PHENOME 2020

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Radiometric calibration of airborne spectral data for plant phenotyping:

a journey from raw images to reflectance images

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Objectives:

The objectives were to:

1- Study the importance of radiometric calibration, with the focus on radiance conversion.

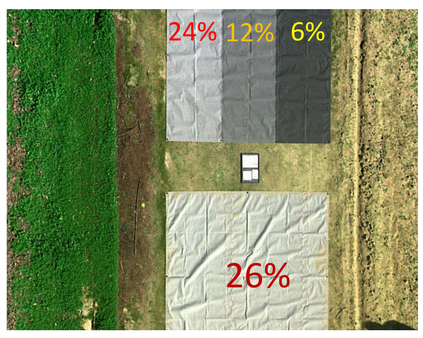
2- Identify the best approach for reflectance conversion.

Digital number → Radiance ($Wm^{-2}sr^{-1}nm^{-1}$) → Reflectance

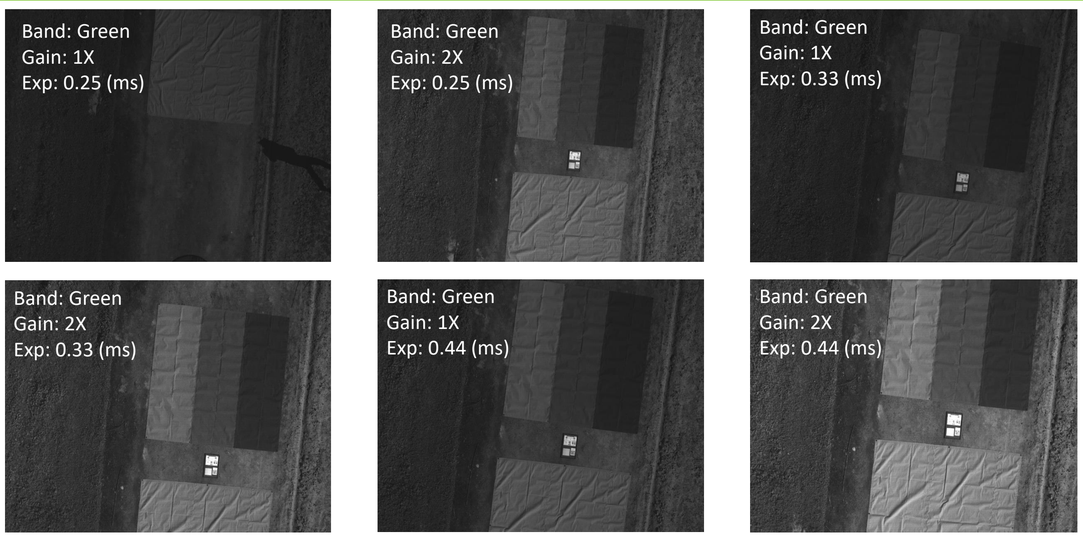
Multispectral imagery

Camera: Micasense RedEdge
Drone: DJI Matrice 210

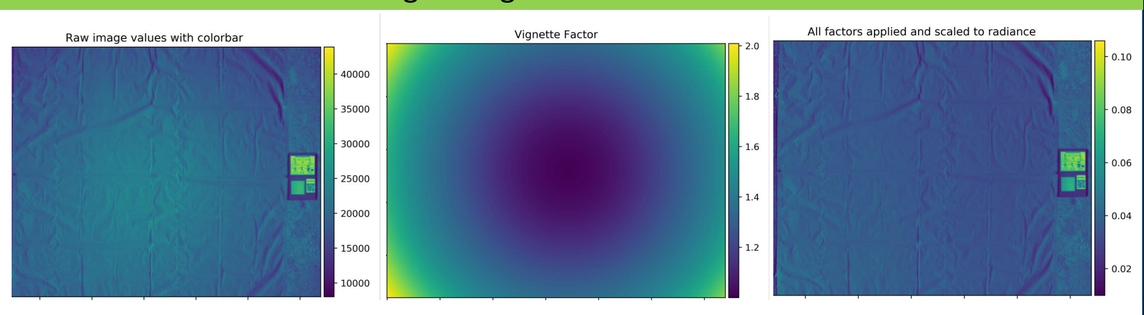
Tarps with various reflectivity



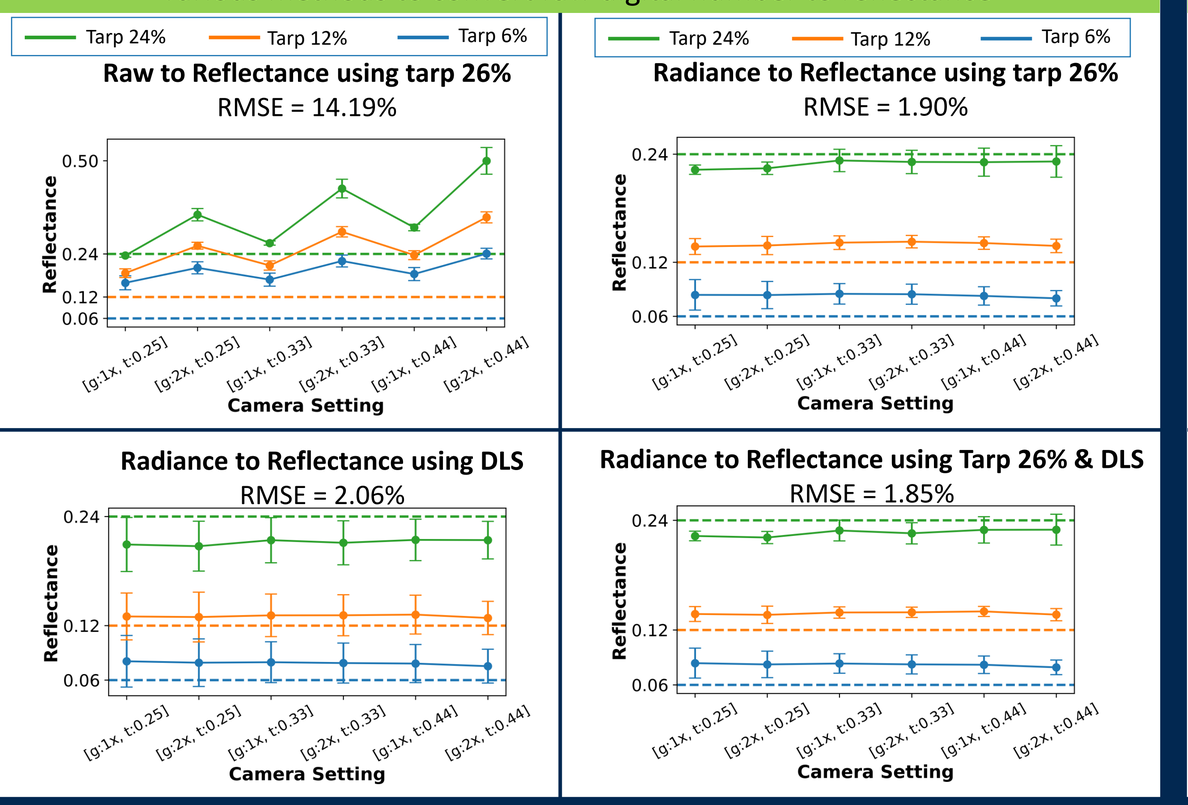
