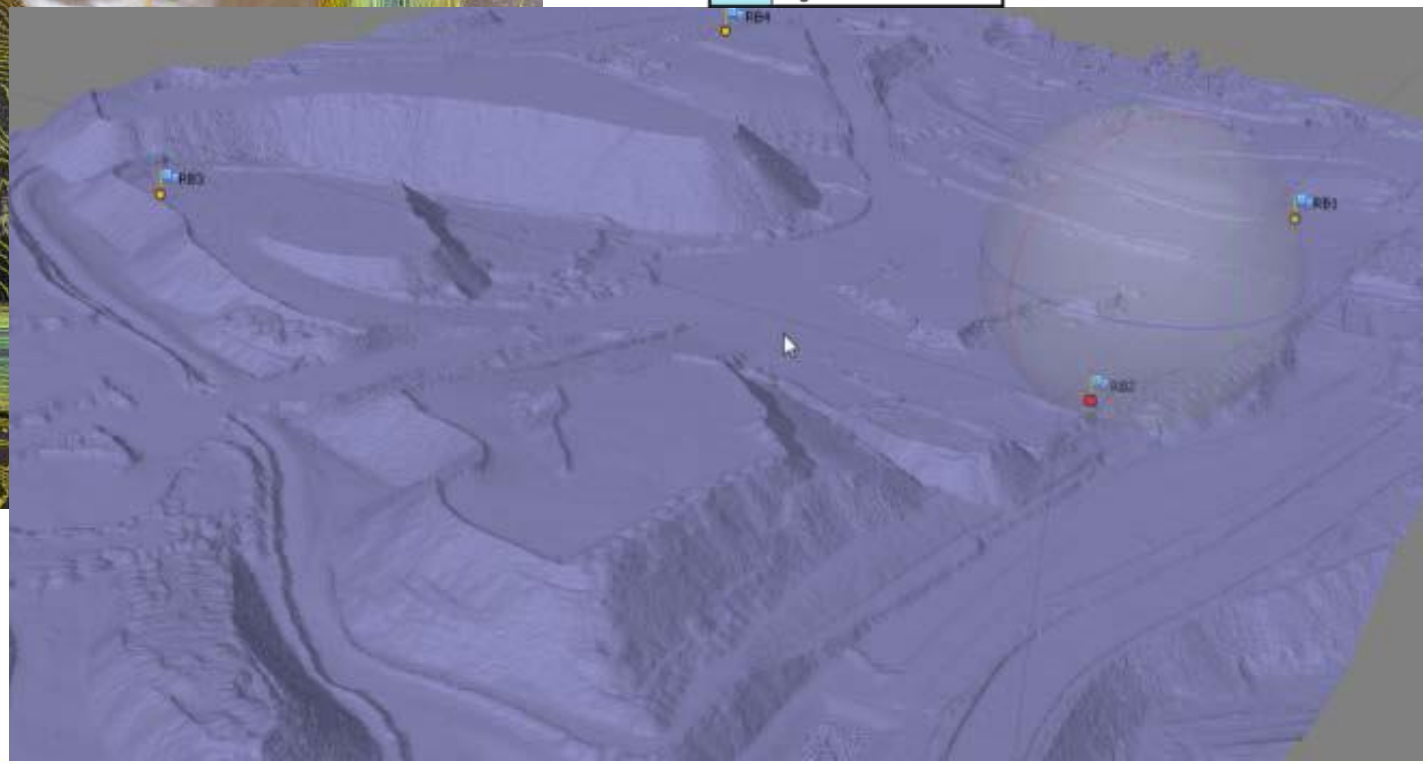




Orthophoto
Digital Surface Model (DSM-DTM)







