Using unmanned aerial systems for the monitoring of Belgium forests:

discrimination of tree species based on time series of airborne images

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BEODays 2013, 20 november 2013

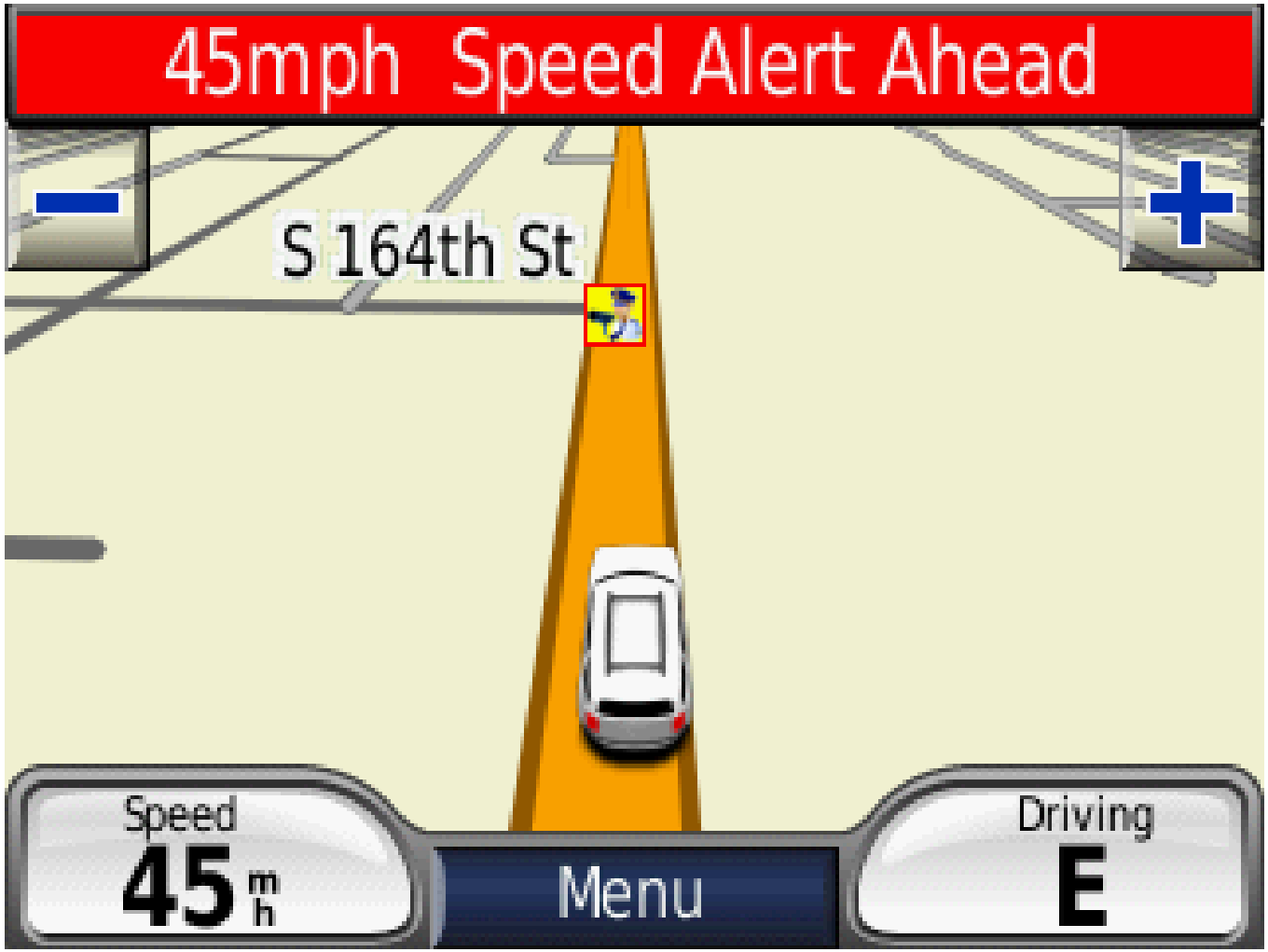
Plan

Introduction

Measurement of the vegetation height

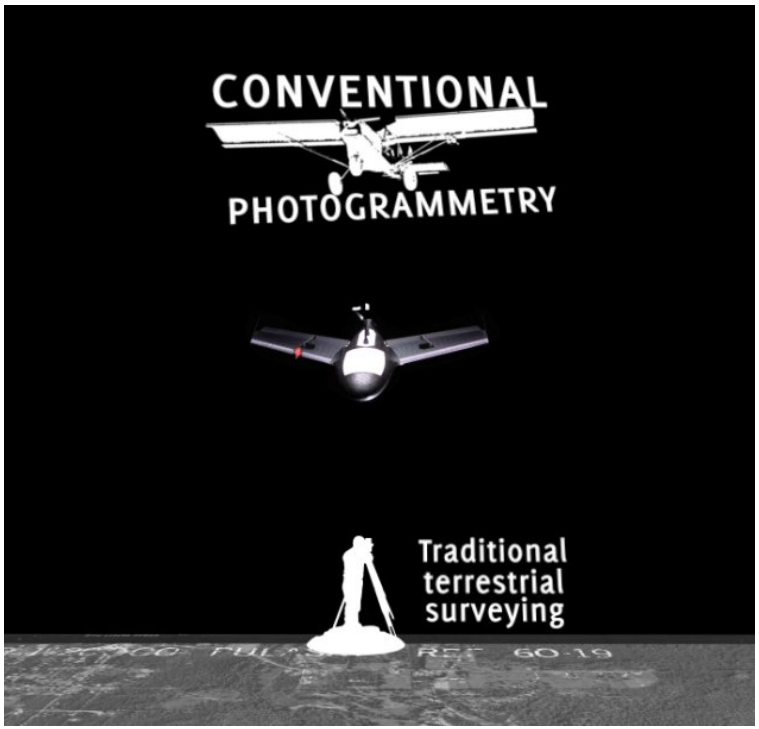
Discrimination of tree species

Decision-making tool



What is the added value in comparison to others remote

- The spatial resolution : unmanned aircrafts fly at low-altitude, cover relatively small area but result in a very high resolution.
- The temporal resolution : UAS deployment is quick and operational costs are low. Revisit period can fit ecological phenomenons.



