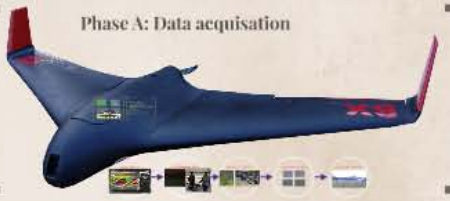
From Precision Plantation Preparation to Management via Drone-Enabled GIS Mapping and Remote Sensing

Phase A: Data acquisation



Phase B: Data processing/analysis

Phase C: On-Site Implementation

BRAINTREE TECHNOLOGIES

Introduction

Other services

Future services

Video Summary

THANK YOU!

Presented by: Mustaqim bin Mohd Alidin
Email: mustaqim.abdin@gmail.com
mustaqim@braintreesb.com
www.braintreetechnologies.com

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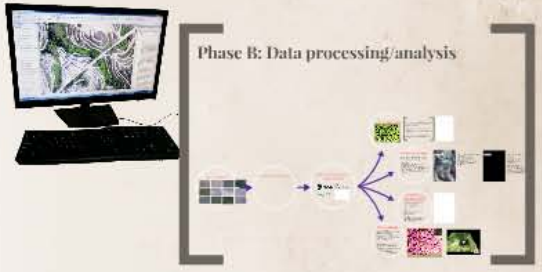

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Introduction

What is UAV?

-UAV has become popular and widely used in various industries
-"Unmanned Aerial Vehicle"; an aircraft with no human pilot on board. Sometimes called UAS (Unmanned Aircraft System) or drones

Why UAV?

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Why UAV?

Antiquated Technology:

-Traditionally done by the use of theodolite-assisted, land survey for the land preparation (terrace, roads and row constructions)

Disadvantages:
-Laborious, low productivity, higher cost

Current Technology:

-The use of high resolution imagery from satellite remote-sensing and generated computer graphics for the same purpose.

Disadvantages:
-difficulty in getting days of clear skies

Advanced Technology:

-For precise, informed & sustainable management of oil palm plantations:
UAV for PRECISION AGRICULTURE

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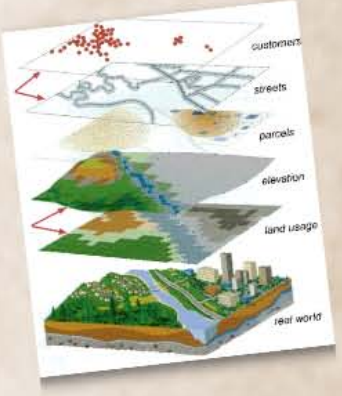
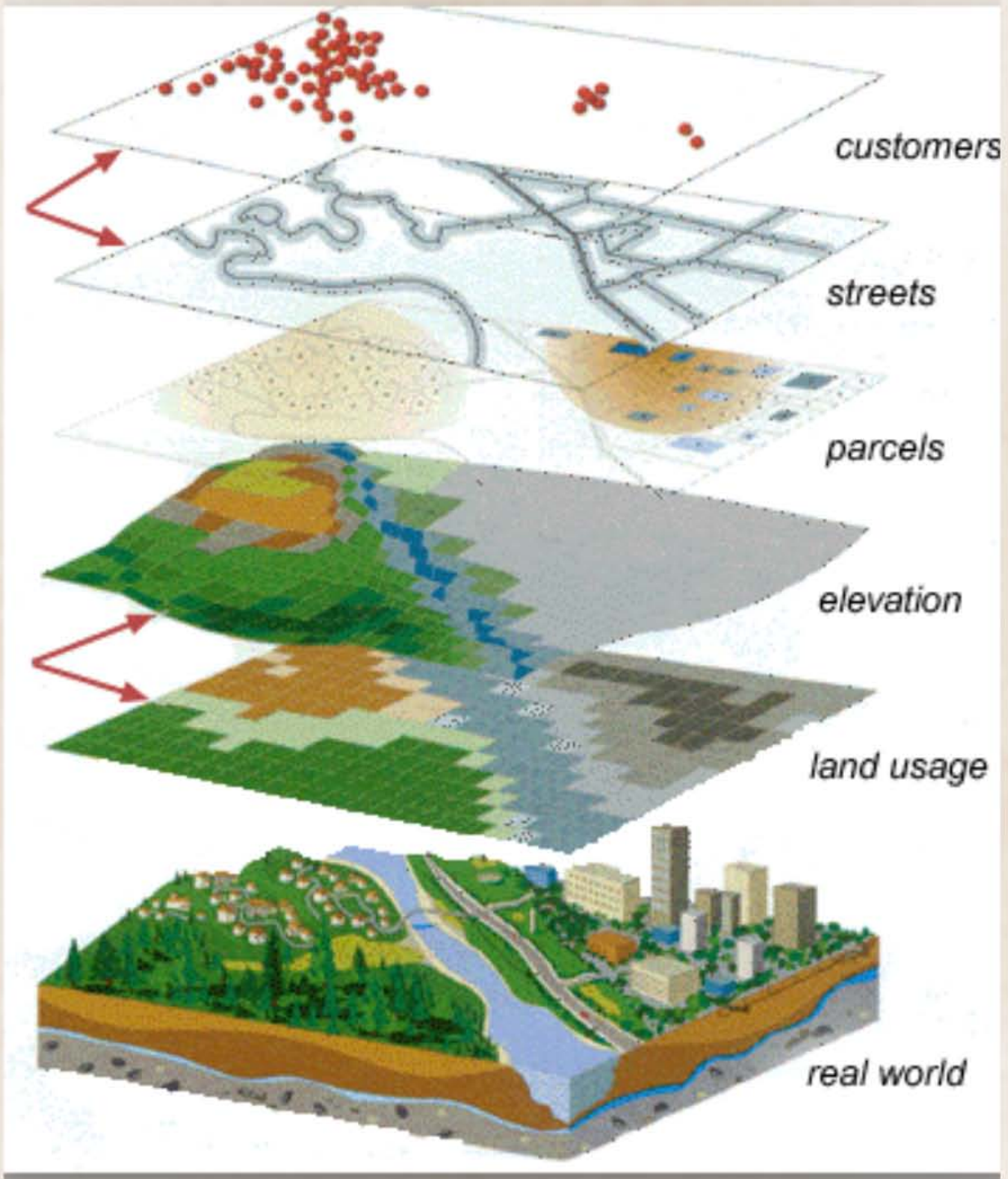


Benefits of a UAV survey
(vs traditional land survey vs satellite imagery)

-site work carried out far quicker
-can be deployed anytime when needed
-does not affected by cloud (since it flies under the cloud)
-reduced exposure to risk for surveyors
-inaccessible/hazardous areas can be surveyed remotely
-high-resolution aerial imagery
-more cost effective (scalable)


