TELESPAZIO
a LEONARDO and THALES company

PLURIFOR technical meeting, Oeiras, Portugal, 27/01/2018

Jean Charles Samalens

Telespazio group

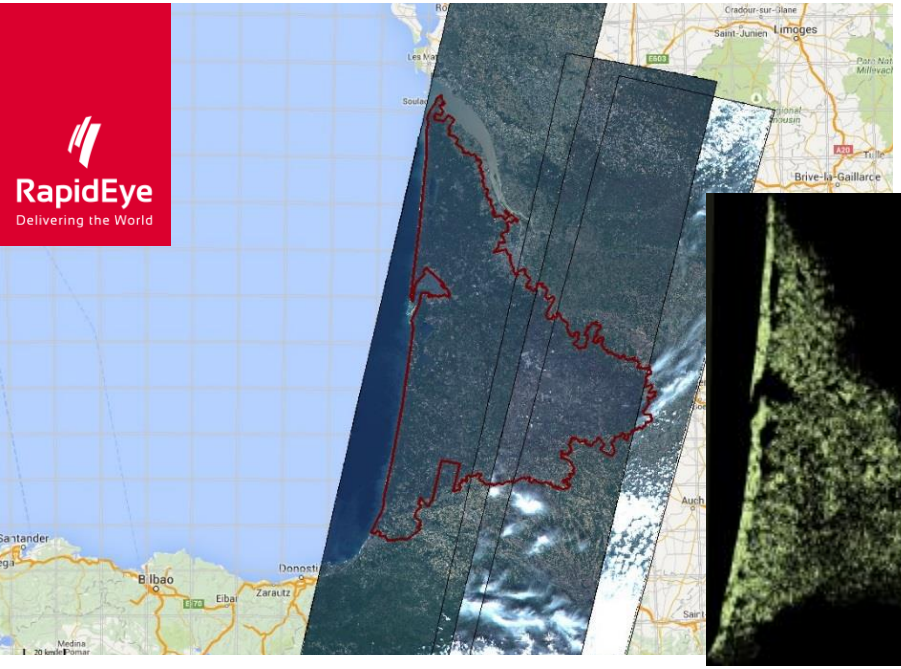
67% Leonardo Finmeccanica

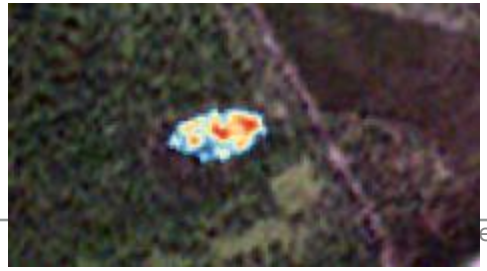
33% Thales

Telespazio

French experience with High resolution satellite (5m)

Twice a year change detection since 2015

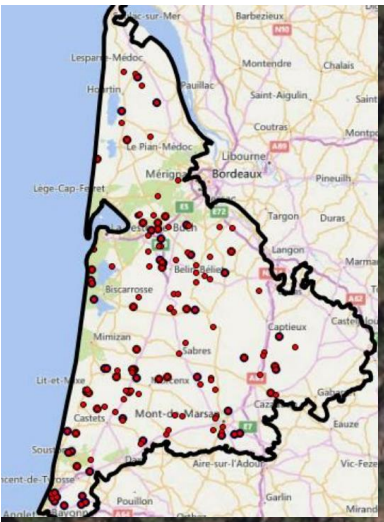




TELESPAZIO
a LEONARDO and THALES company

CAISSE PHYTO FORÊT
maison de la forêt

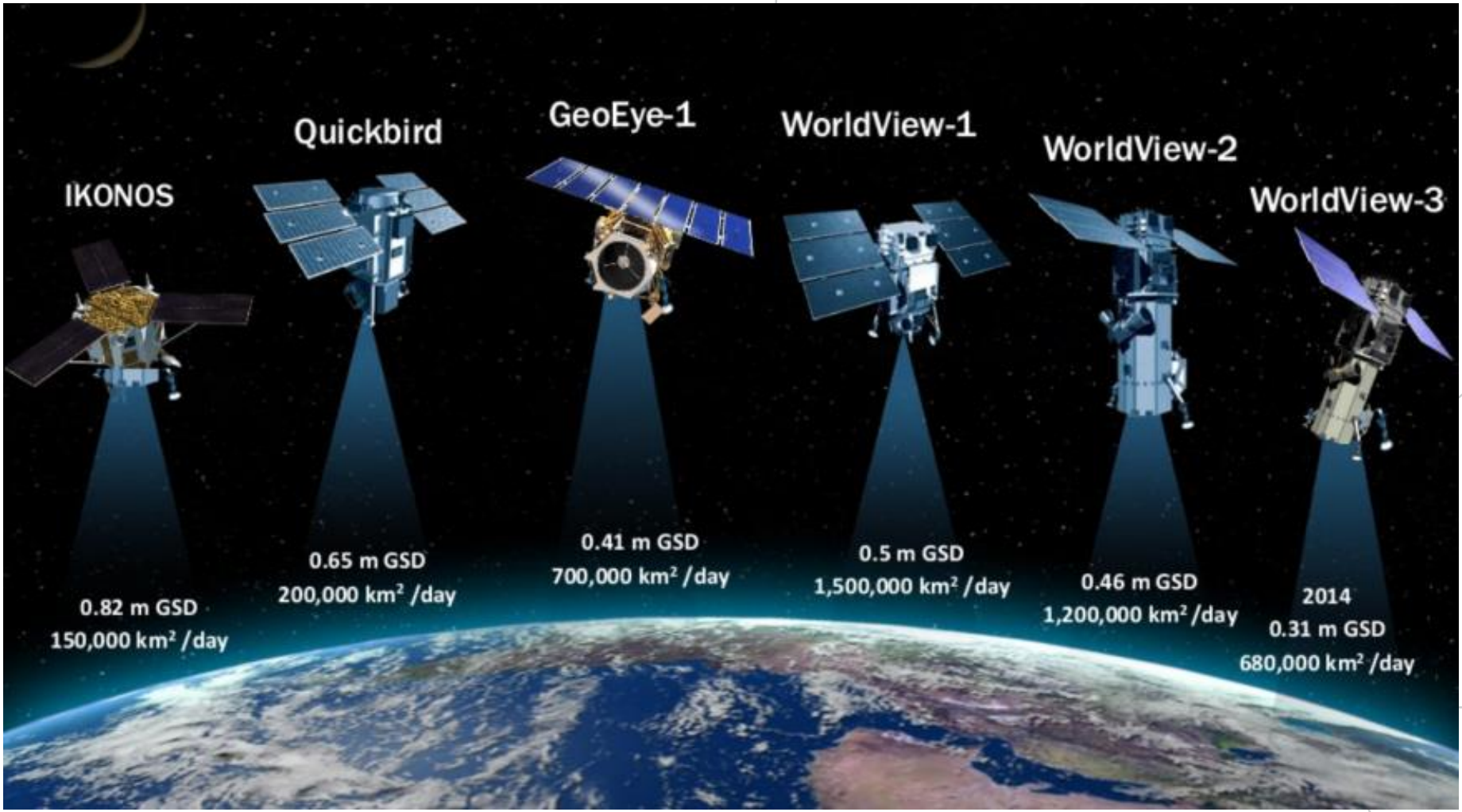
Aerial ckeck campains



Not adapted for single tree damage detection

Remote sensing data

Very High Resolution Satellite



Worldview 3 & 4

Panchromatic band (31 cm)

