



**Knowledge • Observation
Response • Evaluation**



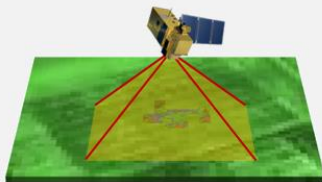
ESA Project manager:
Olivier Becu

KORE: ARTES 20 IAP
3 UK project partners

Presentation:
Keith Geary – G2Way
David Petit – Deimos-space



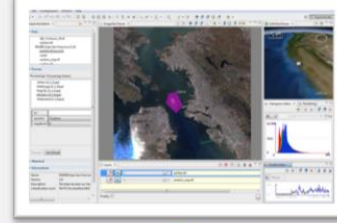
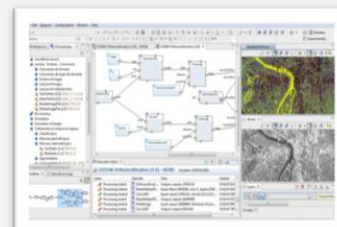
Satellite EO data provider



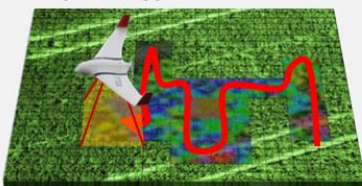
Satellite EO
images



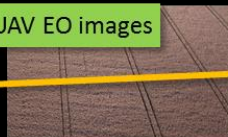
KORE Data Service (Deimos)



RPAS (G2way)



UAV EO images

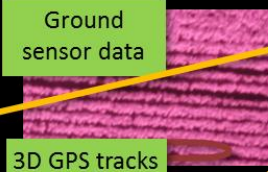


Farmer infrastructure

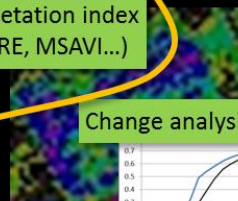


Ground
sensor data

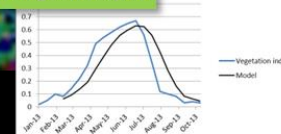
3D GPS tracks



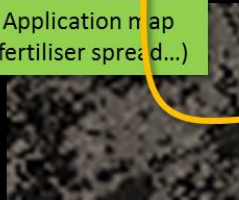
Vegetation index
(NRE, MSAVI...)



Change analysis on index

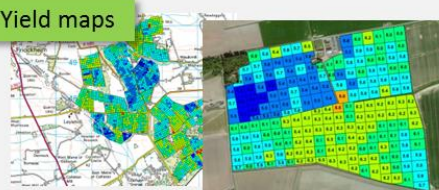


Application map
(fertiliser spread...)



KORE Service (Soil Essentials)