customers
streets
parcels
elevation
land usage
real world

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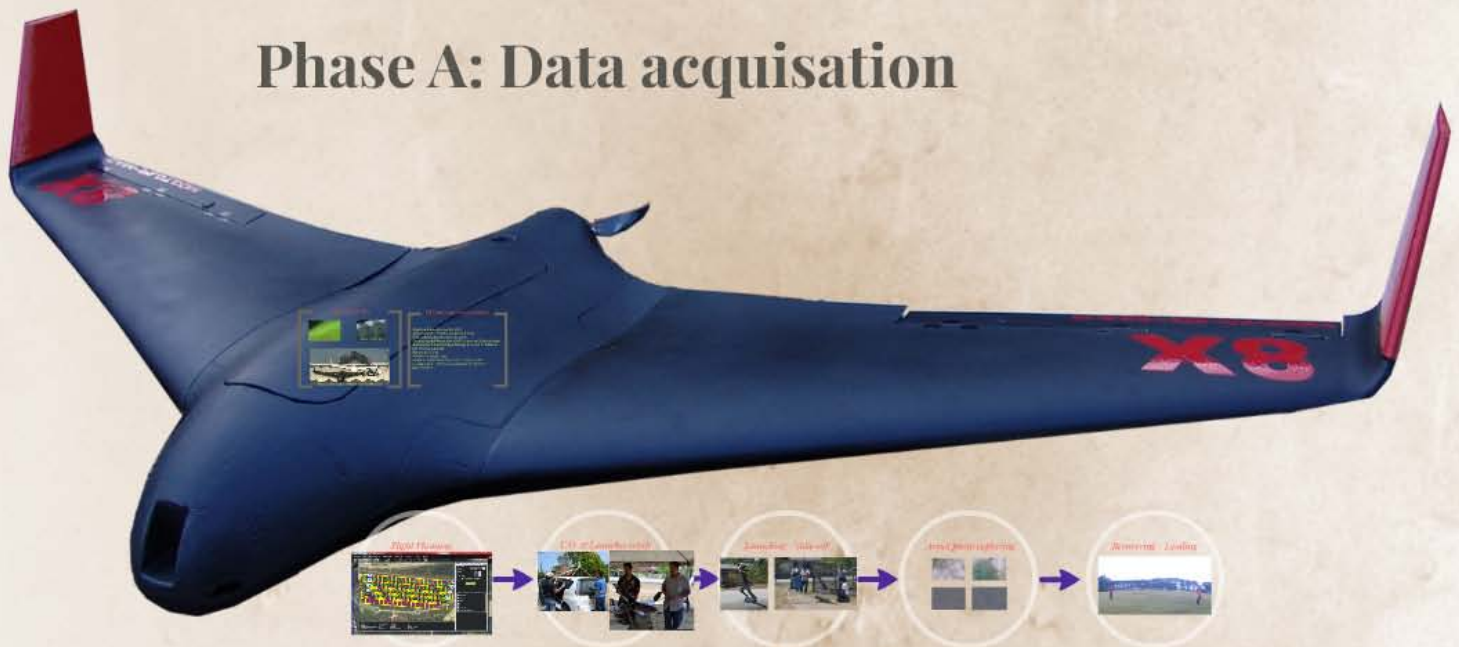
Precision Plantation Preparation

Phase A: Data acquisation



Phase B: Data processing/analysis

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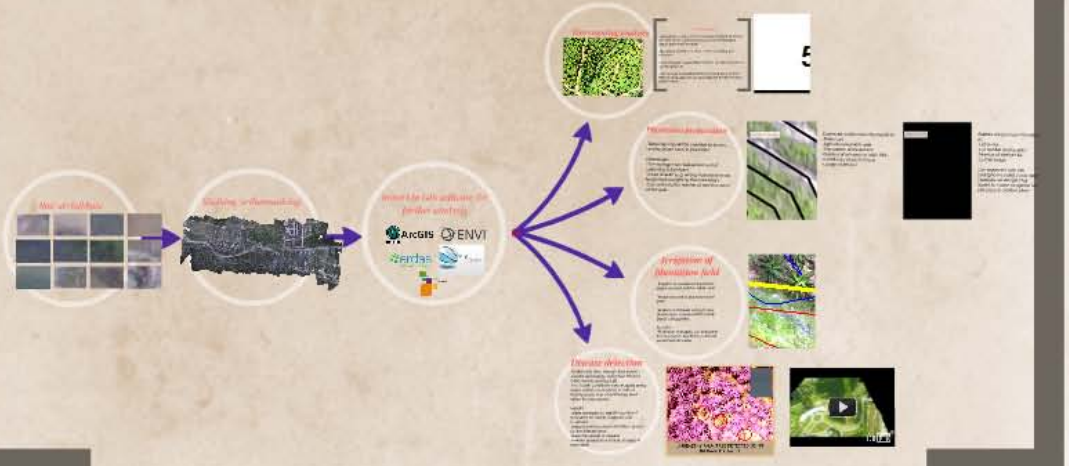
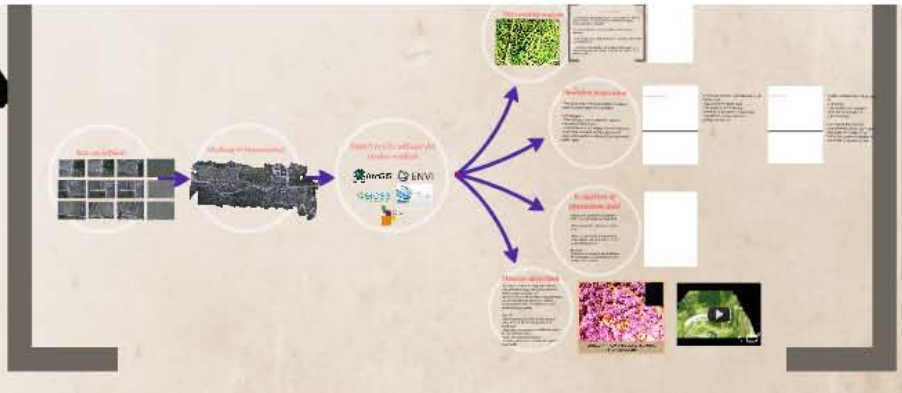


Phase C: On-Site Implementation



Phase C: On-Site Implementation

BR

Phase A: Data acquisation

Phase B: Data processing/analysis

Our set of UAVs

Quadcopter SK450 with GoPro/ SJCam camera

Octocopter DJI S1000+ with Canon 5D Mark II DSLR camera

Marcus UAV, Skywalker X8 (black & white body) & Zagi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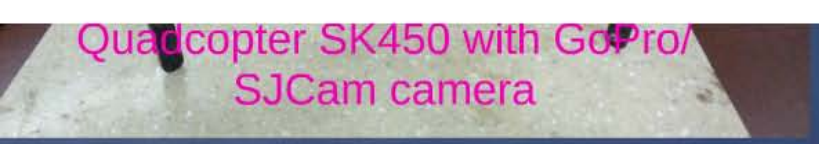

Marcus UAV, Skywalker X8 (black & white body) & Zagi

UAV specs (for aerial mapping)

-200ha to 500ha per day per UAV
-Cruise speed: 47 km/h (20 mph or 13m/s)
-Typical flying altitude: 100m to 300m
-Ground Spatial Resolution (GSD): 3.2cm (at 100m altitude)
-Endurance: 0.5 hour (single battery) to 3 hour (4 batteries with minimal payload)
-Wingspan: 2.12m
-All take off weight: 5kg
-Camera: SONY NEX-5N or ILCE 5100 or A7R II (16Megapixel, 16mm lense) *swapable for multi or hyperspectral*