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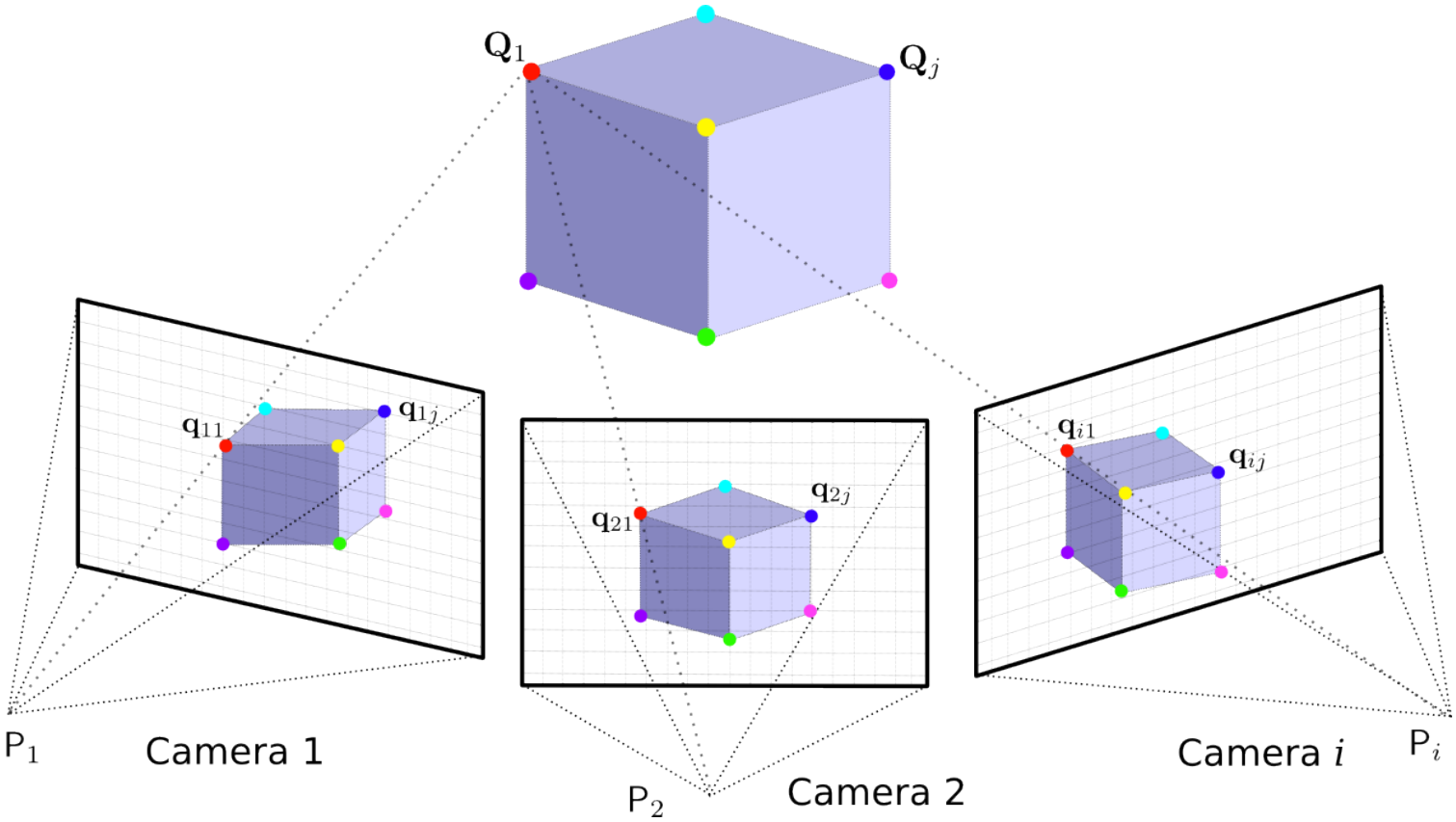