Pan: 450-800 nm

Multispectral bands (1.24 m)

Coastal: 400-450 nm

Blue: 450-510 nm

Green: 510-580 nm

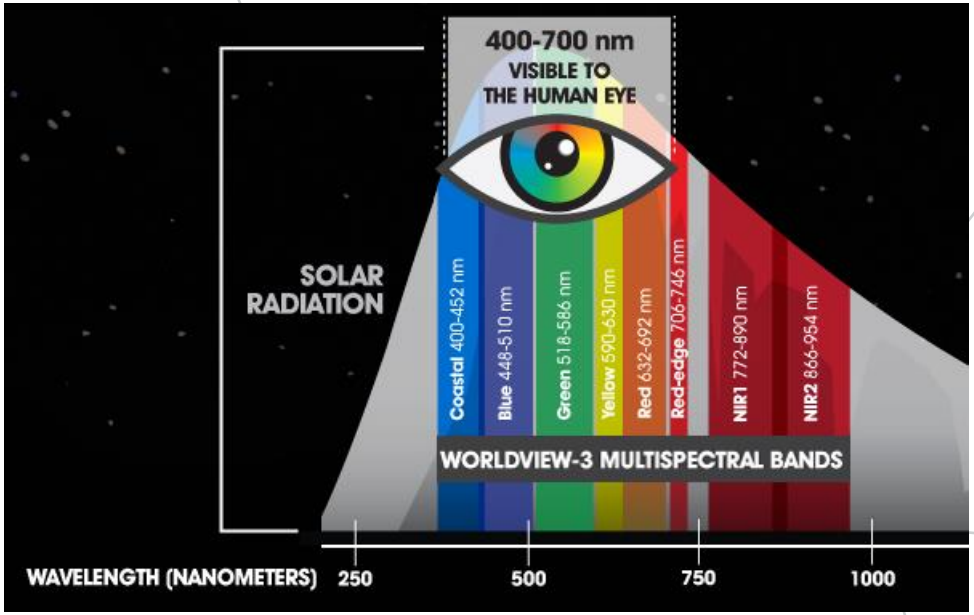
Yellow: 585-625 nm

Red: 630-690 nm

Red Edge: 705-745 nm

Near Infrared 1: 770-895 nm

Near Infrared 2: 860-1040 nm