of UAV

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Flight Planning

UAV & Launcher setup

Launching / Take-off

Aerial photo capturing

Flight Planning

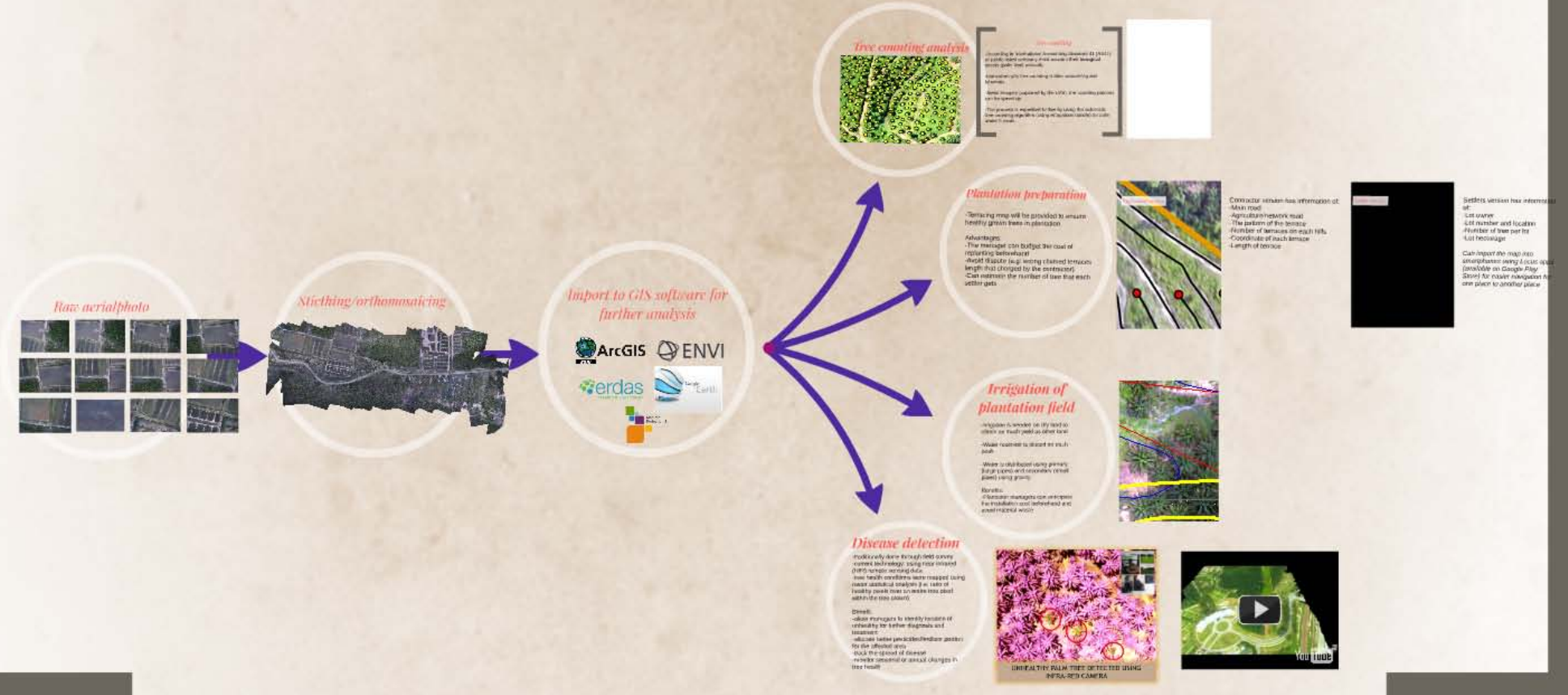
UAV & Launcher setup

Launching / Take-off

Aerial photo capturing

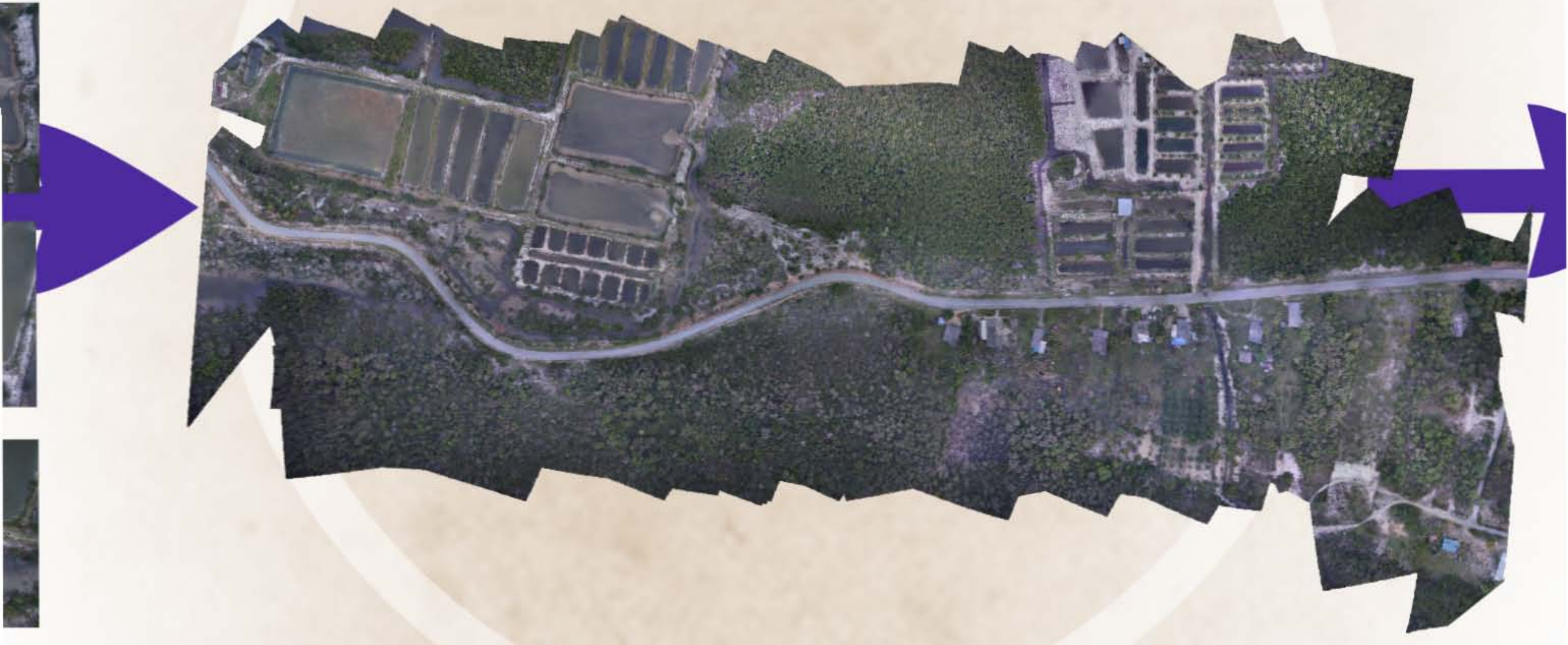
Recovering / Landing

Phase B: Data processing/analysis



Raw aerialphoto

Sticthing/orthomosaicing



Import to GIS software for further analysis

ESRI ArcGIS

ENVI

erdas
The Earth to Business Company

Google Earth

MapInfo Professional

Stitching/orthomosaicing

Import to GIS software for further analysis

ArcGIS ENVI erdas Google Earth

Tree counting analysis

Tree counting

-According to International Accounting Standard #1 (IAS41) all public listed company must account their biological assets (palm tree) annually.

-Manual on-site tree counting is time consuming and laborious.

-Aerial imagery (captured by the UAV), the counting process can be speed up.

-The process is expedited further by using the automatic tree counting algorithm (using eCognition bundle) for palm under 5 years.

Plantation preparation

-Terracing map will be provided to ensure healthy grown trees in plantation

Advantages:
-The manager can budget the cost of replanting beforehand
-Avoid dispute (e.g: wrong claimed terraces length that charged by the contractor)
-Can estimate the number of tree that each settler gets

Contractor version has information of:
-Main road
-Agriculture/network road
-The pattern of the terrace
-Number of terraces on each hills
-Coordinate of each terrace
-Length of terrace