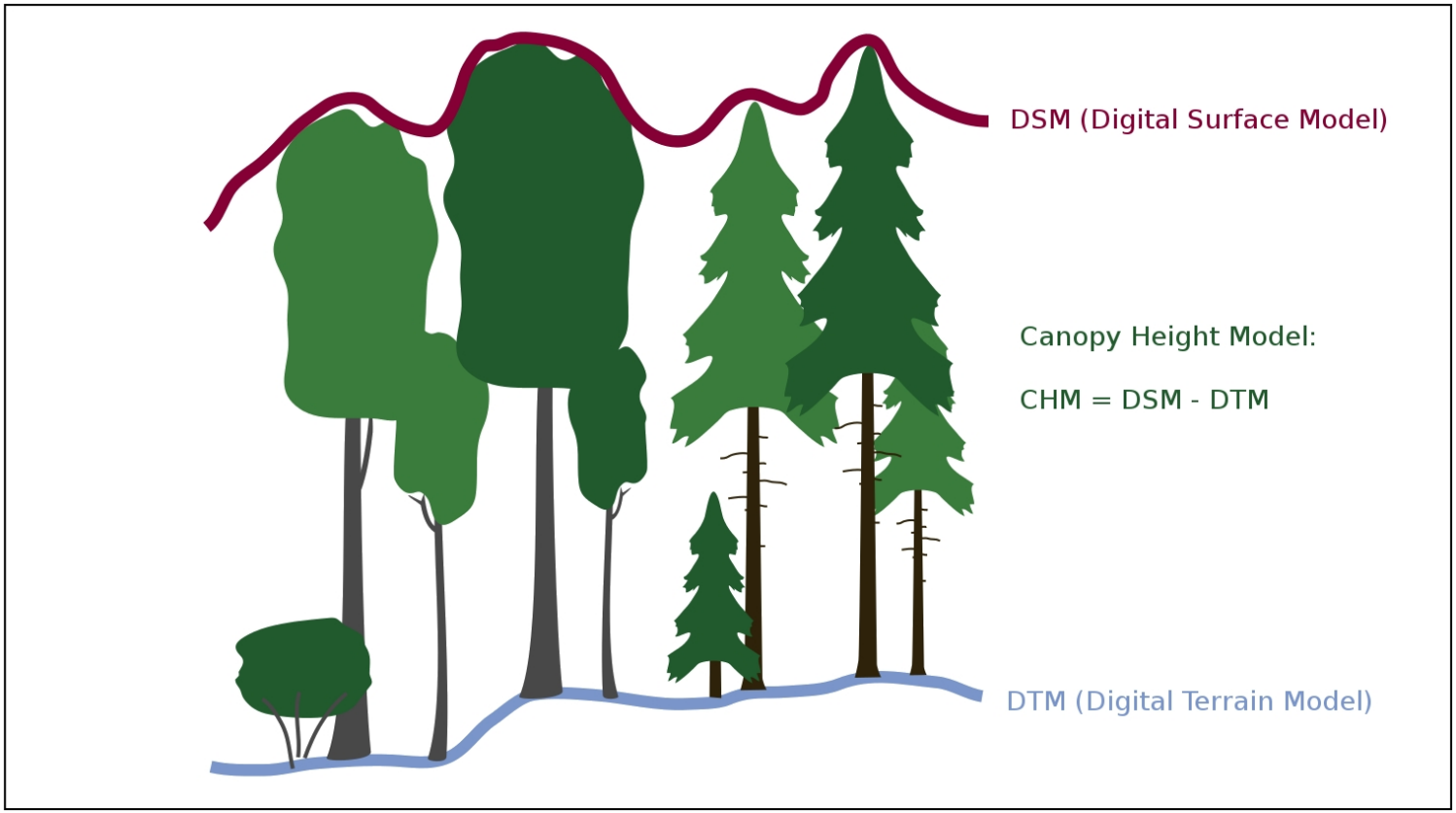
Structure from Motion / Photogrammetry