STUDY AREA

NAZARE

100 km²

minimum tasking

Image date
23/08/2017

~55€/km²

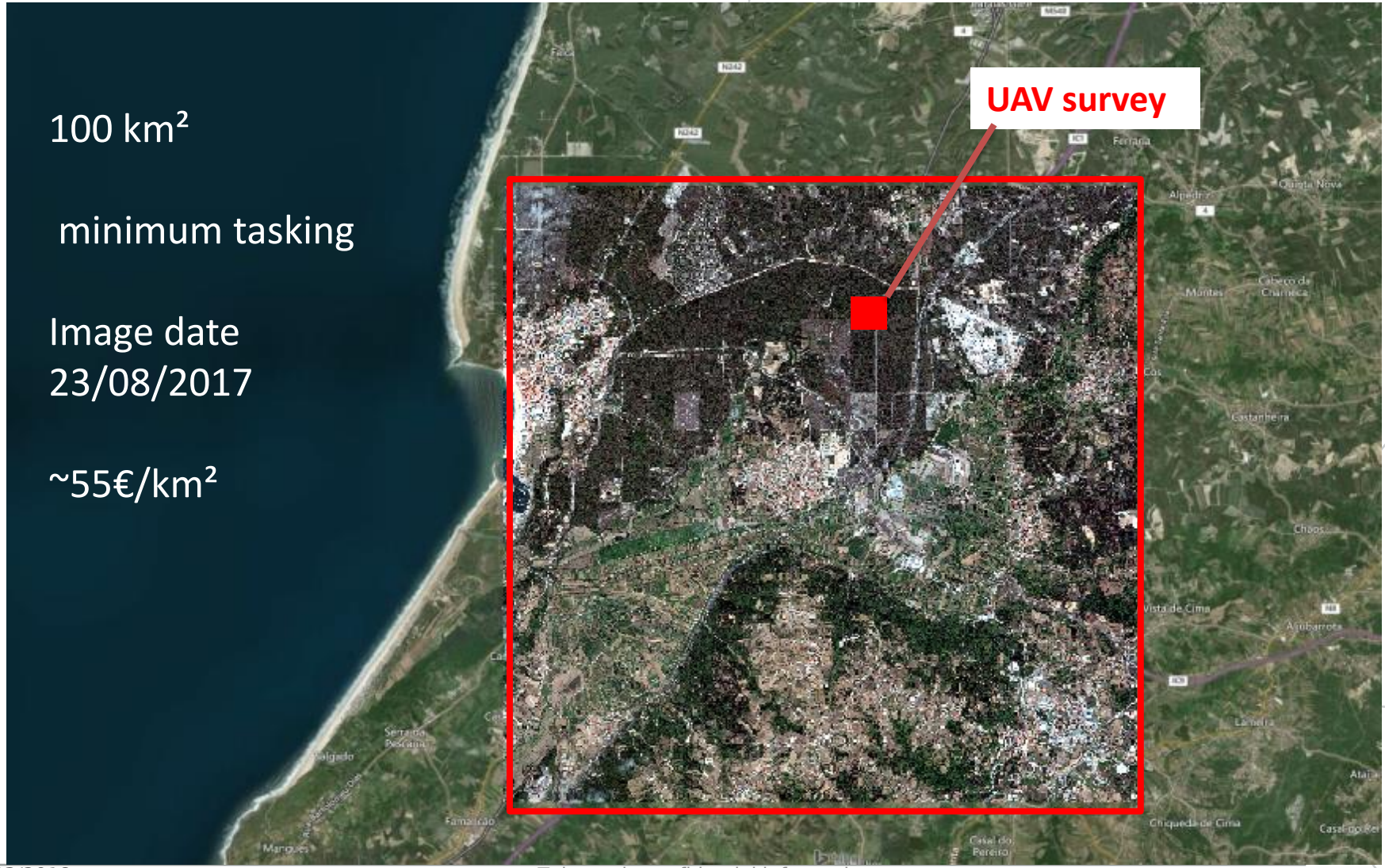


IMAGE ANALYSIS

Image processing chain

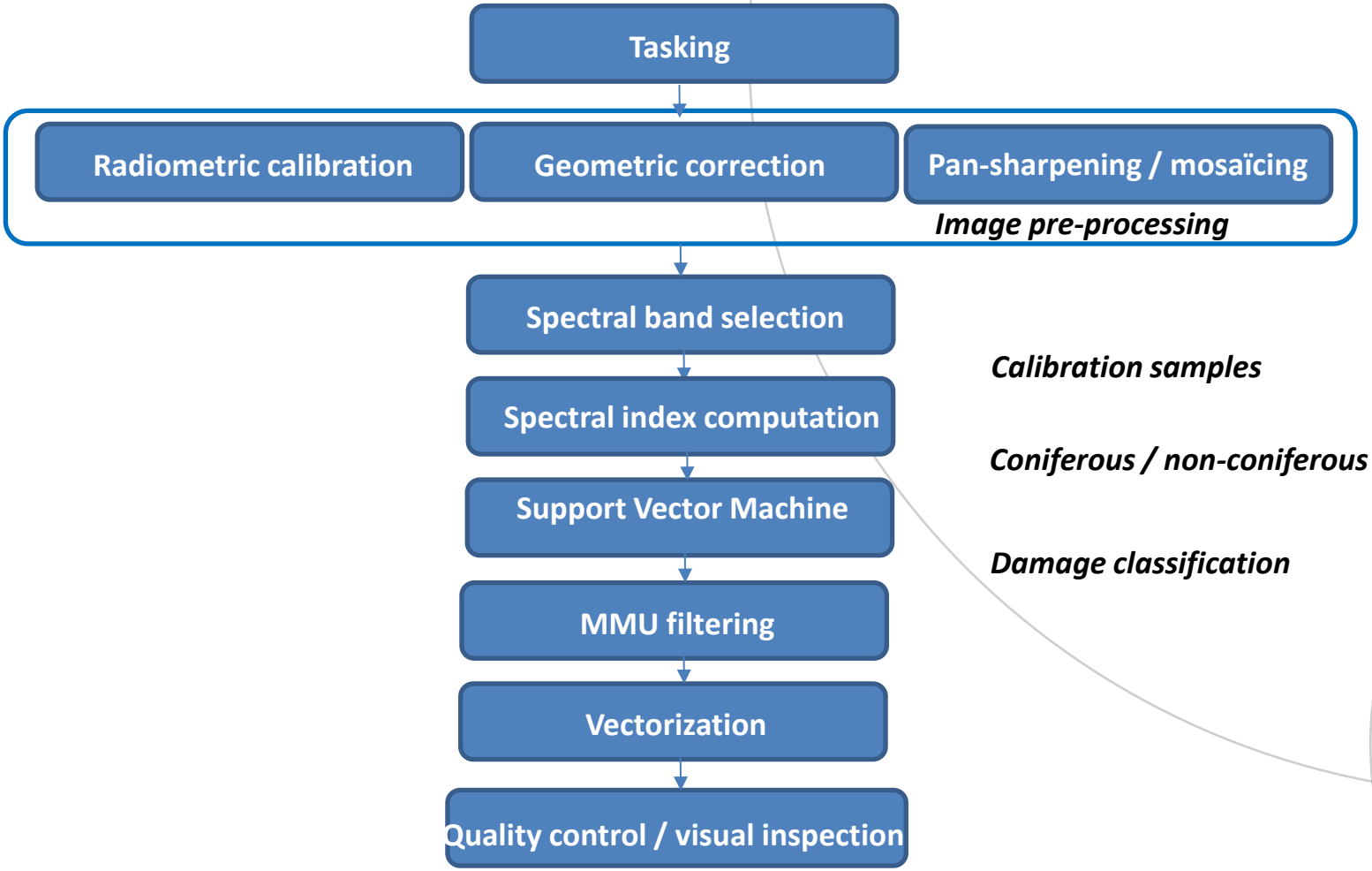
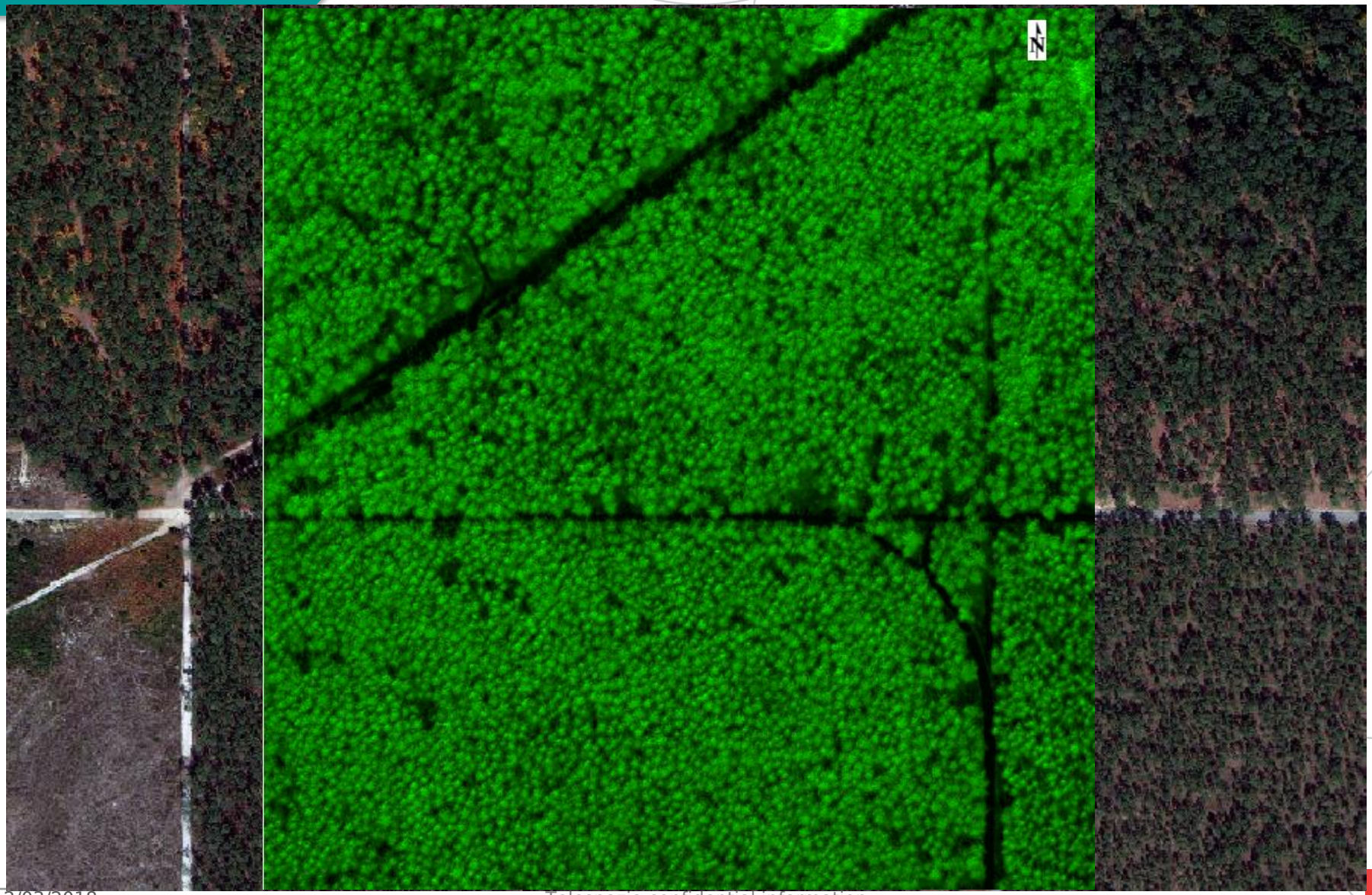