Yield maps



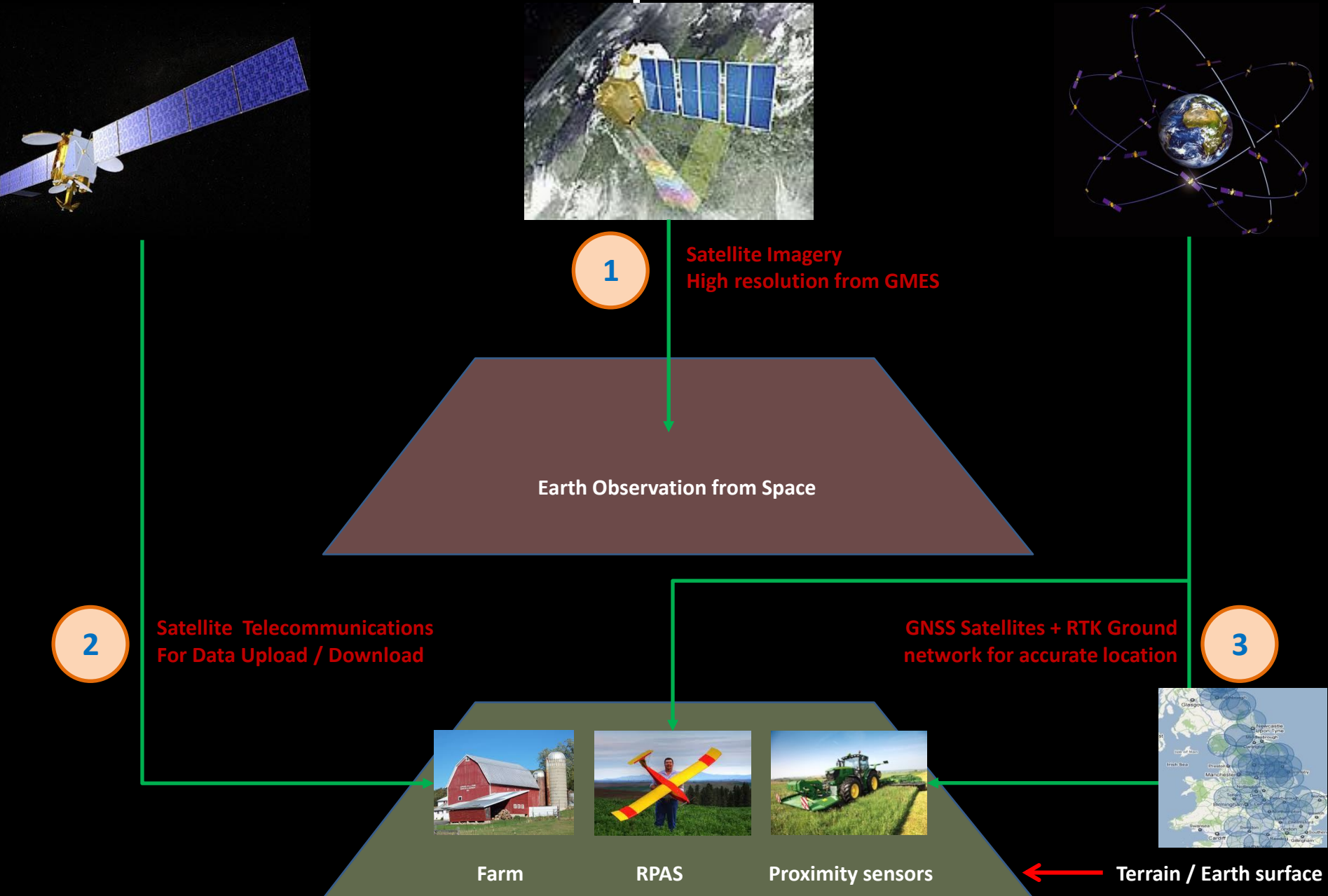
RTK ground network (Soil Essentials)