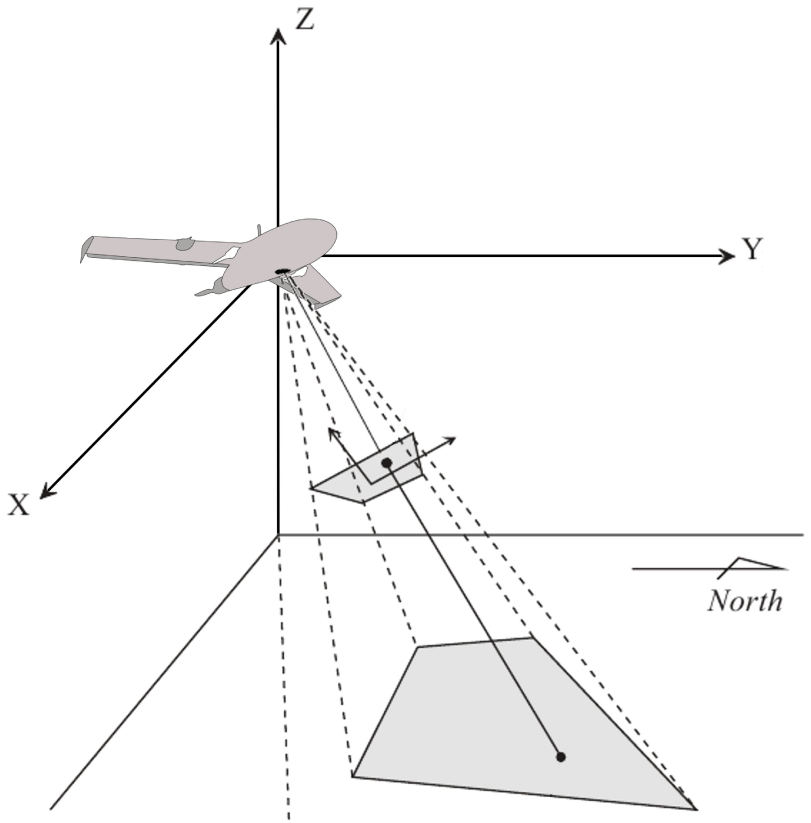
courtesy : Julien Michot

Canopy height model



Low-oblique vantage

Low-oblique vantage images require true orthorectification in forested area.



