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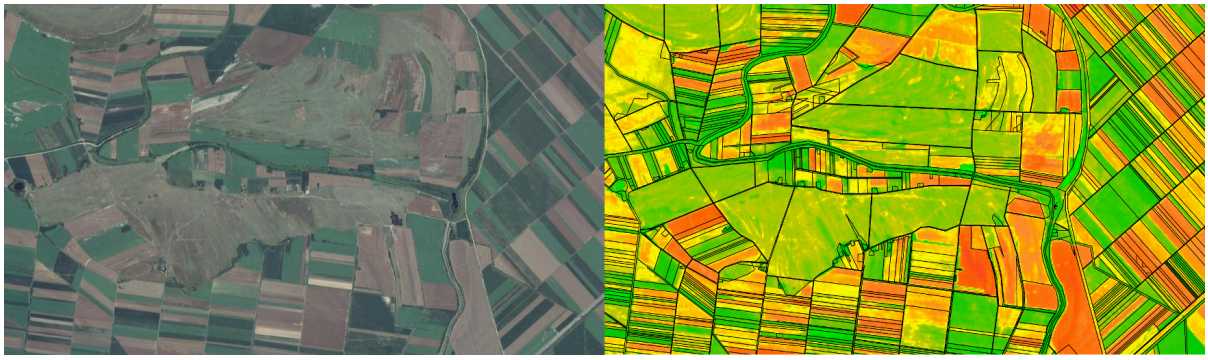
MDE-based Development of a Multispectral Camera for Precision Agriculture



Title	MDE-based Development of a Multispectral Camera for Precision Agriculture
Title (native language)	
Category	• Recording or mapping technology
Short summary for practitioners (Practice abstract) in English)	Precision Agriculture in conjunction with Variable Rate Technology aims at increasing productivity while reducing resource usage (water, fertilizers, pesticides and others). Within this context, the farms management decisions include information from data collected about the crops health development, which need to be gathered in a timely basis. There are several means of obtaining information about the plants health, including manual data collection from sensors installed in the soil and/or its vicinity, mobile sensor systems, for example embedded sensors in UAVs, or aircrafts, or other vehicles, and satellite imagery, to name just a few examples. The adoption of UAVs in such applications has gaining a lot of attention in recent years due to ease of access, low cost and available flight control software. UAV systems may carry several sensors, which include RGB, infrared, multispectral and hyper-spectral cameras. These cameras are respectively more powerful, in terms of data quality, as well as more expensive. The current paper contribution include the platform model, design and characterization of a multispectral camera system made from two low cost, commercial of the shelf cameras that can be integrated in a small UAV. These aforementioned cameras are compatible with open source hardware, namely Raspberry Pi boards, that are used to collect, process and store information. © 2016
Short summary for practitioners	
Website	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85006445756&doi=10.1016%2fj.ifacol.2016.11.117&partnerID=40&md5=d4874d7dd72acd0b1934ea55ecfb692b
Audiovisual material	
Links to other websites	
Additional comments	
Keywords	Farming practice | Fertilisation and nutrients management | Soil management / functionality | Water management
Additional keywords	Cyber Physical Systems; Model Driven Engineering; Multispectral Camera; sensor fusion; Unmanned Autonomous Vehicle
Geographical location (NUTS)	EU
Other	

geographical location	Brazil
Cropping systems	
Field operations	Fertilization | Pesticide application | Irrigation
SFT users	Farmer | Contractor
Education level of users	Secondary education | Apprenticeship or technical school education
Farm size (ha)	50-100 | 100-200

Scientific article

Title	MDE-based Development of a Multispectral Camera for Precision Agriculture
Full citation	Doering, D.; Vizzotto, M.R.; Bredemeier, C.; da Costa, C.M; Henriques, R.V.B.; Pignaton, E.; Pereira, C.E. (2016). IFAC-PapersOnLine, Volume 49, Issue 30, pp 24-29, DOI:10.1016/j.ifacol.2016.11.117

Effects of this SFT

Productivity (crop yield per ha)	Some increase
Quality of product	No effect
Revenue profit farm income	Some increase
Soil biodiversity	No effect
Biodiversity (other than soil)	No effect
Input costs	Some decrease
Variable costs	No effect
Post-harvest crop wastage	No effect
Energy use	No effect
CH4 (methane) emission	No effect
CO2 (carbon dioxide) emission	No effect
N2O (nitrous oxide) emission	No effect
NH3 (ammonia) emission	No effect
NO3 (nitrate) leaching	No effect
Fertilizer use	Some decrease
Pesticide use	Some decrease
Irrigation water use	Some decrease
Labor time	No effect
Stress or fatigue for farmer	No effect
Amount of heavy physical labour	No effect
Number and/or severity of personal injury accidents	No effect
Number and/or severity of accidents resulting in spills property damage incorrect application of fertiliser/pesticides etc.	No effect
Pesticide residue on product	No effect
Weed pressure	No effect
Pest pressure (insects etc.)	No effect
Disease pressure (bacterial fungal viral etc.)	No effect

Information related to how easy it is to start using the SFT

This SFT replaces a tool or technology that is currently used. The SFT is better than the current tool	no opinion
The SFT can be used without making major changes to the existing system	no opinion
The SFT does not require significant learning before the farmer can use it	disagree
The SFT can be used in other useful ways than intended by the inventor	no opinion
The SFT has effects that can be directly observed by the farmer	disagree
Using the SFT requires a large time investment by farmer	agree
The SFT produces information that can be interpreted directly	disagree

[View this technology on the Smart-AKIS platform.]

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