Agronomists, farmers



Role of Space assets



UK Rules and Regulations

Civil Aviation Authority

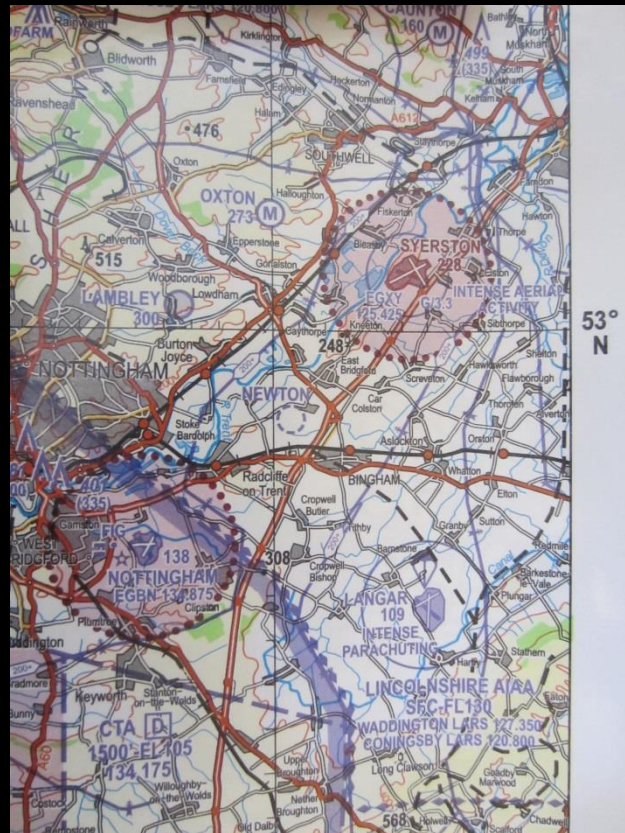


- To use UAVs < 20Kg for commercial gain or outside of the hobby enthusiast capacity requires compliance with CAA CAP 393 and CAP 702 i.e. a BNUC-S licence in the UK.

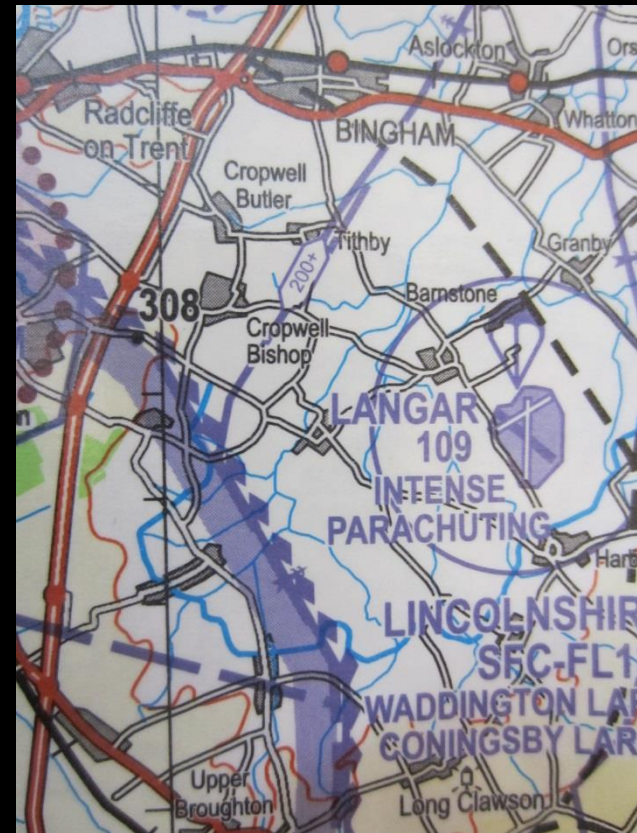


Air Navigation, 120m Above Ground Level and 500m from the operator.

Controlled and Class G Airspace.



No Fly Zones



Micro UAV's Sub 7kg



Delta Winged micro UAV



Multi-rotor UAV's

Pro's:

- Station holding
- VTOL launch / landing
- Can fly missions as low as 15 meters

Con's:

- Short flight time 10 - 20 Min
 - Max wind up to 25 Kph.
 - Less coverage up to 1 Ha
 - Needs gimbal stabilisation
 - More expensive
 - Payload of 200g to 2.5kg
- Con's:



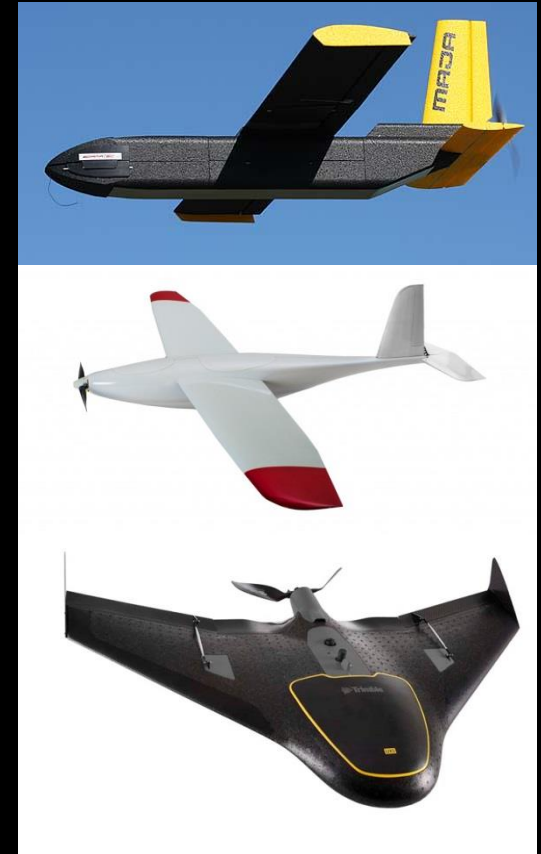
Fixed Wing UAV's

Pro's:

- Flight time up to and over 1 hour
- Wind up to 45 Kph
- Large ground coverage 1 -5 Ha
- Cheaper with less moving parts
- Payload up to 200 -2.5Kg+

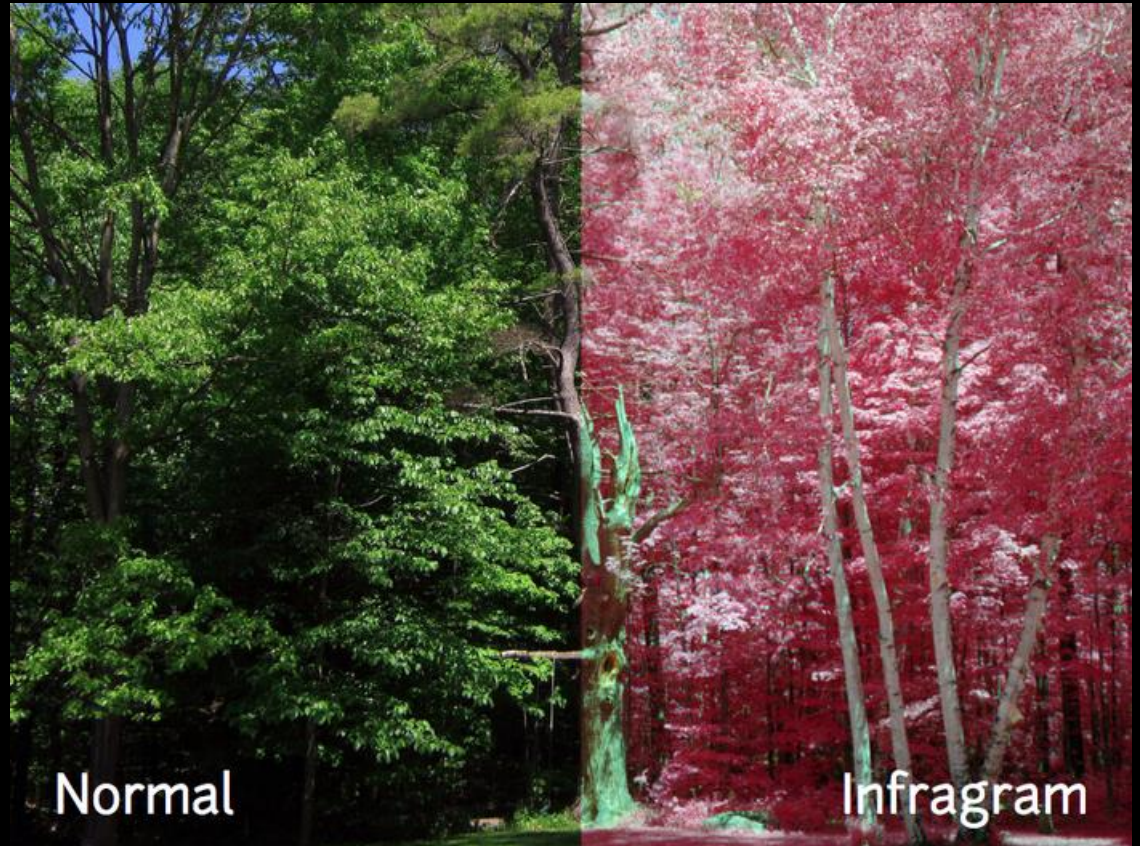
Con's:

- **Mission Altitude 100 - 400+ feet**
- **No station holding capability.**
- **More space for Launch and Landing.**

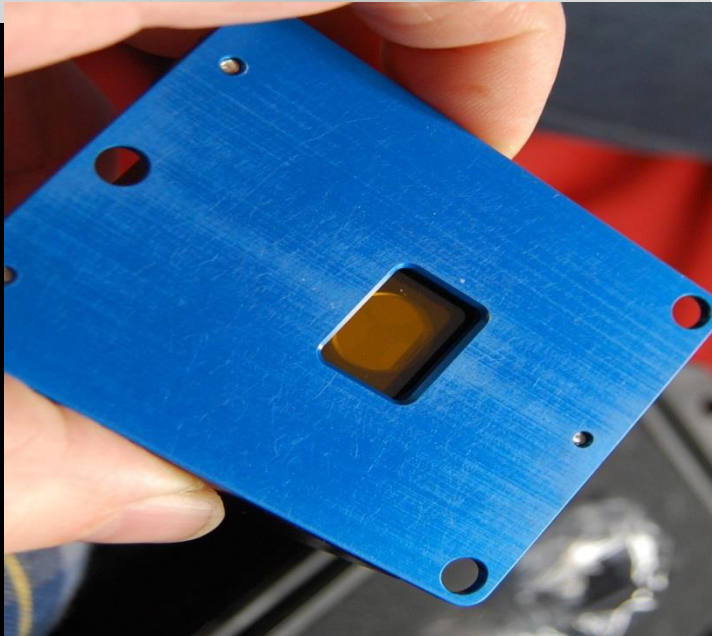


Payloads;
Visible = RGB

NDVI = Red channel from RGB + IR channel from
Infrared converted cameras,

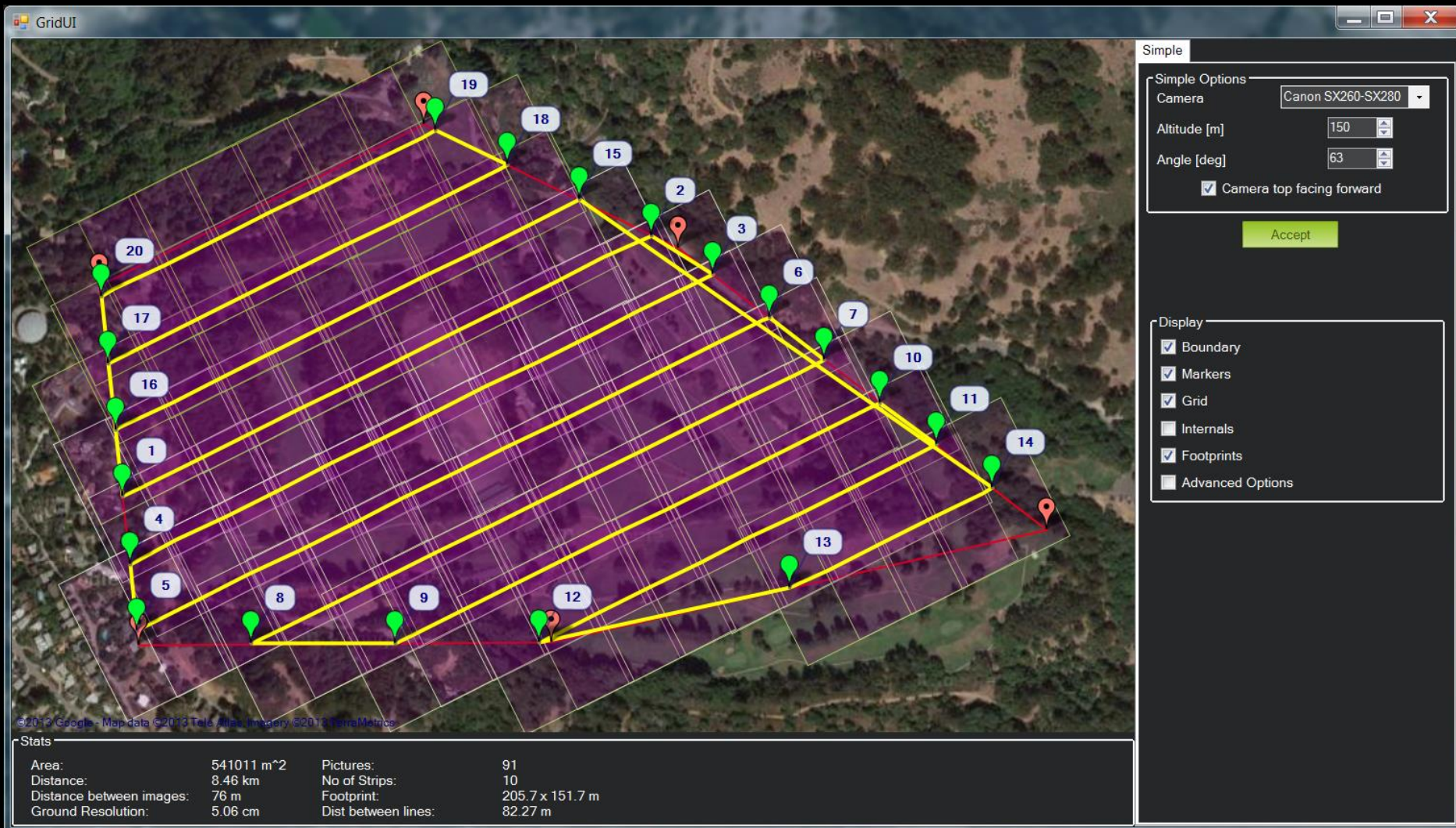


Multispectral; Tetracam Agricultural Digital Camera Range



RPAS Mission Planning.

GridUI



Simple

Simple Options

Camera: Canon SX260-SX280

Altitude [m]: 150

Angle [deg]: 63

☒ Camera top facing forward

Accept

Display

☒ Boundary

☒ Markers

☒ Grid

☐ Internals

☒ Footprints

☐ Advanced Options

Stats

Area:	541011 m ²	Pictures:	91
Distance:	8.46 km	No of Strips:	10
Distance between images:	76 m	Footprint:	205.7 x 151.7 m
Ground Resolution:	5.06 cm	Dist between lines:	82.27 m

©2013 Google - Map data ©2013 Tele Atlas, Imagery ©2013 TerraMetrics

Ground Control Points (GCP's).



RPAS Execution.



Geo Ref Images

☐ Time offset ☒ CAM Message Synchro

Seconds offset

Shutter lag (ms)

CAM Message Offsets				GPS Message Offsets			ATT Message Offsets	
GPS Millis	Lat	Lon	Alt	GPS Millis	GPS Week	AMSL Alt	Head	Roll
<input type="text" value="1"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="9"/>	<input type="text" value="7"/>	<input type="text" value="3"/>
GPS Week	Head	Roll	Pitch	Lat	Lon	Alt	Pitch	
<input type="text" value="2"/>	<input type="text" value="8"/>	<input type="text" value="7"/>	<input type="text" value="6"/>	<input type="text" value="6"/>	<input type="text" value="7"/>	<input type="text" value="8"/>	<input type="text" value="5"/>	

Dir fov Rotation Cross fov

☒ Use AMSL Alt

>> >>

- ← Selection of Log file
- ← Selection of Pictures folder
- ← GeoTag Mode
- ← Time offset Estimation and Shutter Lag
- ← Log Offsets
- ← Camera FOV info
- ← AMSL or AGL Altitude selection
- ← Action buttons
- ← Process messages

Uploading data from a UAV.