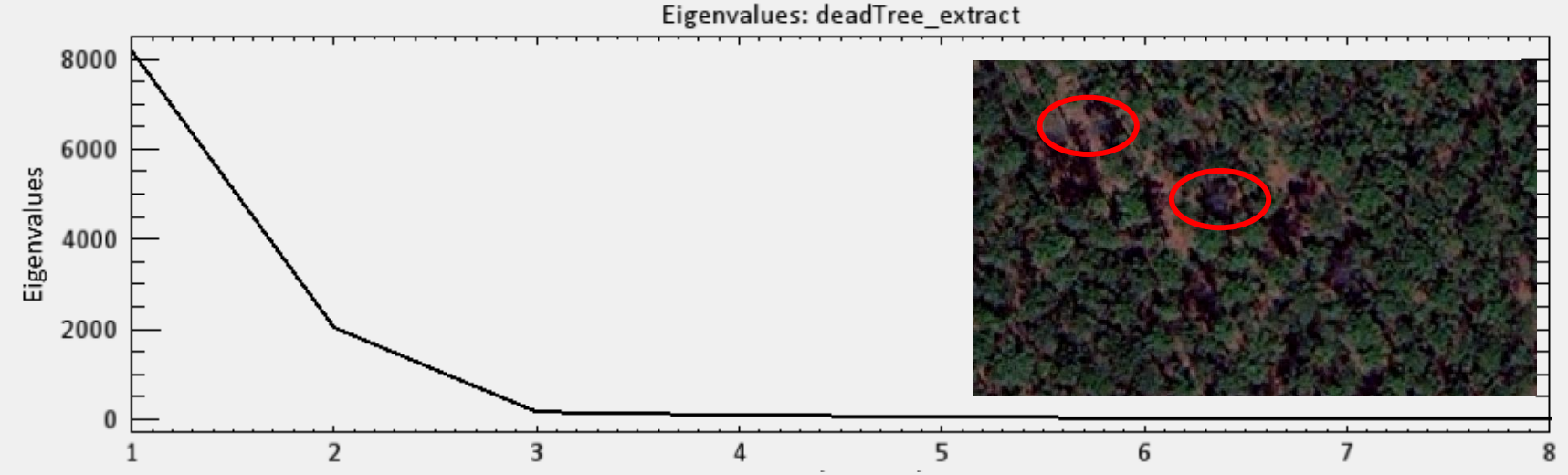
IMAGE ANALYSIS

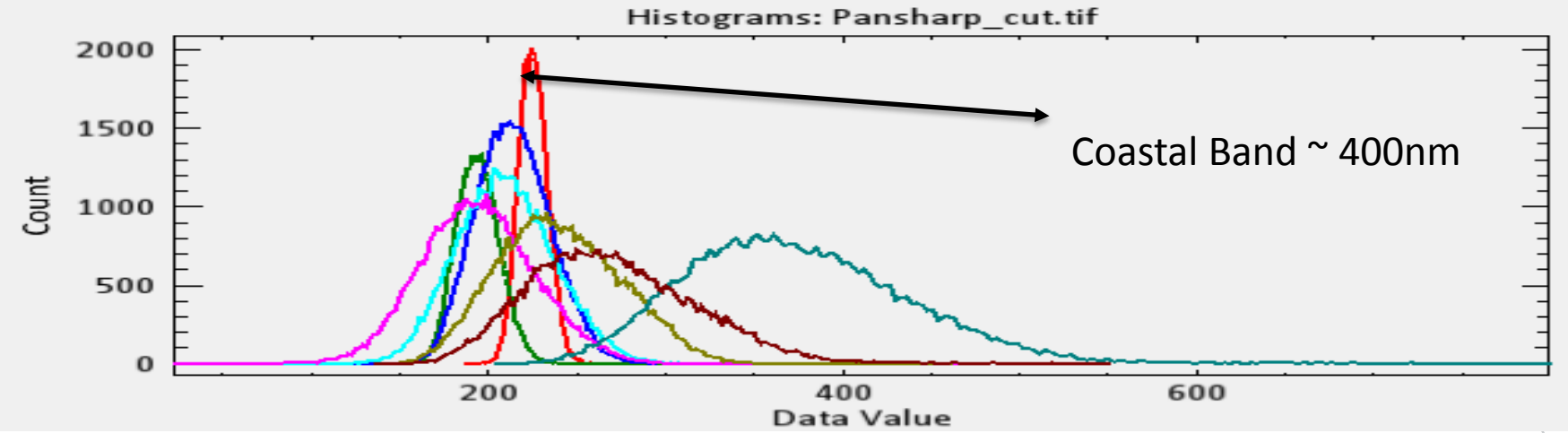
Canopy mask



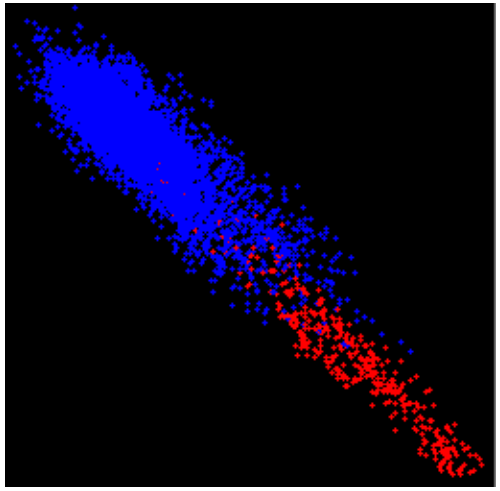
SPECTRAL ANALYSIS

Spectral band contribution

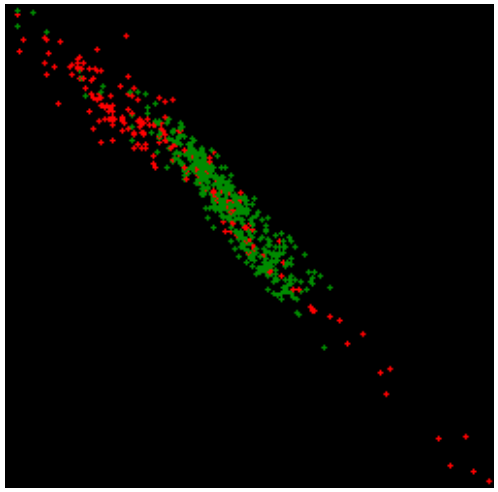




Class separability



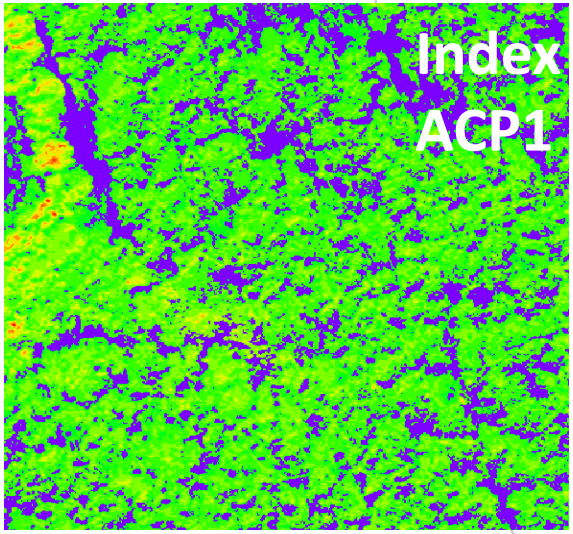