Irrigation of plantation field

-Irrigation is needed on dry land to obtain as much yield as other land

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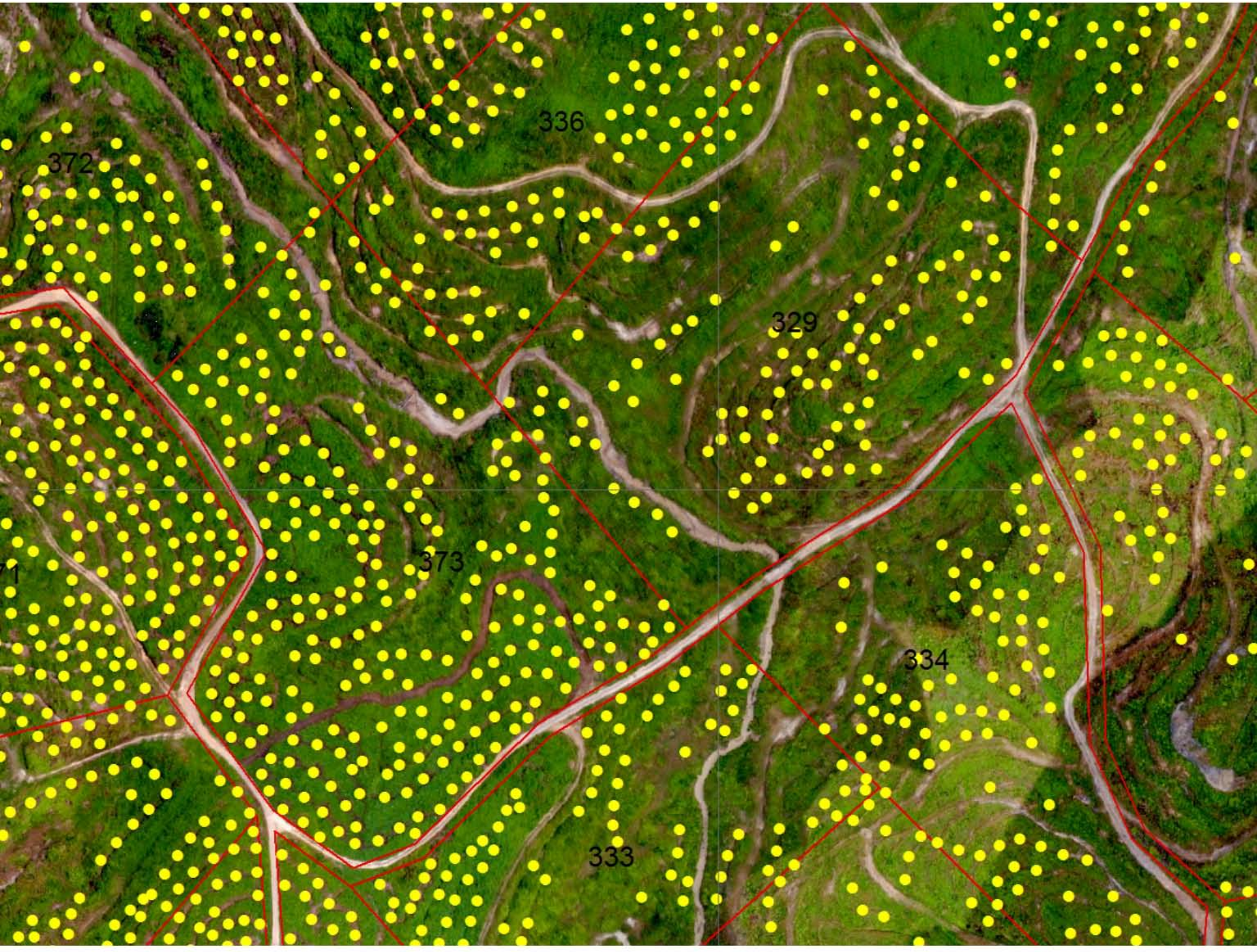
OIL PALM PLANTATION INVENTORY
FELDA KERTEH, TERENGGANU


336
372
329
373
334
333

Legend


Oil Palm


Forest


Plantation Road


Terrace


Cadastral Map

Tree Counting

NO LOT	NO OF TREES
278	636
279	115
280	114
282	29
283	77
290	15
295	15
304	137
305	0
306	33
307	9
308	22
309	9
310	152
311	76
312	34
313	16
314	28
315	42
316	19

NO LOT	NO OF TREES
317	62
318	51
319	26
320	22
329	112
330	26
331	91
332	186
333	83
334	90
335	53
336	89
337	87
338	4
339	96
340	55
341	101
342	42
343	25
344	76

NO LOT	NO OF TREES
345	15
346	3
347	50
348	13
349	10
350	104
351	171
352	31
353	84
354	64
356	36
357	49
358	51
359	24
360	89
361	27
362	112
363	26
364	82
365	66

NO LOT	NO OF TREES
366	95
367	89
368	88
369	55
370	131
371	281
372	98
373	239
374	178
375	97
376	103
377	106
378	96
379	55
380	78
381	145
382	230
383	157
384	191
385	154

NO LOT	NO OF TREES
386	0
387	159
388	169
389	247
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391	147
392	113
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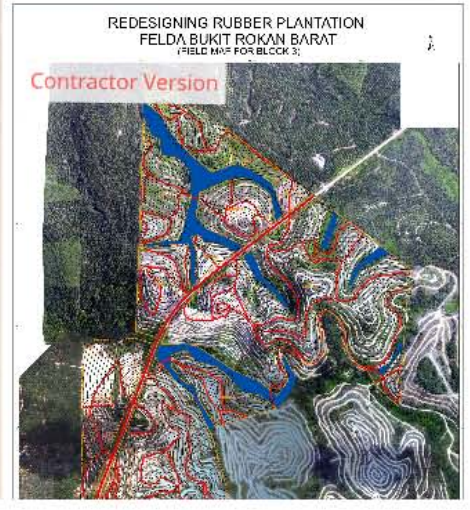

Contractor v
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tree counting algorithm (using [illegible])
under 5 years

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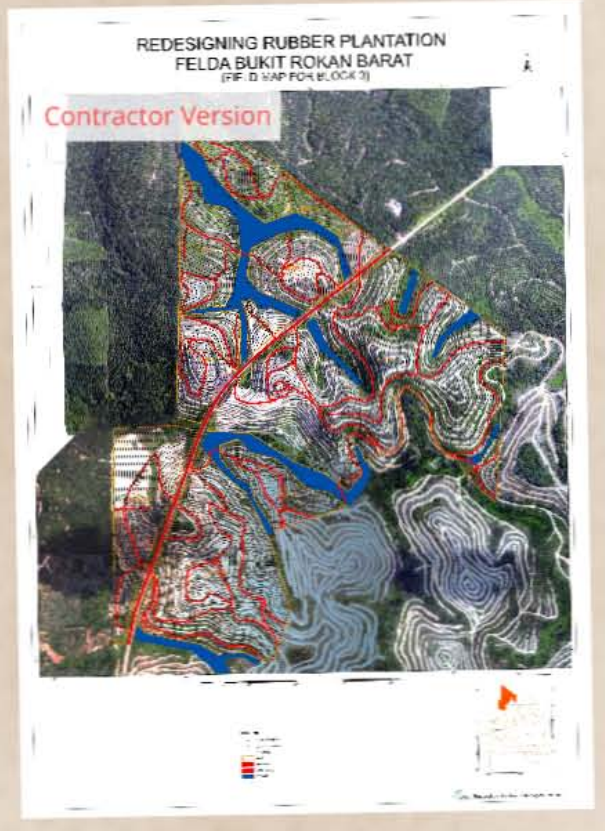