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Goal : identifying species based on their phenology through the use of UAS imagery. Defining which orthophotos are the more essential for species discrimination (time windows, metrics).

- 24 flights during 3 seasons (spring, summer and autumn)
- flight altitude from 150 to 350 meters
- from spring 2011 to autumn 2013
- a total of 12700 images

Time series of Grand-Leez

Pipeline :

1. Images acquisition
2. Processing Images block and co-registration
3. Delineate tree crowns (photo-interpretation) of known species (field inventory)
4. Compute metrics for each tree crown from time series

5. Classify tree crowns

Pipeline :

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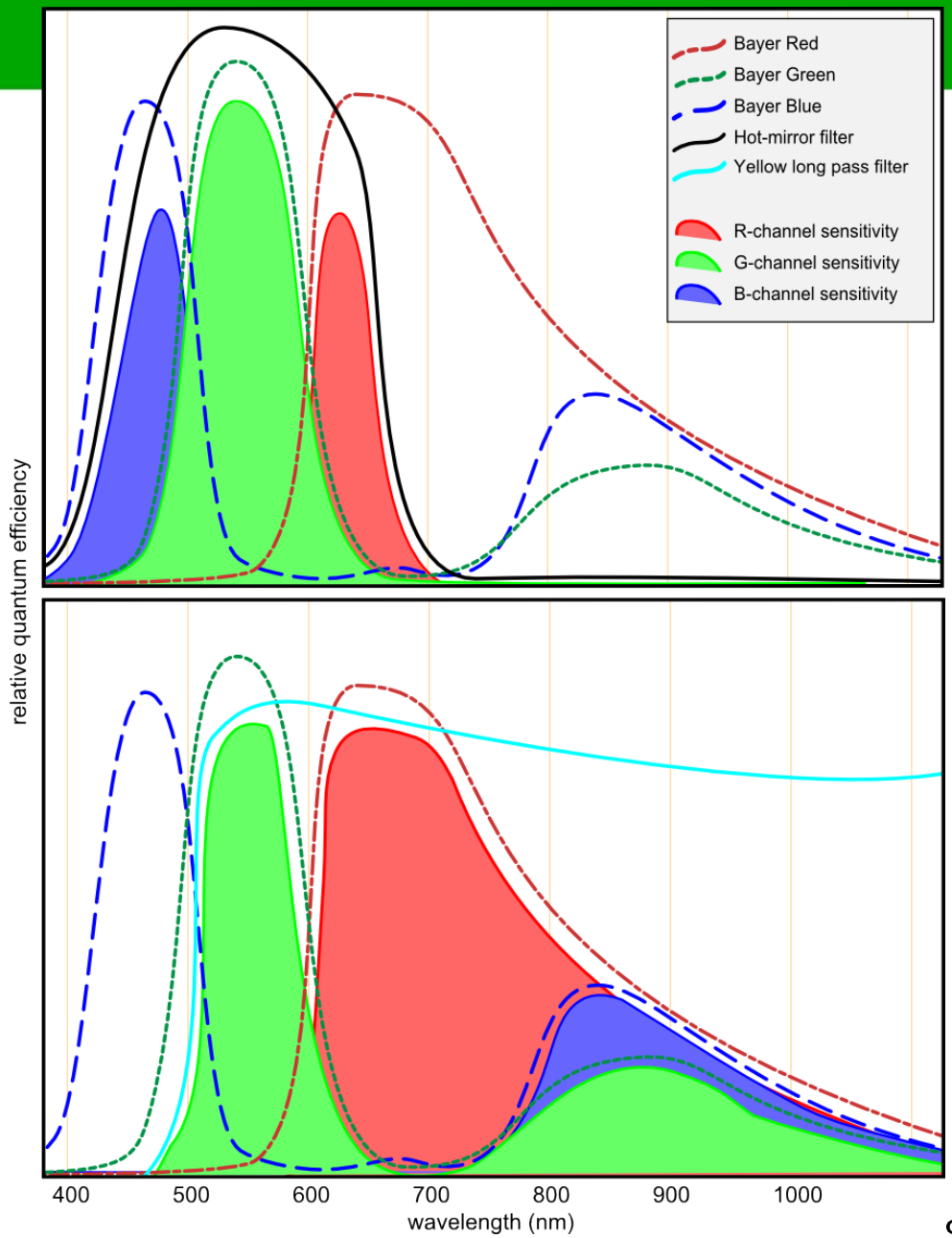
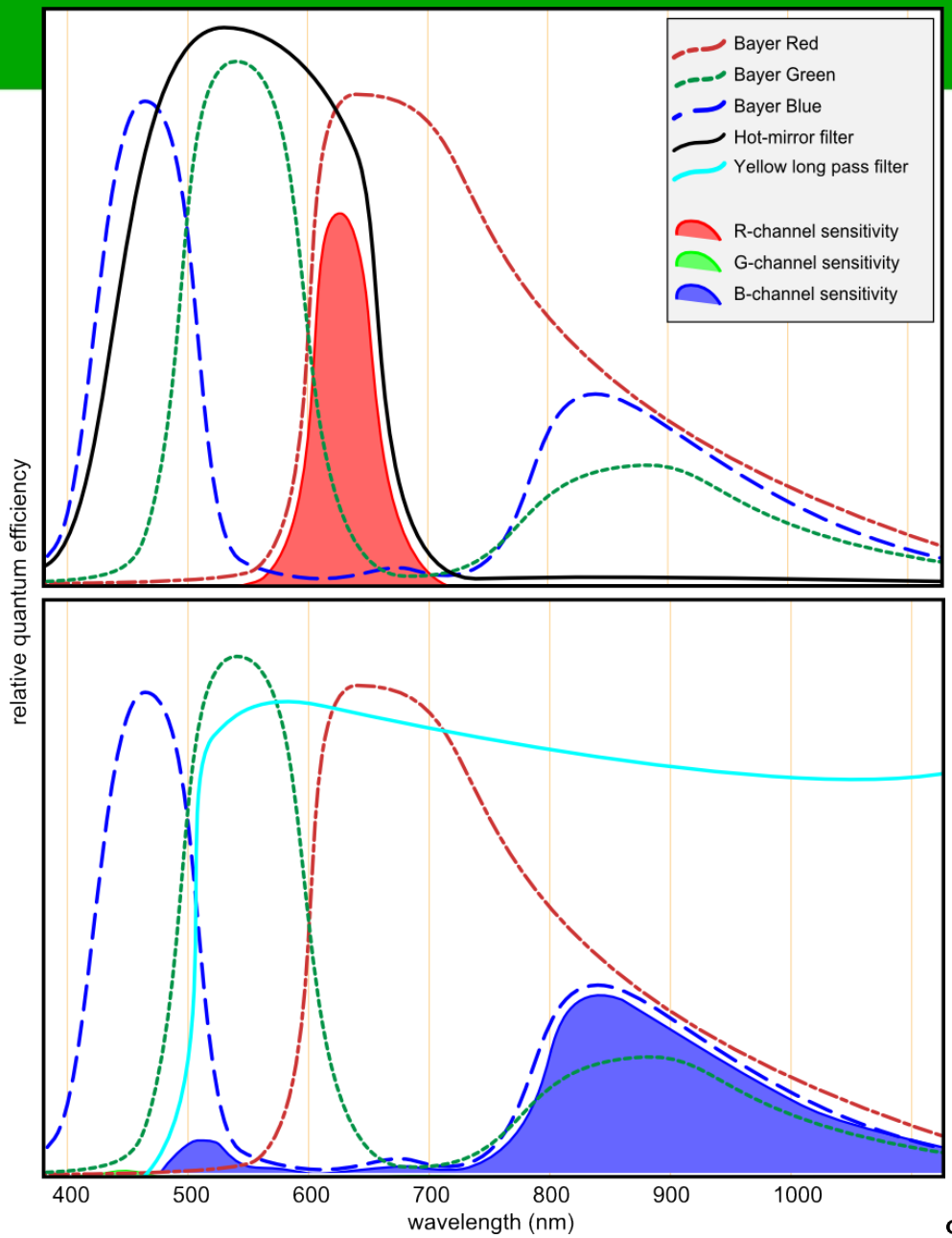
Modified Camera