- Dead tree
- Healthy tree

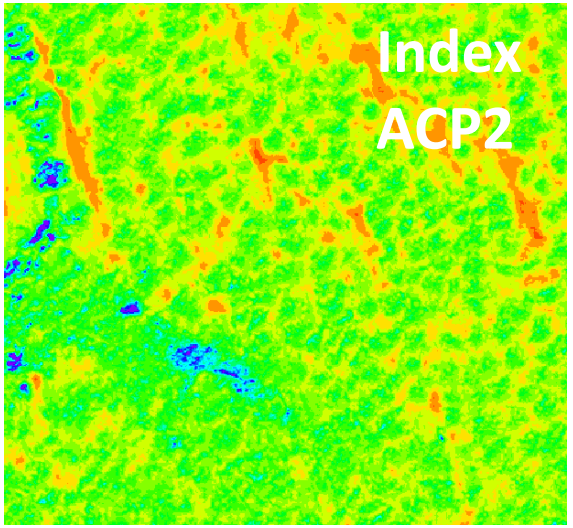


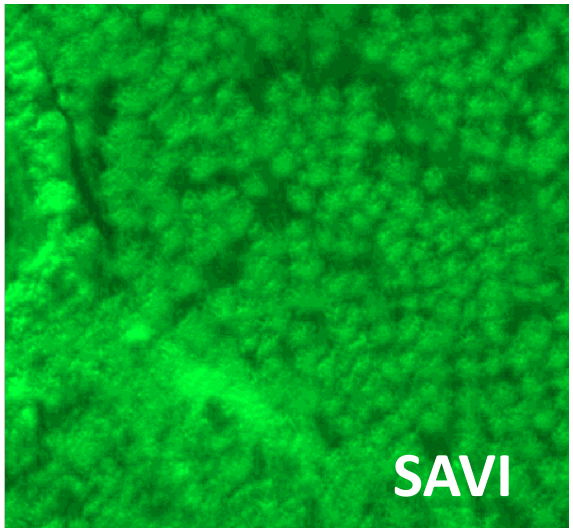
- Red/Brown attacks
- Understorey

SPECTRAL ANALYSIS

Processing chain steps

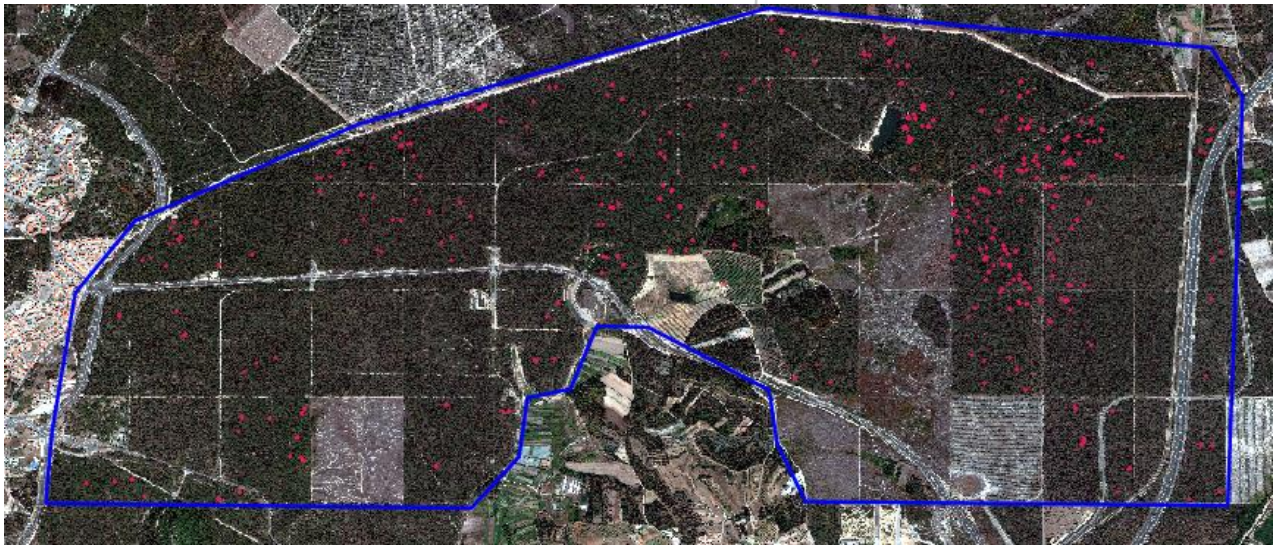




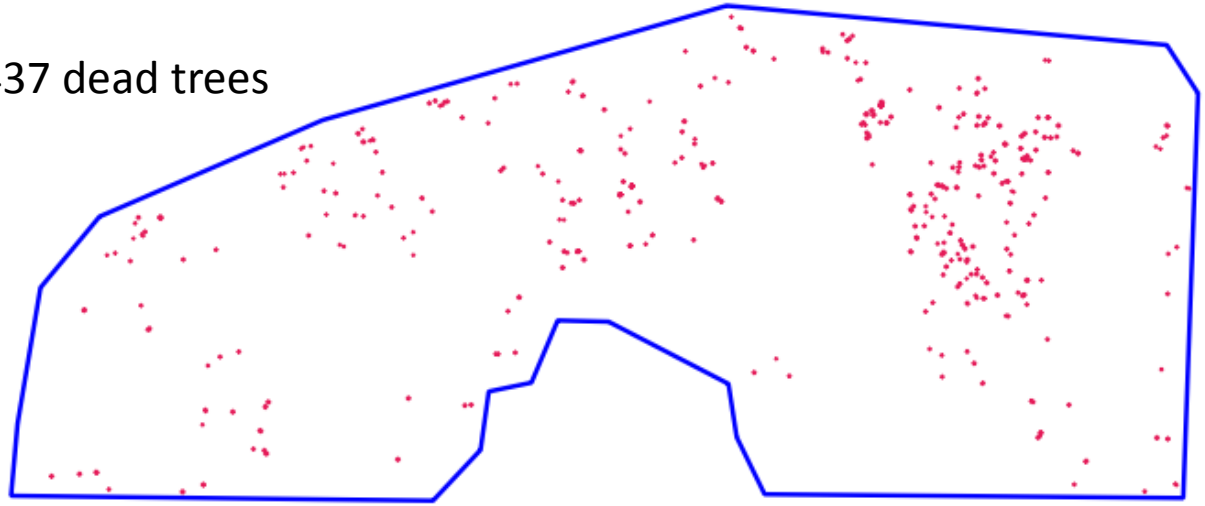


DETECTION