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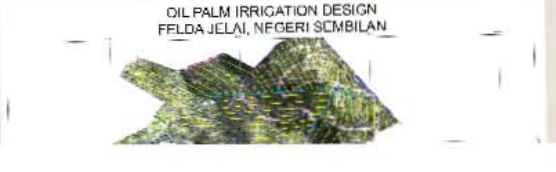
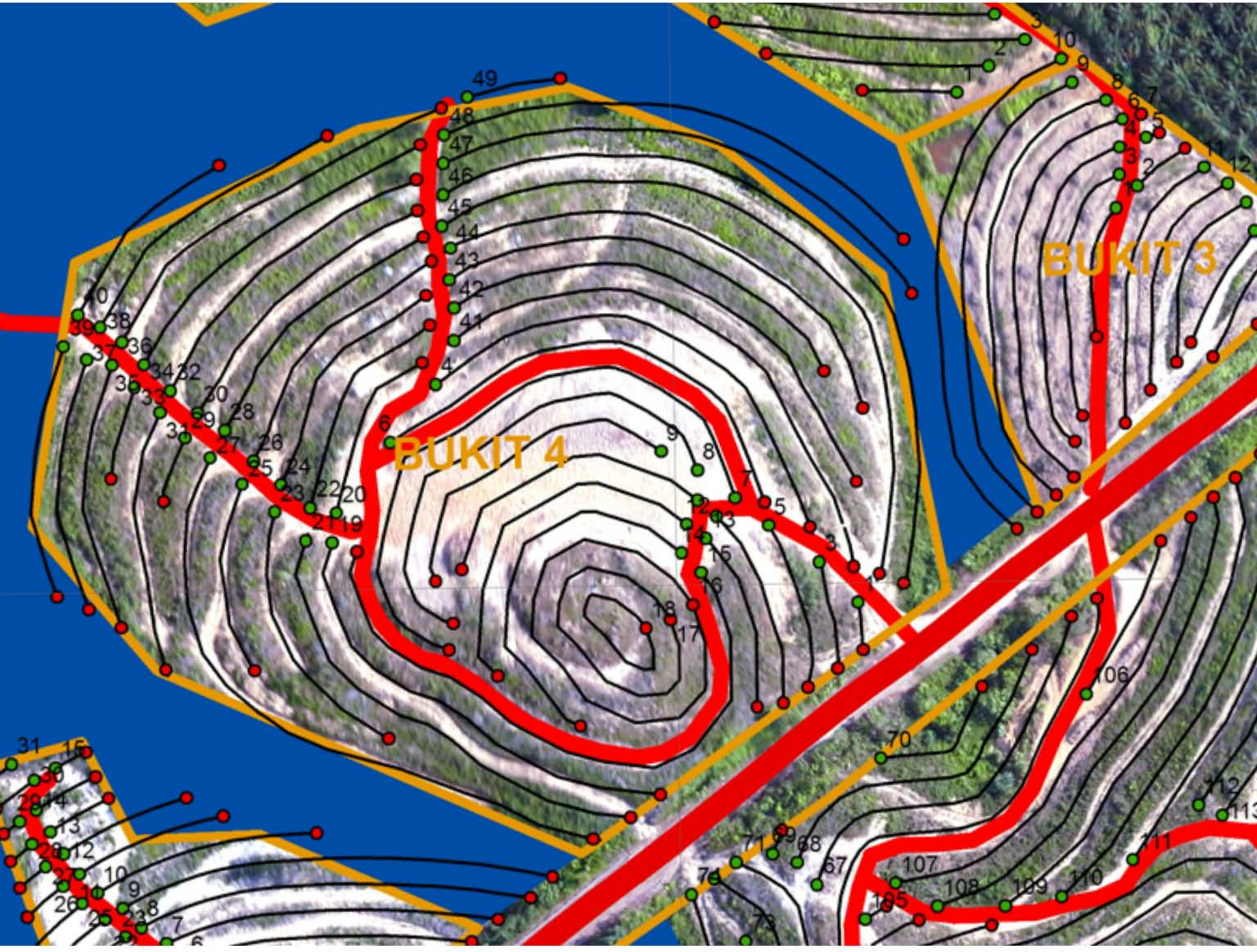
Irrigation of plantation field




BUKIT 4
BUKIT 3

ɔn has information of:

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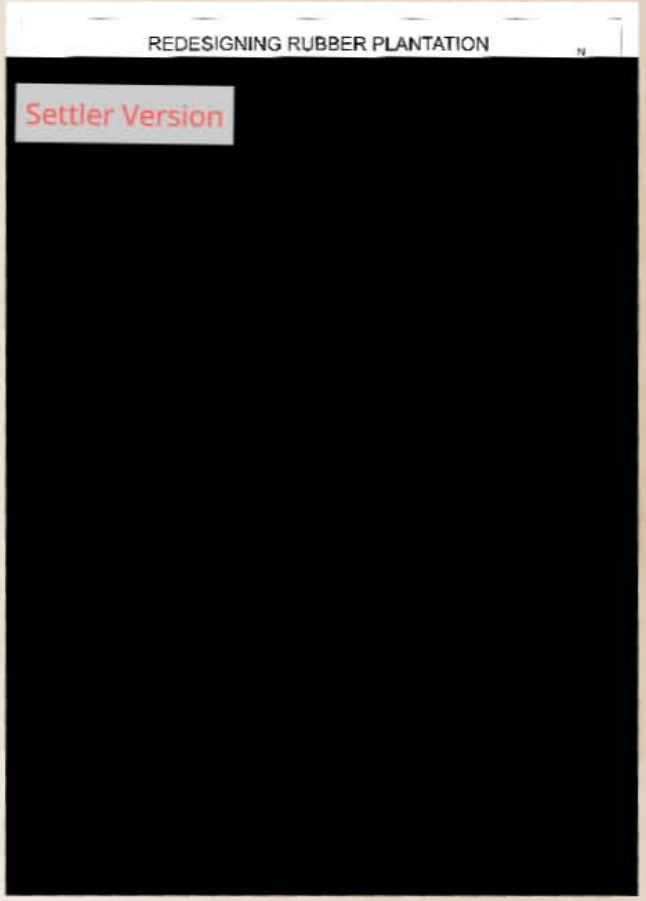

Settlers version has information of:
-Lot owner
-Lot number and location
-Number of tree per lot
-Lot hectarage

Can import the map into smartphones using Locus apps (available on Google Play Store) for easier navigation for one place to another place

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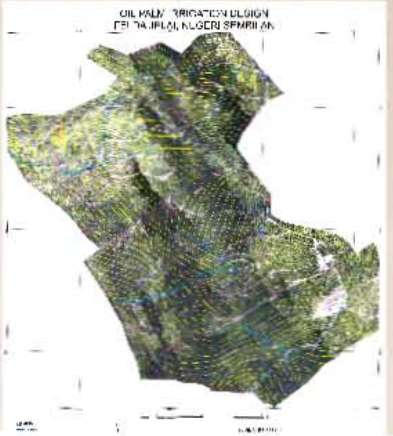