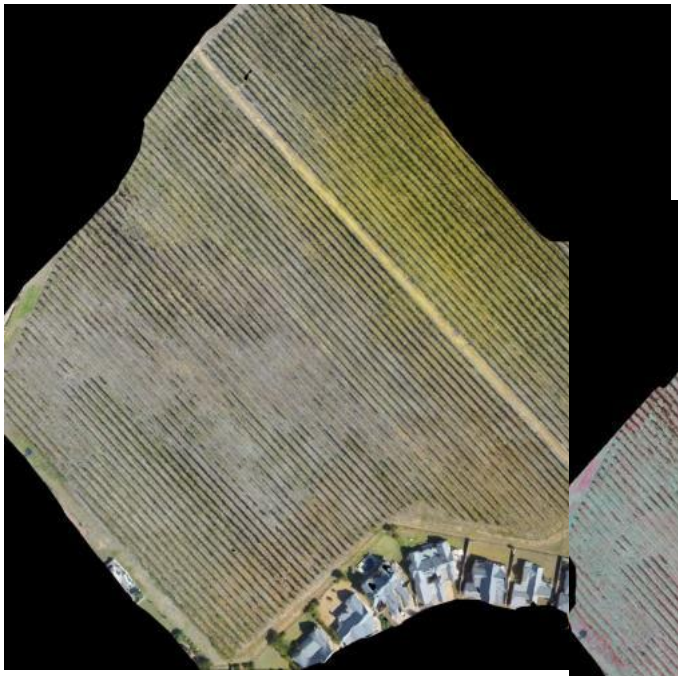
Elevation Comparison Terrestrial-based VS UAS-based

Table 1. Elevation comparison between terrestrial-based vs UAV-based.

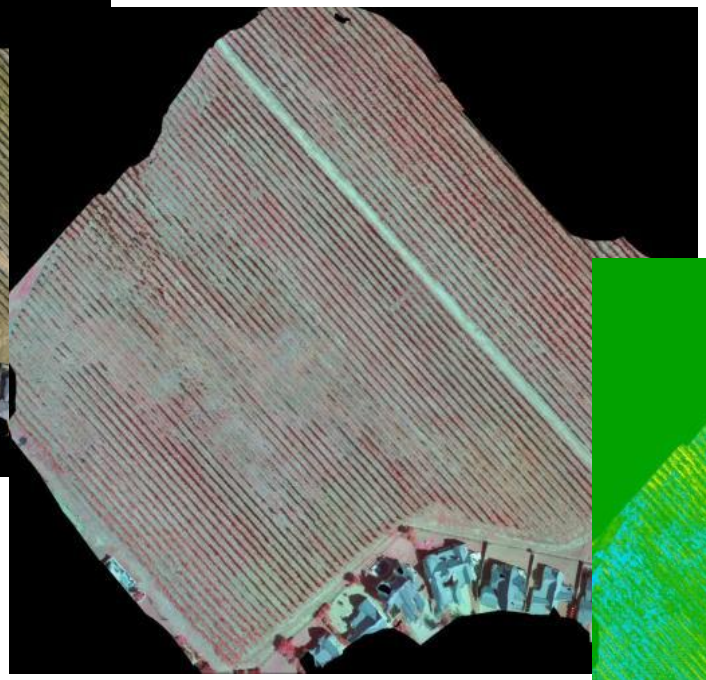
No	X	Y	UAV (m)	Terrestrial (m)	Difference (m)
1	313950.2	9583286	110.0627	109.9042	0.158516
2	313867.7	9583150	102.1747	102.0564	0.118309
3	313925.2	9583248	110.6041	111	0.395859
4	313939	9583281	110.4387	110.1942	0.24453
5	313892.1	9583172	105.0292	105.1997	0.170525
6	313984.8	9583210	111.2323	111	0.232323
7	313965.4	9583291	109.4784	109.5796	0.101173
8	313827.5	9583408	87.29626	87.49712	0.200859
9	313878.9	9583158	102.8614	103.245	0.383583
10	313925.2	9583248	110.6041	111	0.395859
11	313916.9	9583327	106.34	106.3681	0.028122
12	313770.8	9583319	101.606	101.6643	0.058327
13	313913.6	9583347	104.989	104.9234	0.065636
14	313756.6	9583261	101.537	101.6031	0.066147
15	313859.4	9583318	106.126	106.2806	0.15464
16	313971.9	9583368	105.502	105.6598	0.157753
17	313907.7	9583267	110.513	110.6995	0.186478
18	313801.5	9583170	99.418	99.22723	0.190773
19	313793.4	9583221	104.646	104.8824	0.236389
20	313878.4	9583143	101.358	101.1	0.257988