Preliminary results

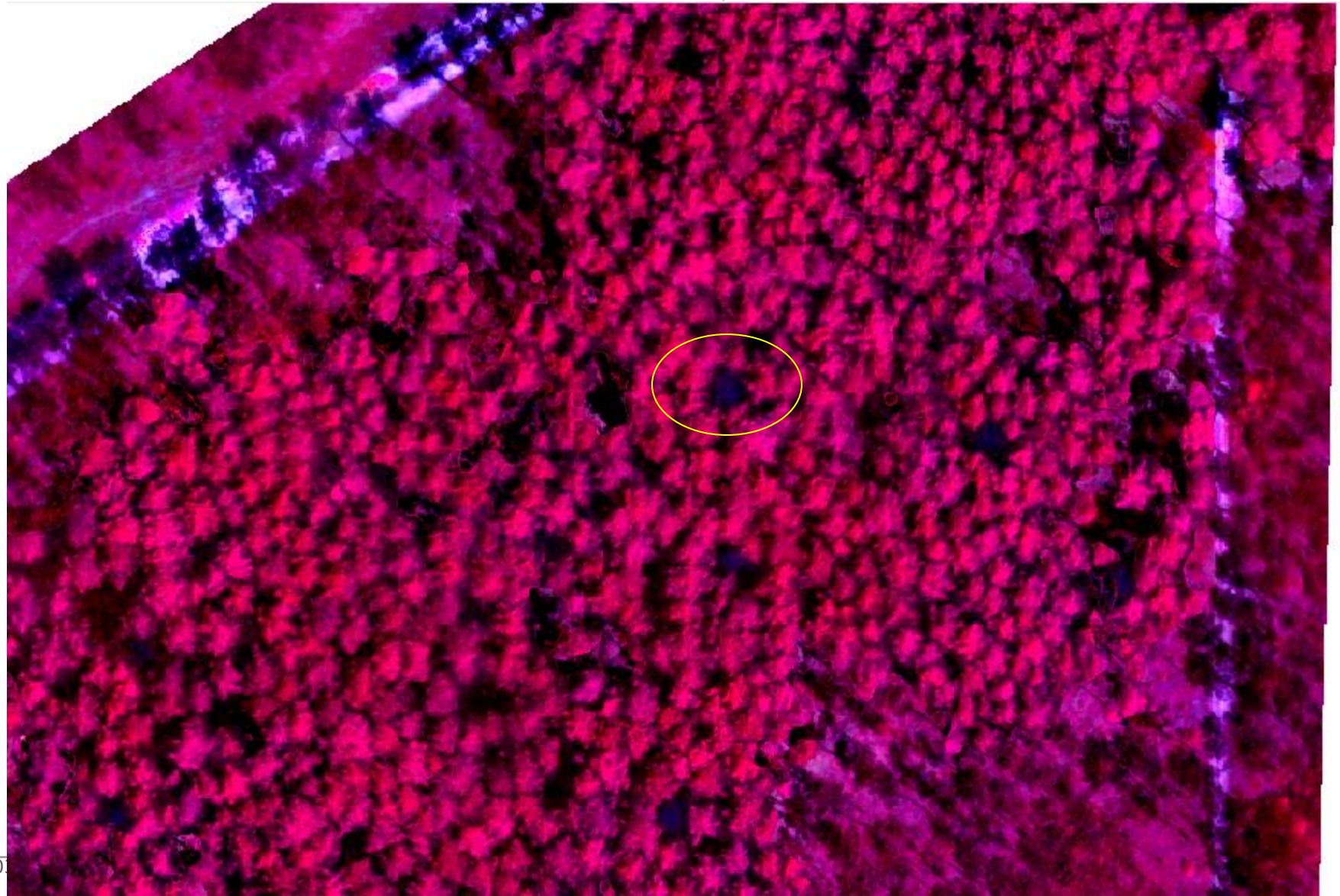


437 dead trees



CROSS COMPARISON

Preliminary results

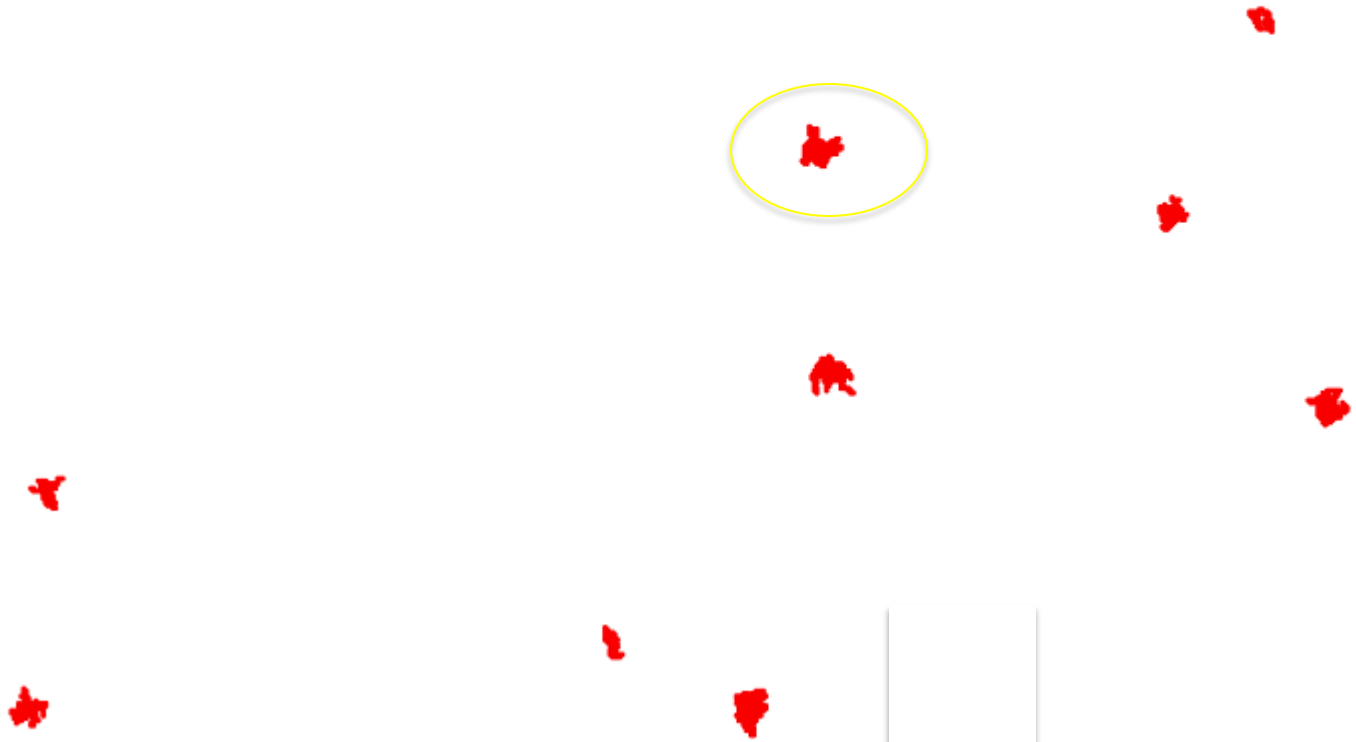


CROSS COMPARISON

Preliminary results

To be compared with

- Ground survey of november
- The ultimate UAV flight…