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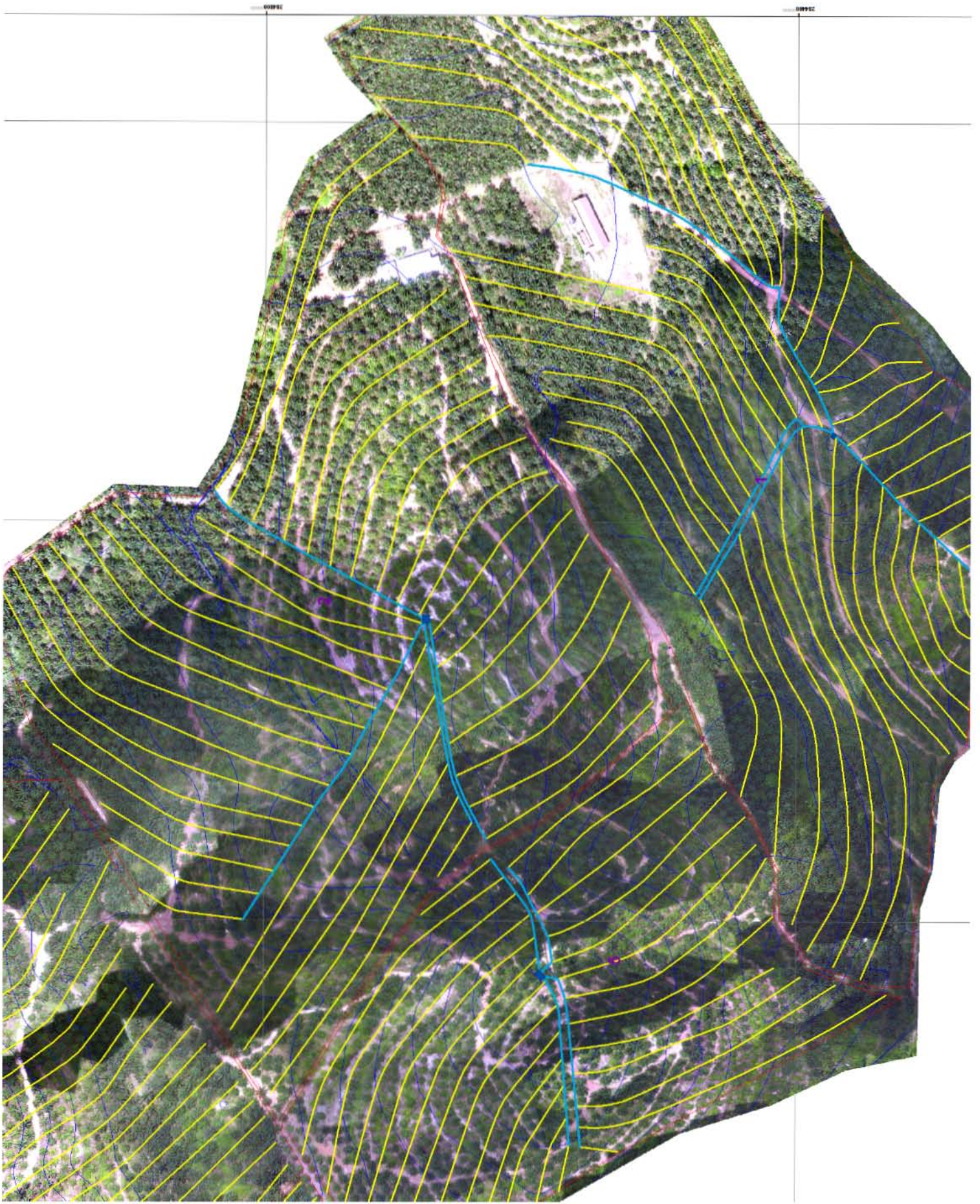
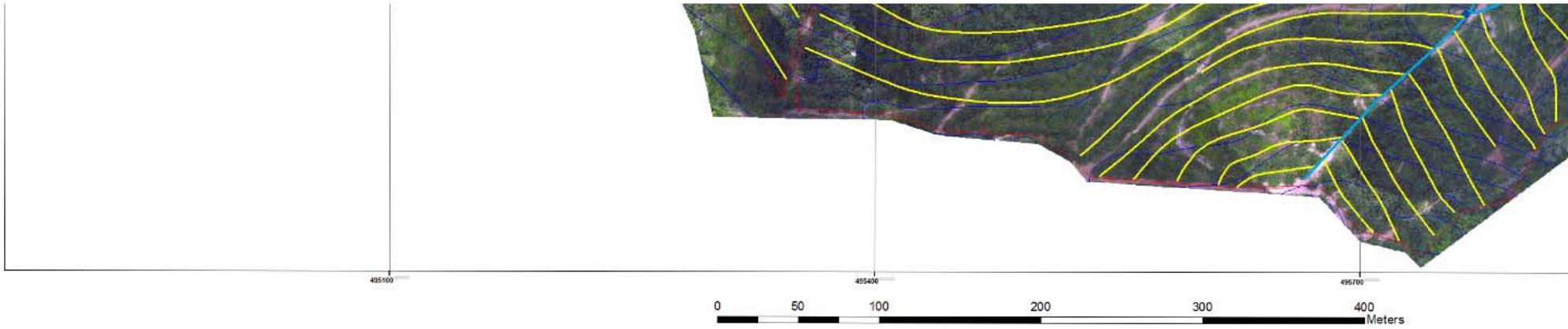


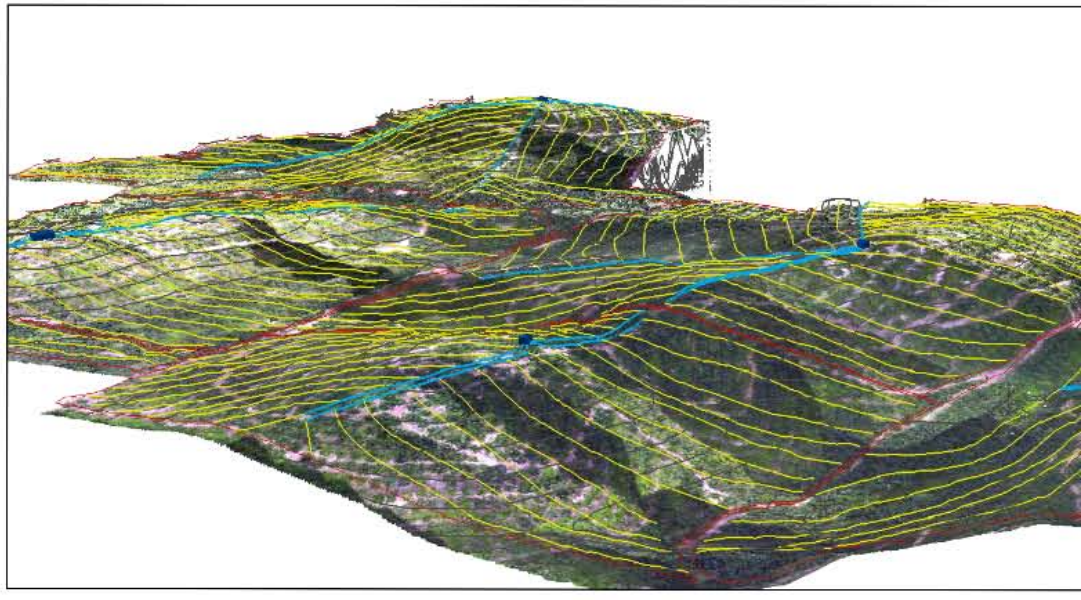


LEGEND

- WATER TANK
- MAIN PIPE
- SECOND PIPE
- CONTOUR
- BLOCK BOUNDARY

N

3D JELAI IRRIGATION



BLOCK	AREA COVER		TOTAL DISTANCE (m)	
	(m^2)	(ha)	MAIN PIPE	SECOND PIPE
1	182405.21	18.241	815.828	8579.083
2	183433.74	18.343	774.661	8013.105
3	152477.94	15.247	751.201	7916.701
4	125102.65	12.51	676.682	6752.092
5	93990.105	9.399	452.883	4734.868
6	48390.165	4.839	222.419	2923.312
TOTAL 6	785799.81	78.579	3693.674	38919.161

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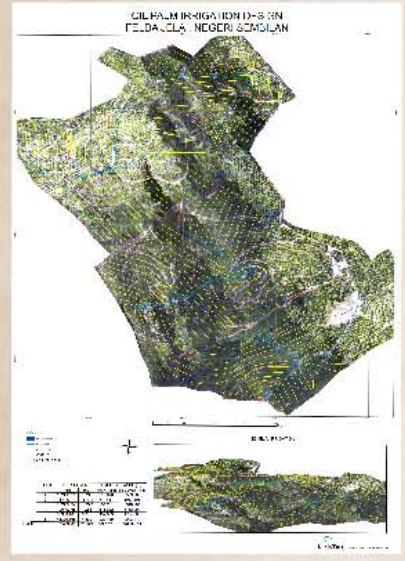

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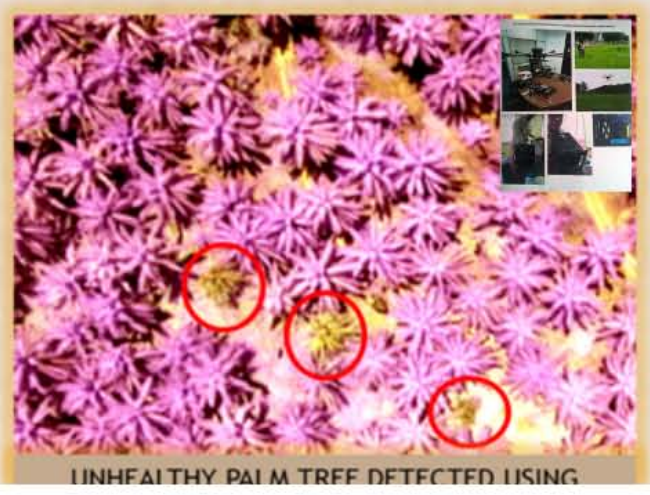

UNHEALTHY PALM TREE DETECTED USING

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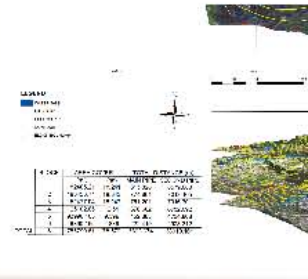

