

UAV-based SR validation protocol

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Wageningen University contribution to IDEAS-QA4EO

IDEAS-QA4EO Phase I

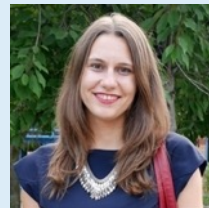


Benjamin Brede
(now GFZ Potsdam)

- WP-2140 Land Cal/Val - forest site
- WP-2342 UAV-based Surface Reflectance - support sensor characterisation and protocols



IDEAS-QA4EO Phase II



Magdalena Smigaj

- Continuation of work on UAV-based surface reflectance retrieval
- WP-2520 Support to SRIX4VEG campaign

UAV-borne spectroscopy



- Upsurge in the availability of UAV hyperspectral sensing systems.
- High interest for:
 - Local scale applications requiring high spatial resolution, e.g. precision agriculture,
 - Use as an intermediate step for upscaling,
 - Validation of surface reflectance.

UAV-borne spectroscopy

- Variety of solutions on the market with different sensing systems, mounting solutions, processing workflows.
- Additional uncertainty from variations in data acquisition designs (operator-induced).

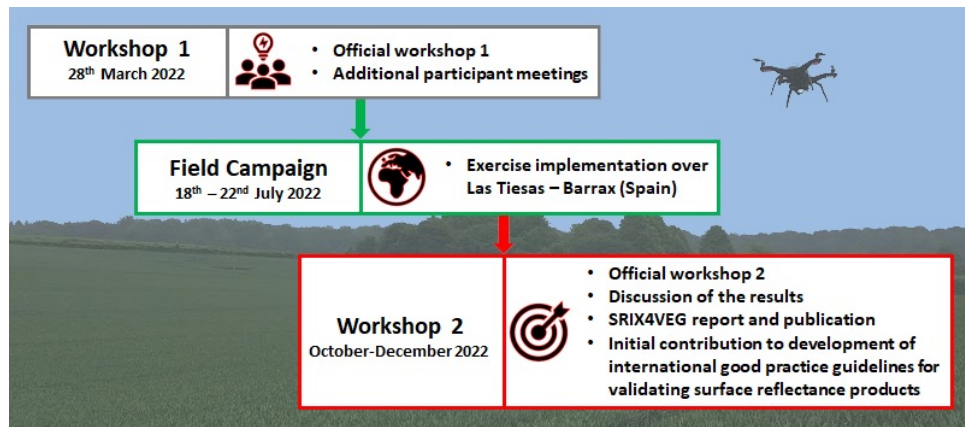
Comparability of spectral information collected with different systems and different teams?



SRIX4VEG campaign in Barrax, Spain (July 2022)

- Assess the variability in surface reflectance (vegetation) resulting from different teams conducting the same validation work.
- Contribute towards a community-agreed protocol to reduce this variability.

Surface Reflectance Intercomparison eXercise for Vegetation (SRIX4VEG)



University of Southampton

NPL
National Physical Laboratory

EOLAB

ITAP
INSTITUTO TECNOLÓGICO DE ALBACETE

USCLM
Universidad de Castilla-La Mancha
CAMPOS DE EXCELENCIA INTERNACIONAL

Australian Government
Geoscience Australia

CSIRO

USGS
science for a changing world

esa

CEOS
Committee on Earth Observation Satellites

WAGENINGEN
UNIVERSITY & RESEARCH

100years
1918 — 2018

IDEAS-QA4EO

<https://frm4veg.org/srix4veg/>

SRIX4VEG campaign in Barrax, Spain (July 2022)

- WUR joining as one of a total of 12 teams whose measurements will be compared (vegetation target – mature alfalfa field).
- Two experiments:
 - Surface reflectance validation data collection using own, internal, protocol,
 - Surface reflectance validation data collection following a common, pre-defined protocol.



UAV-based spectral imaging at WUR



Headwall Nano-Hyperspec camera

- VNIR: 400-1000 nm
- 270 spectral bands
- 640 spatial bands
- High performance IMU/GNSS
- Integrated with LiDAR

Platform - DJI Matrice 300

- Sensor hard-mounted due to weight and space limitations (internal design)
- Flight time of approx. 25 min