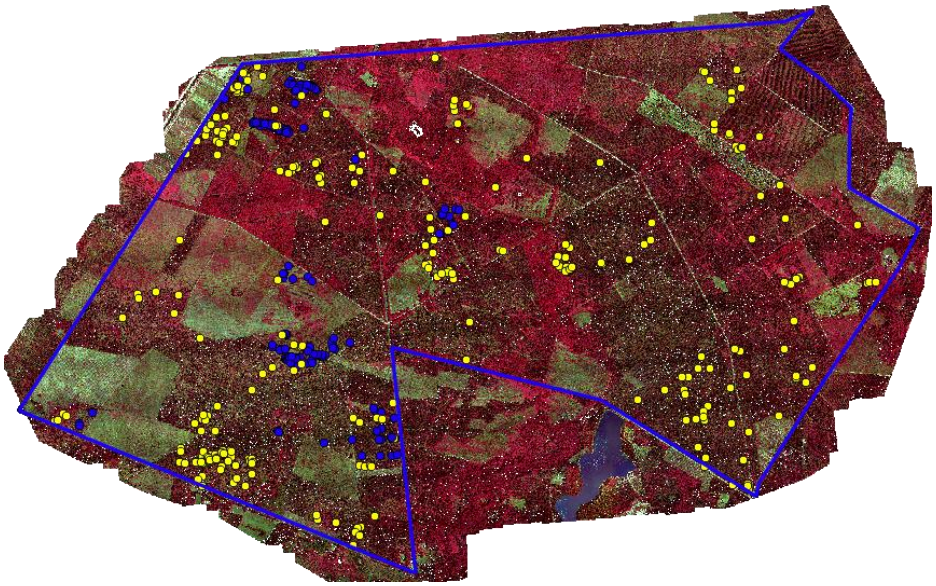


Aerial survey

Spatial resolution impact on photo-interpretation results

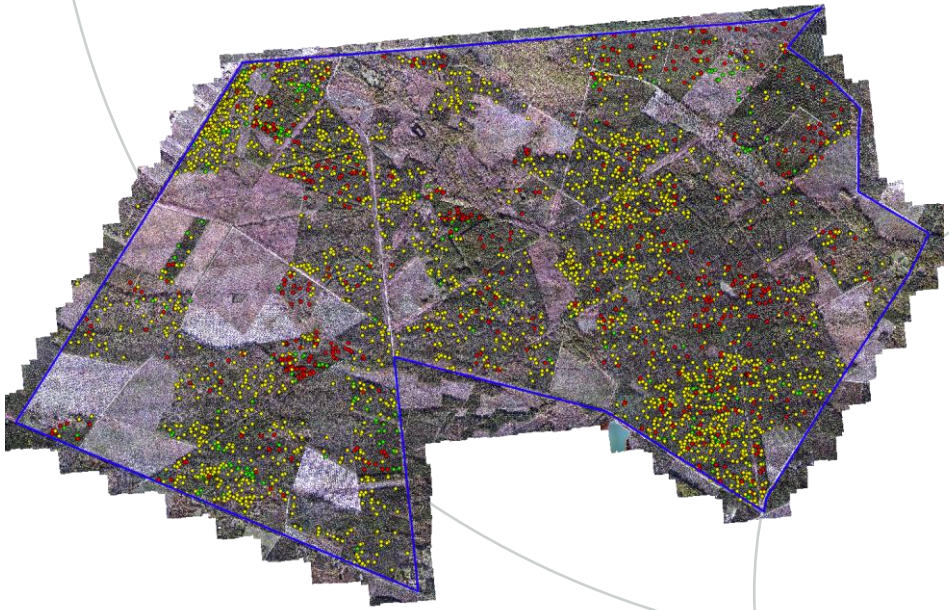
IRC 20cm
(353 photos)

Died (362)
Discolorated (166)



R-V-B 5cm
(1076 photos)

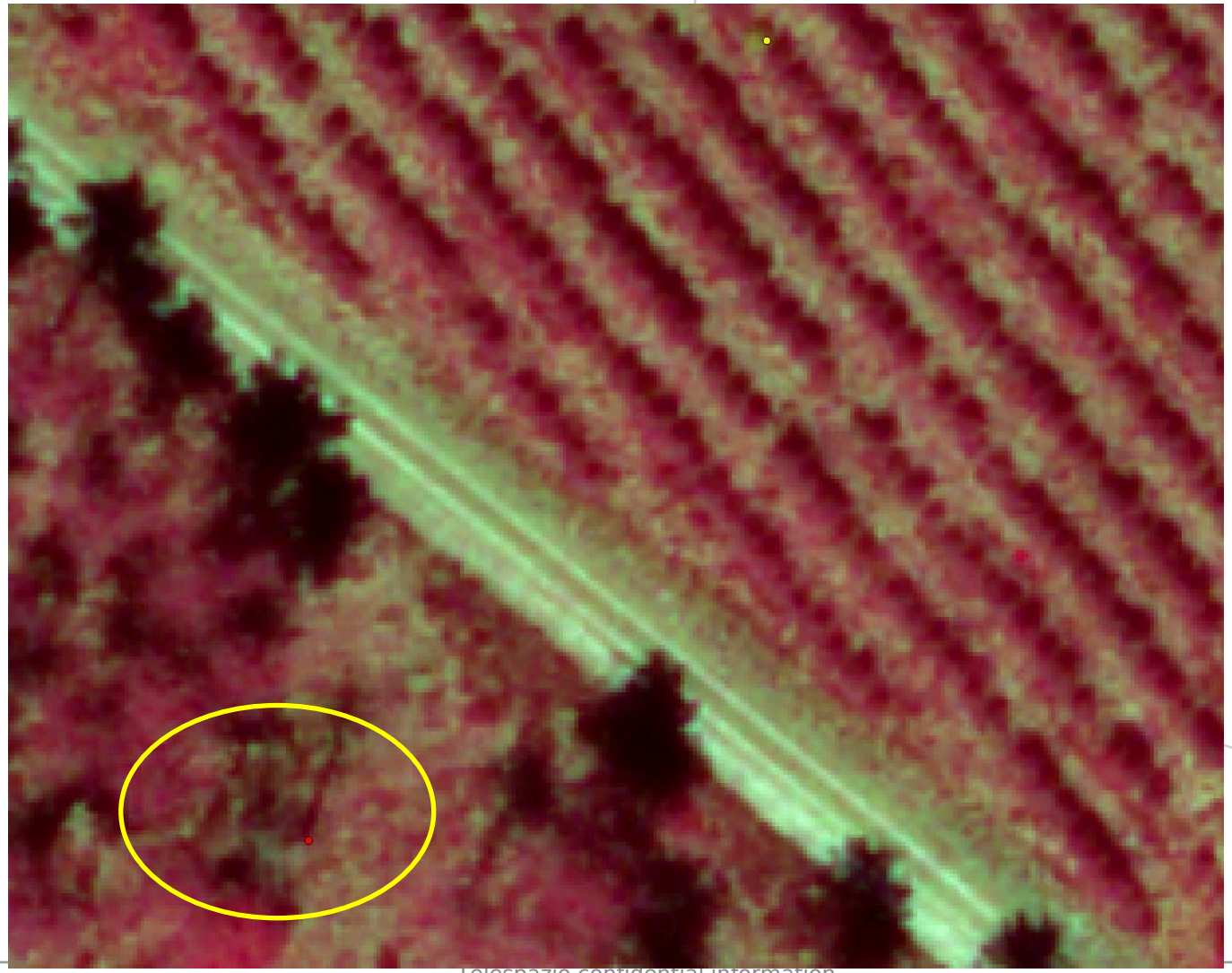
Died (3101)
Discolorated (711)