courtesy : Rogier de Jong

Modified Camera



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Time series of Grand-Leez

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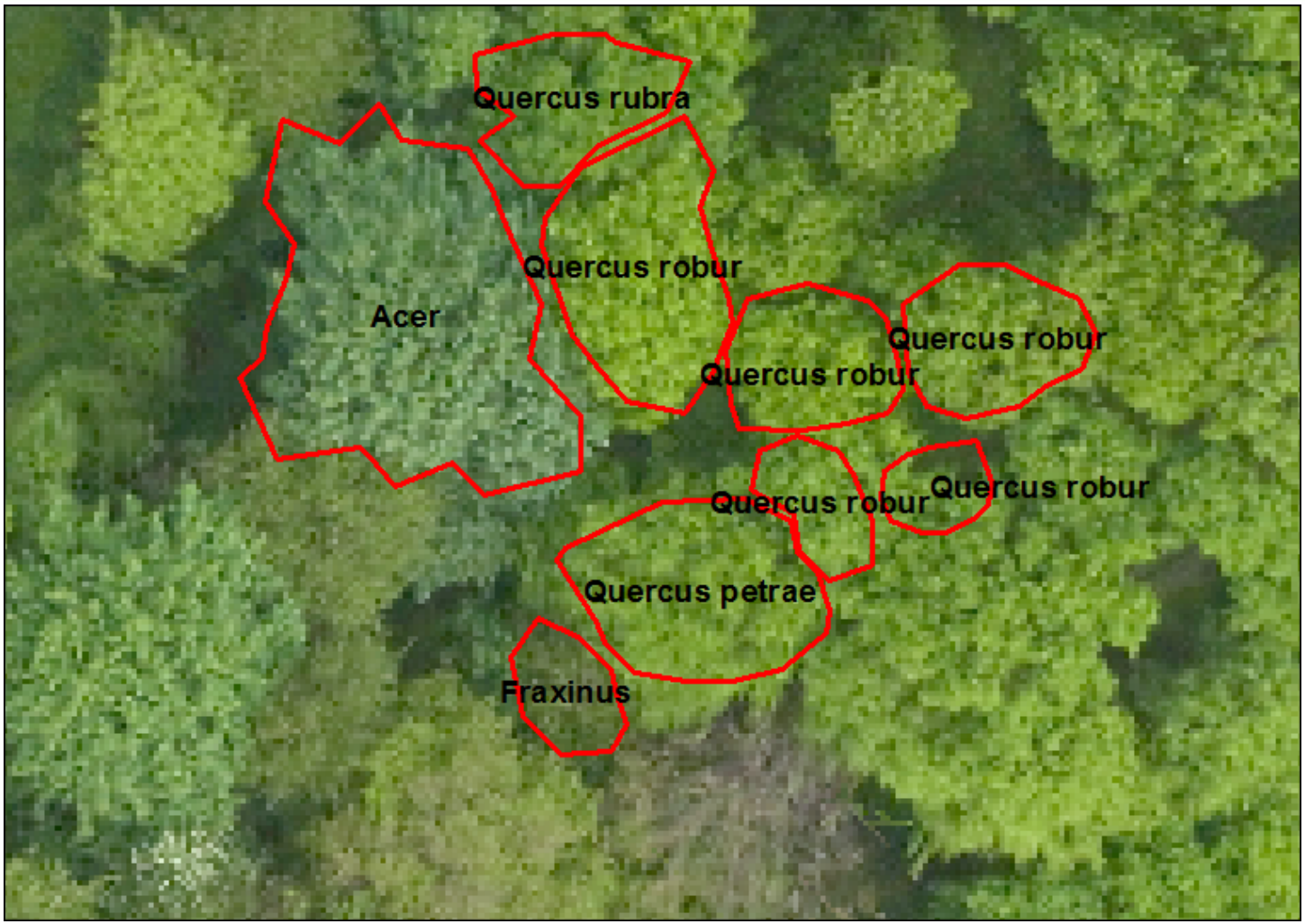

Thank you for your attention

Presentation will soon be available on Orbi