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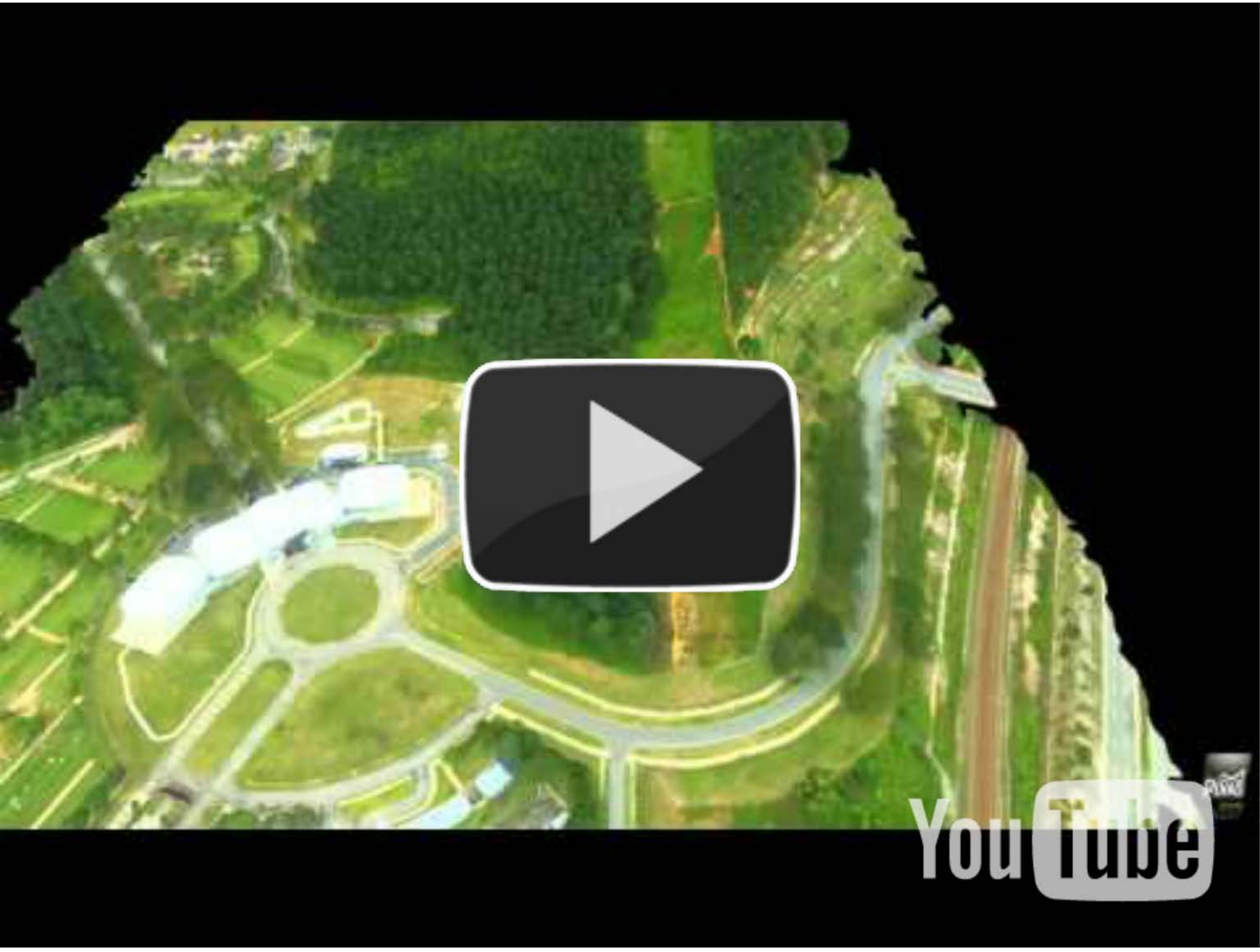
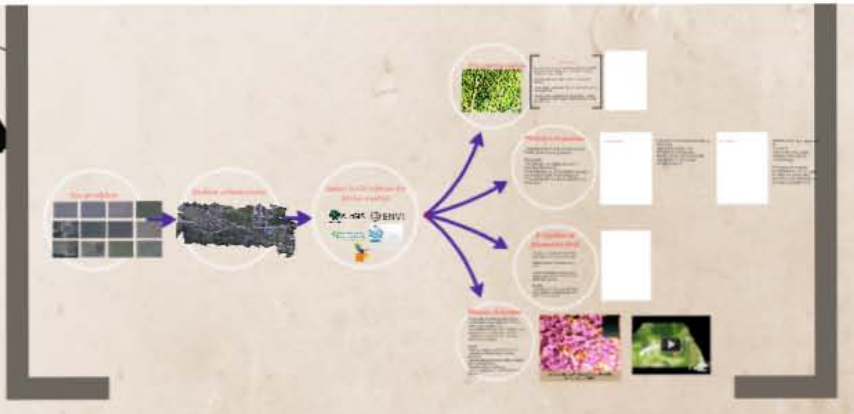
UNHEALTHY PALM TREE DETECTED USING INFRA-RED CAMERA

UAV OCTOCOPTER PROVIDE BY BRAINTREE AND RESONON HYPERSPECTRAL CAMERA BY SISB


YouTube



Phase C: On-Site Implementation

BRA

Phase C: On-Site Implementation

Load proposed map into tablet

Mount GNSS receiver & tablet on the vehicle

Vehicle operators begin on-site work

Completed terraces, roads & drainages

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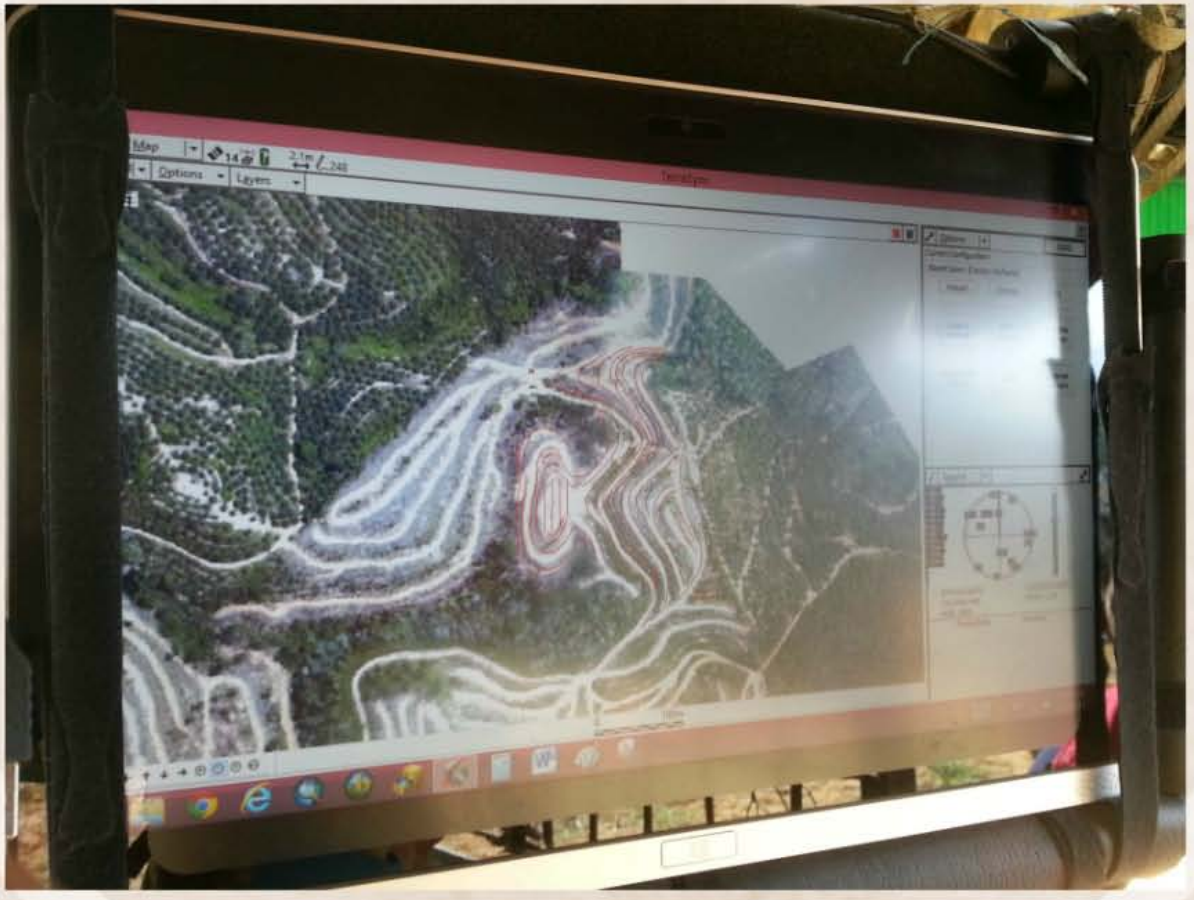