Sources :
ISPRS International Journal of Geo-Information
ISSN 2220-9964
www.mdpi.com/journa;/ijgi/
Title :
Low-cost UAV (Unmanned Aerial Vehicle) for environmental monitoring of mine activities
Location :
Coal Mining Operation IAC (Indoasia Cemerlang)- PT Britmindo
Author :
Fatwa Ramdani , Ph.D, Andy Gusty Rangga, Brenden Duffy, Putri Setiani Ph.D

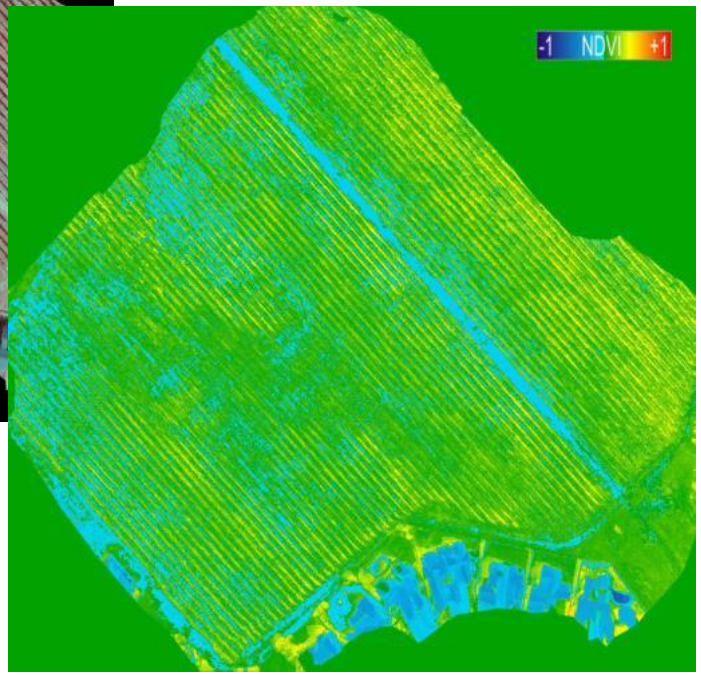
Vegetation application



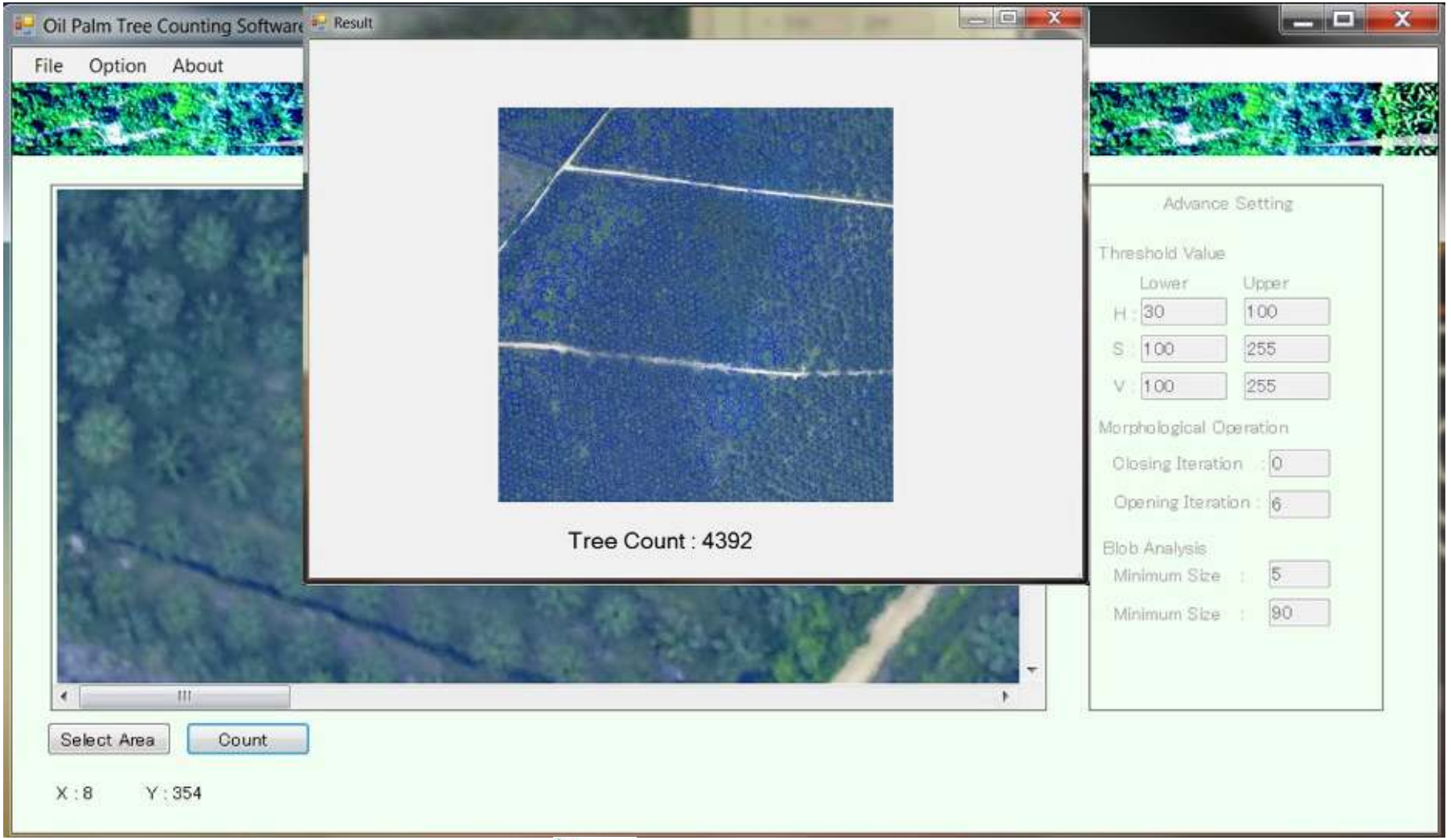
Visible RGB



False color



NDVI

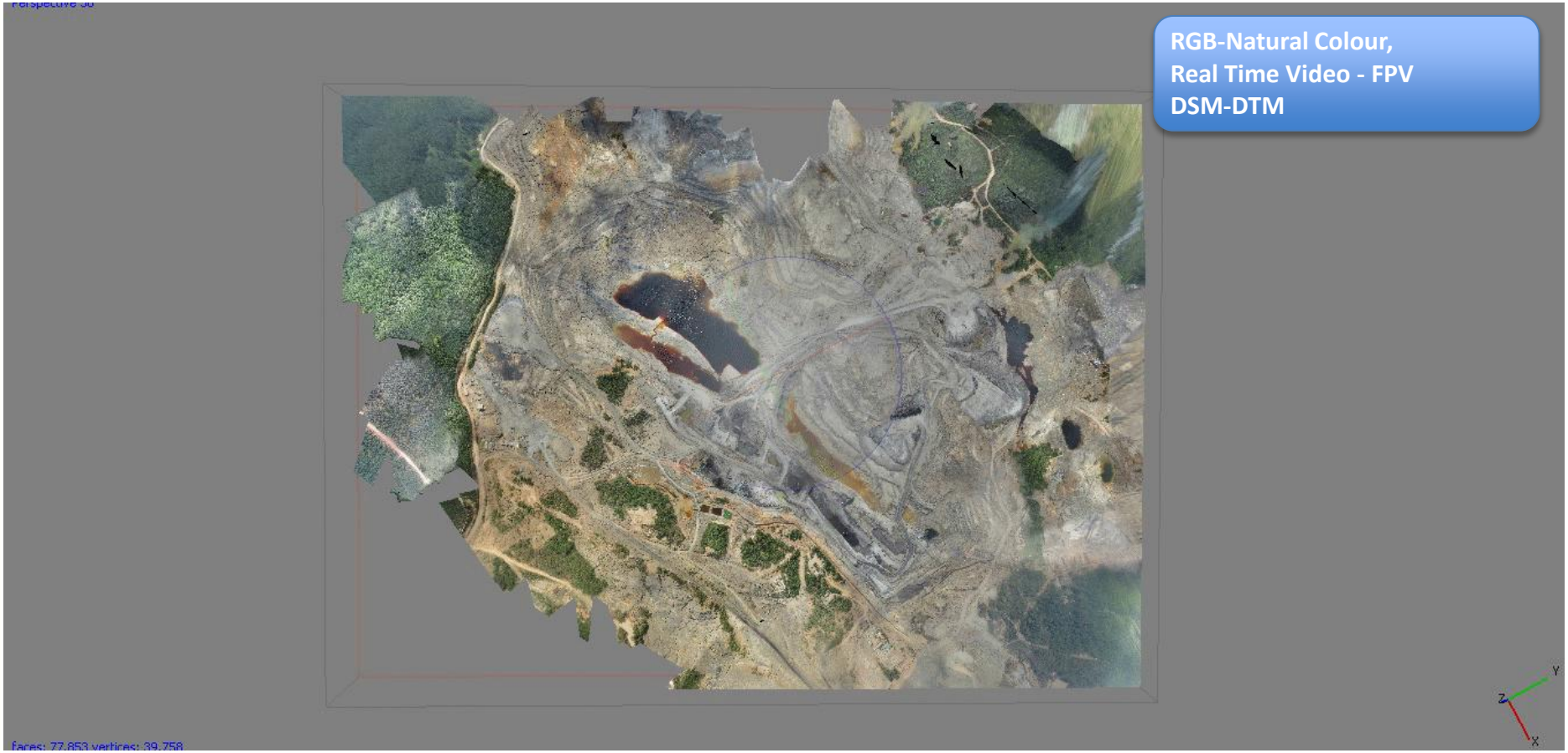

Oil Palm Tree Counting Software
File
Option
About
Result
Tree Count : 4392
Advance Setting
Threshold Value
Lower
Upper
H : 30
100
S : 100
255
V : 100
255