Dashboard [+ New Map](#)

Maps recent

Sawmill
UAV test area at Owtorpe, Nottinghamshire, UK

Pending recent

There are currently no pending maps to display.

Public recent

There are currently no publicly shared maps.

Point Use recent

Sept. 17, 2014, 11 a.m.	-321
Sept. 15, 2014, 11:17 p.m.	500
Sept. 15, 2014, 11:16 p.m.	18750
Sept. 15, 2014, 11:16 p.m.	100
Sept. 15, 2014, 11:16 p.m.	0

Total Transactions **5**

Remaining

279

 Subscription

2 weeks, 5 days

 Expiration

18750

 Purchased

[+ Buy More](#)

Georeferenced Imagery Workflows
More control points gives better results.

Georeferenced Map (w/basemap)
Use public maps to align your imagery to the world.

Georeferenced Map (w/manual GCPs)
Use manually recorded ground control points to align your imagery to the world.

Georeferenced Map (w/GPS camera)
Use your camera's GPS to align your imagery to the world.

Georeferenced Map (w/custom basemap)
Add another time layer to a map you already created. - Available 10/10/2014

NDVI Workflows - Available in November
2x point total

Georeferenced with the Camera's GPS tags
Follow the steps to select images, verify the GPS information, upload, and kick off the processing job.

Map info

Select images

Read EXIF Tags

Verify images

Point Use

Georeference

Upload and Process

Name of Map

Thurlow Estate W046

Map Description

W046 Winter Wheat with Blackgrass

Map Privacy

Would you like your map to be public?

Yes No

Previous

Next

Do not close this window or all your upload progress will be lost.

Uploading

Processing will begin when all uploads are complete: 97 remaining.

DSC00893_geotag.JPG 69% of 5.9MB

DSC00894_geotag.JPG 46% of 7.2MB

DSC00895_geotag.JPG 25% of 6.8MB

DSC00896_geotag.JPG

DSC00897_geotag.JPG

DSC00898_geotag.JPG

DSC00899_geotag.JPG

DSC00900_geotag.JPG

DSC00901_geotag.JPG

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DSC00911_geotag.JPG

DSC00912_geotag.JPG

DSC00913_geotag.JPG



Eval 0 days

Eval 1 day

6.0 5.8 6.4 5.9 5.7 6.5

6.0 5.7 5.6 5.6 5.5 5.4 5.6

5.7 5.4 5.7 5.6 5.7 5.4 5.7 5.6 6.0

5.8 5.3 5.2 5.4 5.3 5.4 5.5 5.4 5.5 5.7

5.4 5.3 5.2 5.4 5.3 5.5 5.5 5.7 5.4 5.4 5.5

5.7 5.2 5.3 5.2 5.5 5.5 5.7 5.4 5.4 5.5

5.5 5.2 5.3 5.5 5.5 5.6 5.7 5.5 5.5 5.4

6.1 6.0 6.1 6.1 6.1 6.3 6.4 6.3

5.9 5.9 5.8 6.0 6.0 6.1 6.4 6.3

5.8 6.0 5.8 5.9 6.0 6.1 6.2 6.4 6.1

5.8 5.8 5.8 6.3 5.8 6.3 6.2 6.3 6.1

5.7 6.0 5.9 6.1 5.9 6.1 6.2 6.3 6.5

6.3 6.4 6.3 6.3 6.2 6.3 6.3 6.3

6.3 6.4 6.3 6.1 6.2 6.3 6.3 6.3

6.3 6.4 6.3 6.1 6.5 6.1 6.4

6.3 6.4 6.2 6.2 6.0 6.1 6.3 6.1

6.3 6.2 6.1 6.0 5.8 6.1

6.3 6.2 6.1 6.0 5.9 5.9

6.2 6.1 6.2 6.3 6.0 5.9

6.2 6.2 6.1 6.2 6.1 5.7

Plant counting & weed mapping.