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on the vehicl

Vehicle operators begin on-site work

Completed terraces, roads & drainages

Other services

Aerial photoshoot & filming

Future services

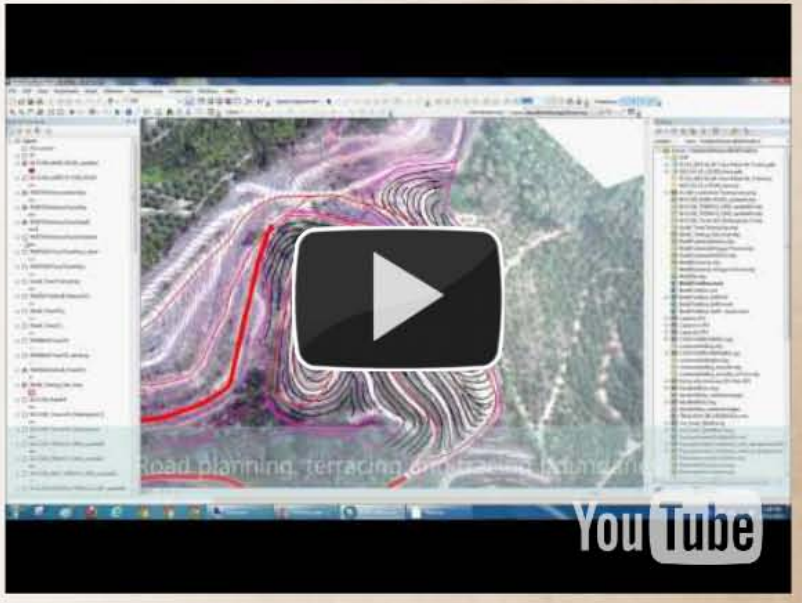
Aerial spraying

Exoskeletons: Wearable hydraulic-enabled Robot Suite

Aerial photoshoot & filming


DROPSAFE
SONY
SONY

Video Summary



THANK YOU!

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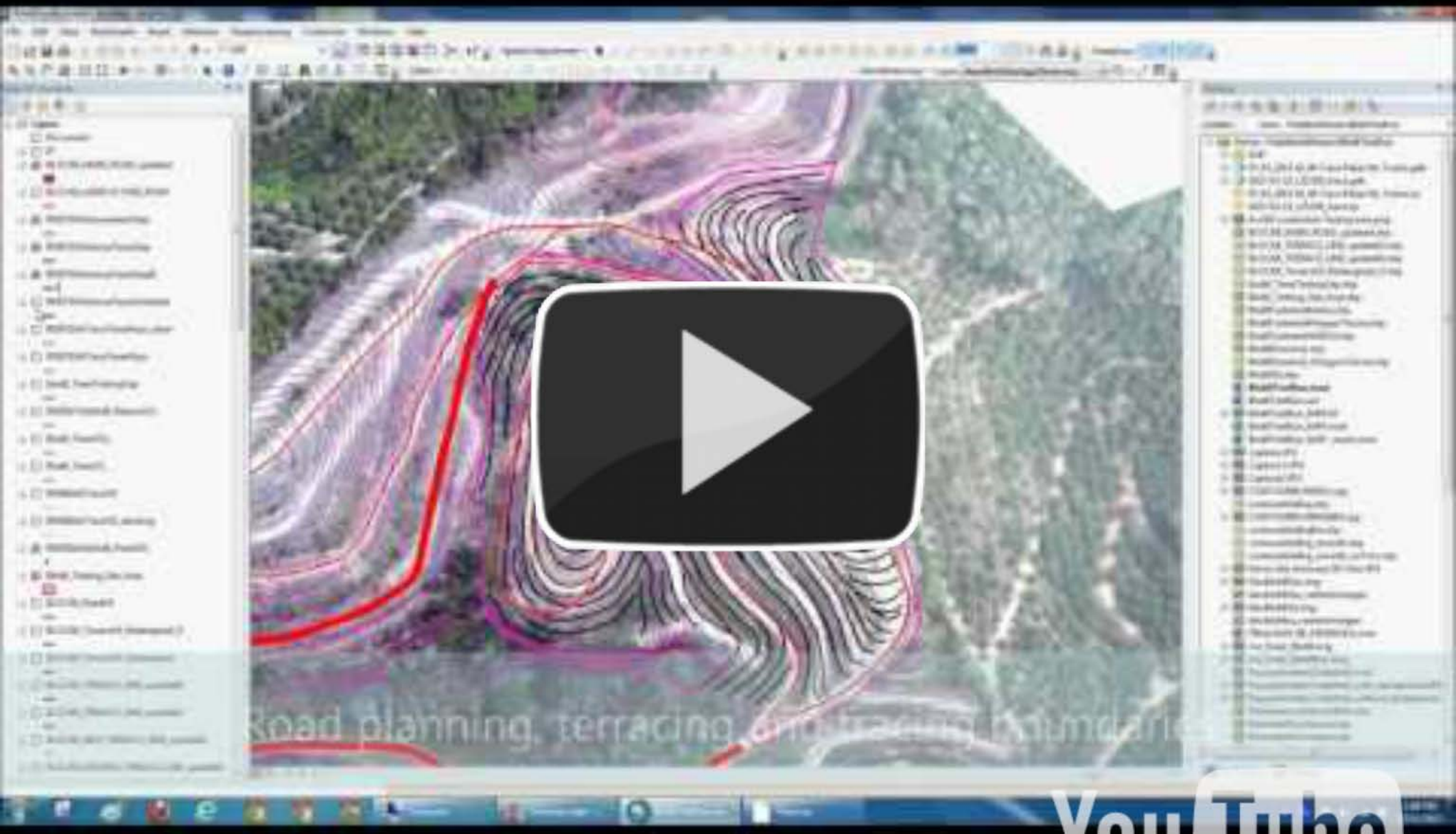
BRAINTREE TECHNOLOGIES


YouTube

Drone demo

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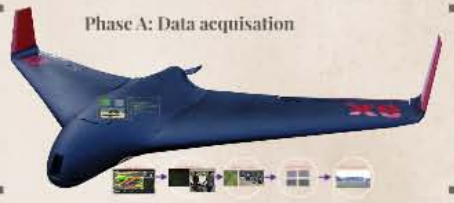
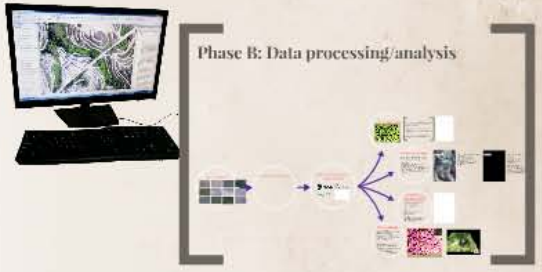
BRAINTREE TECHNOLOGIES

From Precision Plantation Preparation to Management via Drone-Enabled GIS Mapping and Remote Sensing

Phase A: Data acquisation



Phase B: Data processing/analysis



Phase C: On-Site Implementation

BRAINTREE TECHNOLOGIES

Introduction

Other services

Future services

Video Summary

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