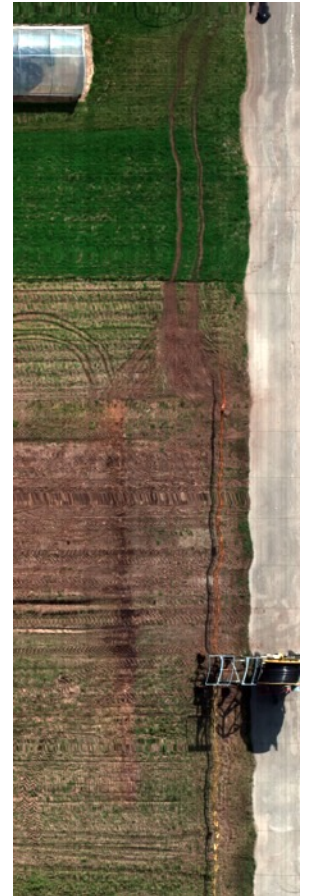
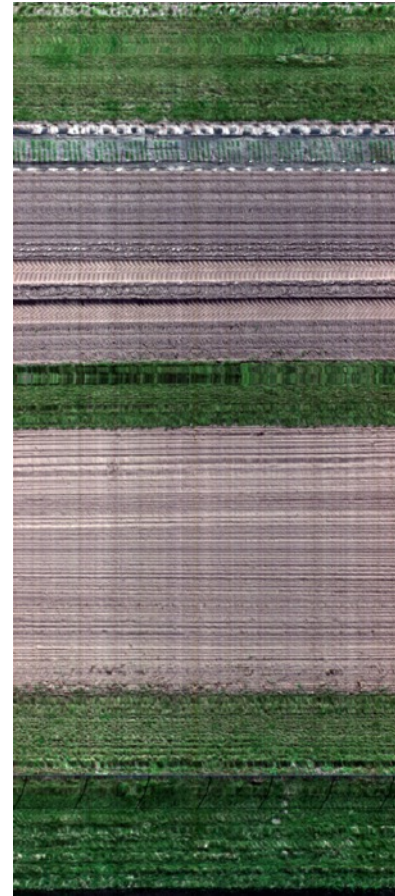
UAV-based spectral imaging at WUR



**FIRST FLIGHTS!
LAST WEEK**



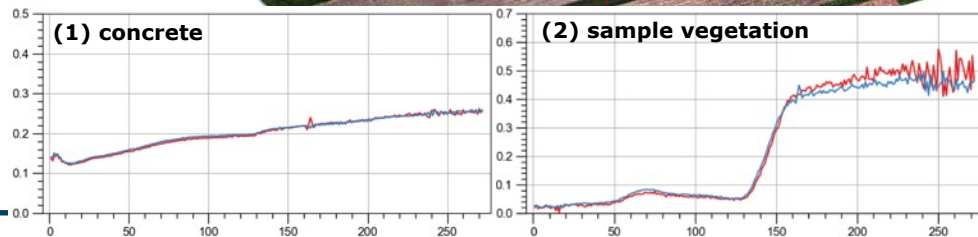
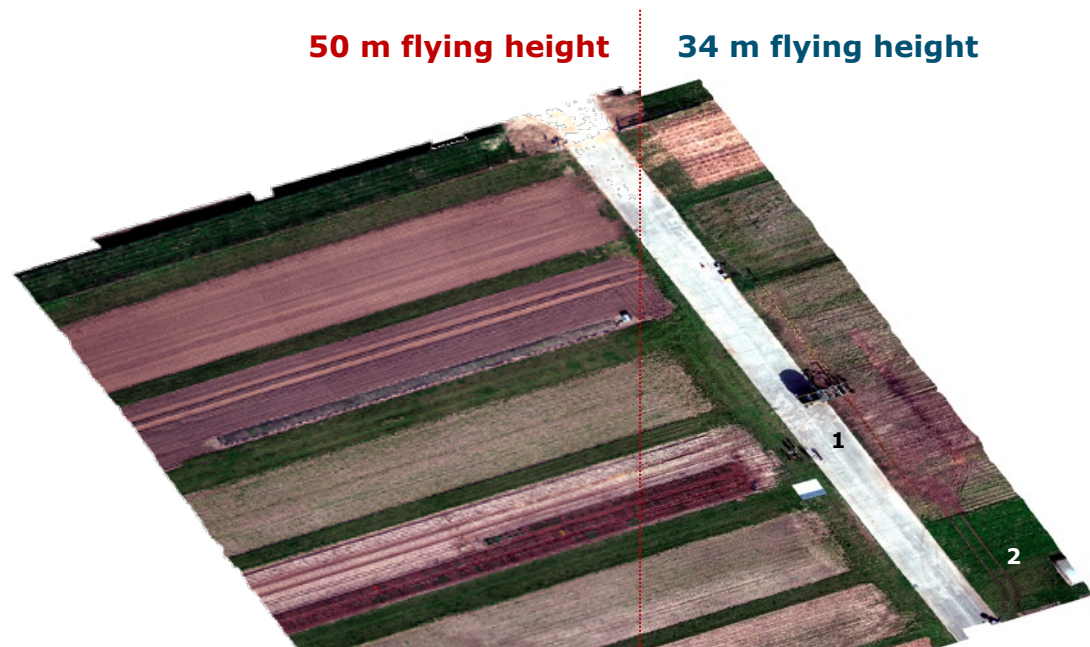
“Raw” scan lines
displayed as
RGB composites



UAV-based spectral imaging at WUR

Currently in the process of developing internal workflows for data acquisition with the Headwall system to ensure:

- Consistent measurements
- High geometric accuracy



UAV-based spectral imaging at WUR

Outlook for the near future:

- Further flight trials over manmade and natural targets with the Headwall system,
 - Complemented with field spectra of the surfaces collected using an ASD FieldSpec spectrometer,
 - Potential to include Hyperspectral Mapping System (HYMSY) developed at WUR for intercomparison,
- Assessment of the geometric accuracy utilising a network of control points.



Thank you!