Morphological Operation
Closing Iteration : 0
Opening Iteration : 6
Blob Analysis
Minimum Size : 5
Minimum Size : 90
Select Area
Count
X : 8
Y : 354

Mining in a day
Seminar 2015

Comparison with competitor

	E**/S**	T**	H**	GEO Garuda Earth Observation
				
Technology	Airframe: Foam	Airframe: Foam	Airframe: Carbon Fiber	Airframe: Foam coated with3D Fiber Carbon Vinyl
	Camera: 18.2 MP RGB or IR only	Camera: 24 MP RGB only	Camera: 24 MP RGB & IR	Camera: 24 MP RGB & IR with gimbal
	Flight time: 45 m	Flight time: 50 m	Flight time: 90 m	Flight time: up to 2 hr
	Communication range: 3 km	Communication range: 50 km	Communication range: unknown	Communication range: 4-50 km
Environment	low condition	low to high	low to medium	low to extrim
Price	~USD 45,000 (single camera)	~USD 65,000 (single camera)	~USD 80,000 (single camera)	USD 28,050 (single camera)
				USD 38,500 (dual camera)
Others	waiting time	waiting time	waiting time	Ready app. 2 weeks
				LiDAR sensor in multicopter
				Airspeed and air temperature sensor

Geospatial data derived from UAS (Natural Colour)



Geospatial data derived from UAS (IR) – NDVI Result

Coal Mine Site at Banjarmasin, South Kalimantan, 1cm resolution

Thank You

www.britmindo.com

Graha Britmindo
Jl. Taman Margasatwa Raya No. 14, Ragunan
Jakarta Selatan 12550, Indonesia
Tel. +62 21 7884 9999 (hunting), Fax. +62 21 7884 9998
Email: bm_jakarta@britmindo.com