The prevalence of pine trees with projected crown diameters of 2 m or less dictates the use of very high resolution imagery for tree-level forest monitoring in the context of the Pine Wood Nematode threat.

SPATIAL RESOLUTION

Aerial campain
IRC20cm vs IRC 10 cm

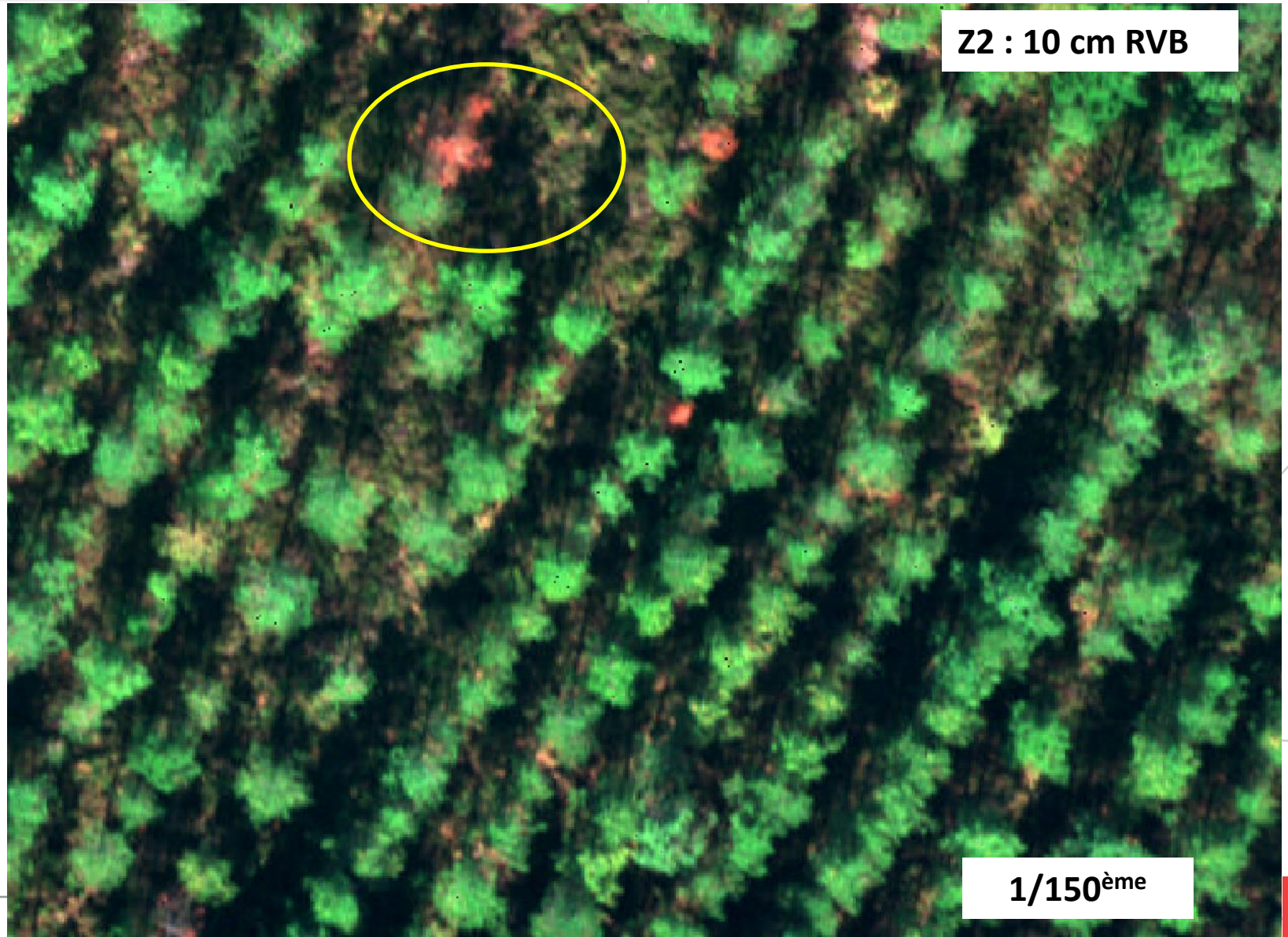


SPATIAL RESOLUTION

Aerial campain
IRC 20cm vs IRC 10 cm

SPATIAL RESOLUTION

10cm vs 5 cm



SPATIAL RESOLUTION

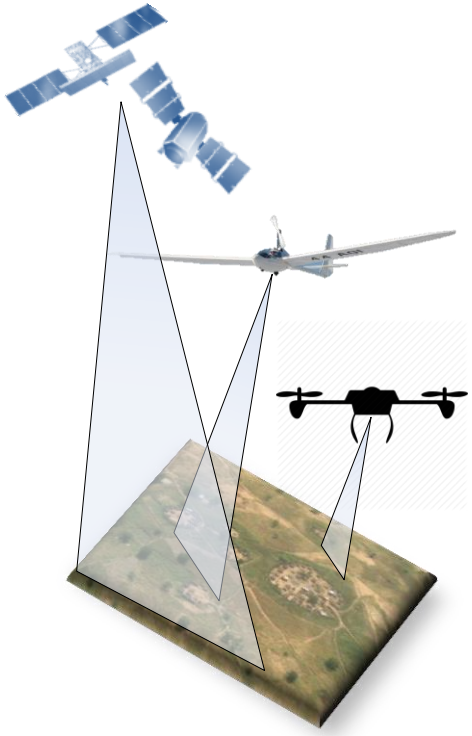
10cm vs 5 cm

Conclusion

Vector complementarity ?

To provide a detailed record of individual coniferous tree crowns in the buffer zone, the area should be imaged in colour at 10 cm or higher spatial resolution.

Potential of **Satellite** images acquired for forest monitoring in the context of the PWN emergency relies



- More to monitor than a early detection
- Change detection than a single scene damage classification
- Perfect georegistration is needed to ensure that

UAV / aerial

- Spatial resolution ok but operational limits (extent, flight duration, aviation rules & legal restrictions, UAV can be more affected by adverse weather conditions.
- On board sketch mapping can be more cost-effective