Flying over tarps at 10-meter altitude with 6 gain/exposure settings



Vignetting issue– NIR Band



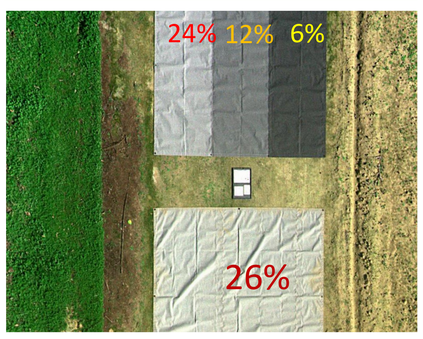
Various methods to convert raw digital number to reflectance



Hyperspectral imagery

Camera: PIKA L, Resonon
Drone: : DJI Matrice 600Pro

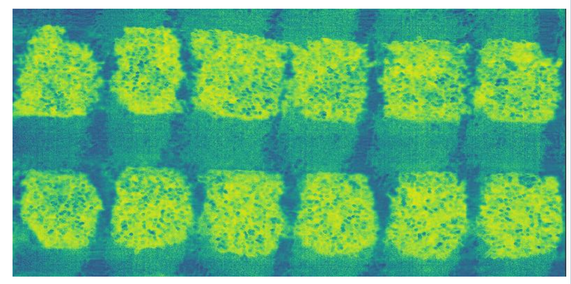
Tarps with various reflectivity



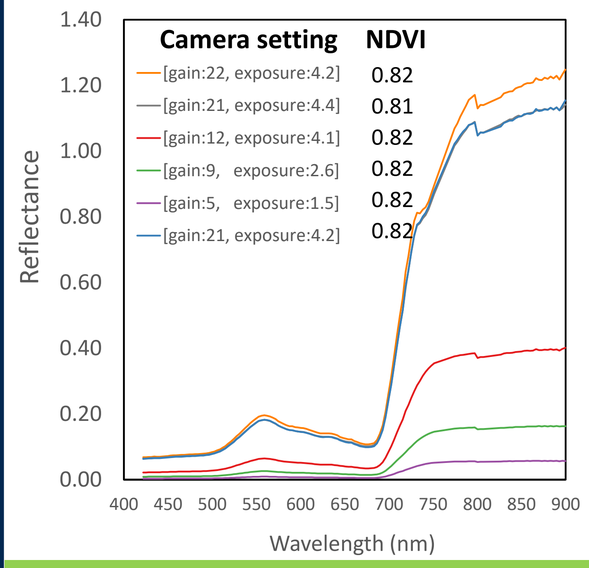
Flying over tarps and citrus trees at 20-meter altitude with 6 gain/exposure settings

RGB representation of a hyperspectral image

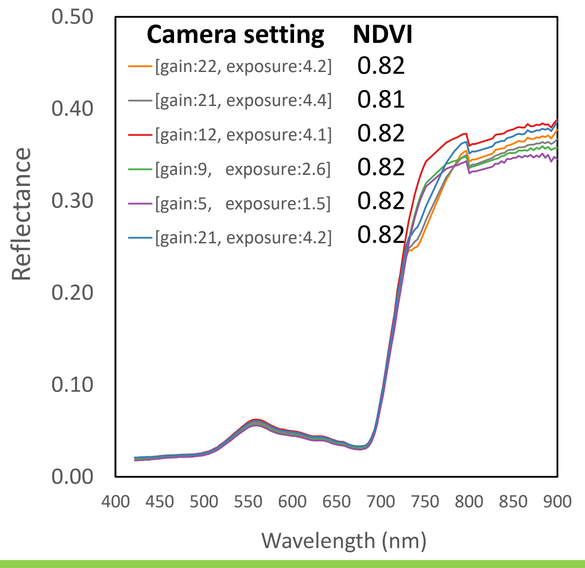
Normalized Difference Vegetation Index (NDVI)



Raw to Reflectance



Radiance to Reflectance



Various methods to convert raw digital number to reflectance