Linking UAV imagery to pre-harvest patch spraying of thistles in cereals

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Thistles

Pre-harvest mapping – "the simple way"

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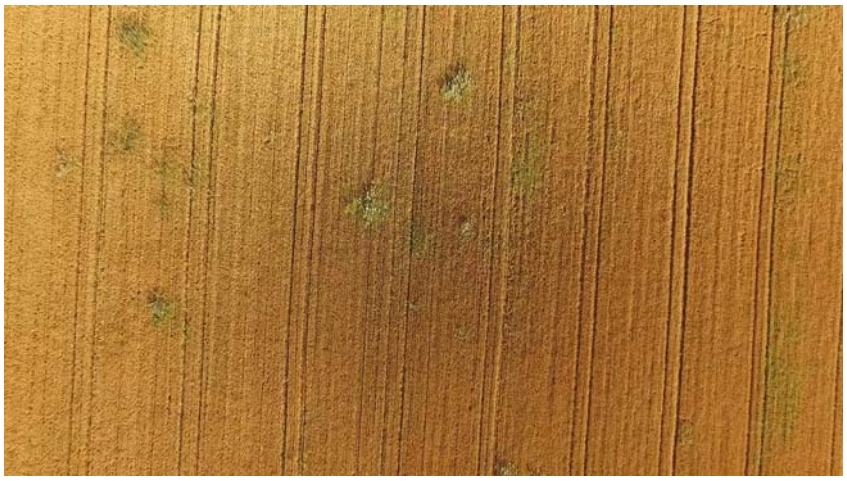
Pre-harvest thistle mapping
Relevant and "a low hanging fruit"



Colours are (relatively) easy to distinguish

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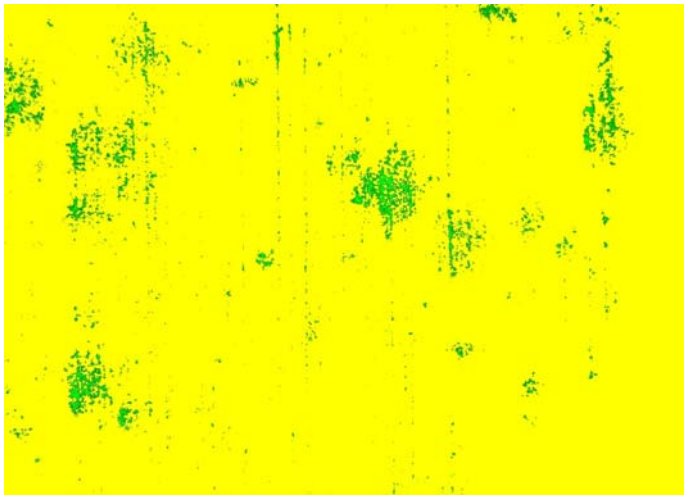
Green and yellow



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Task	Status
Image acquisition	
Geo-referenced ortho-mosaics (= Field maps)	
Image analysis = detection of thistles = Weed maps	
Application maps	
Patch spraying	
From UAV (drone) to patch spraying	

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Task	Status
Image acquisition	**Easy, fast and safe**
Geo-referenced ortho-mosaics (= Field maps)	
Image analysis = detection of thistles = Weed maps	
Application maps	
Patch spraying	
From drone to patch spraying	

Image acquisition – small drones with colour cameras are useful

Capacity: 10 to 35 ha per 20 minutes (one battery)

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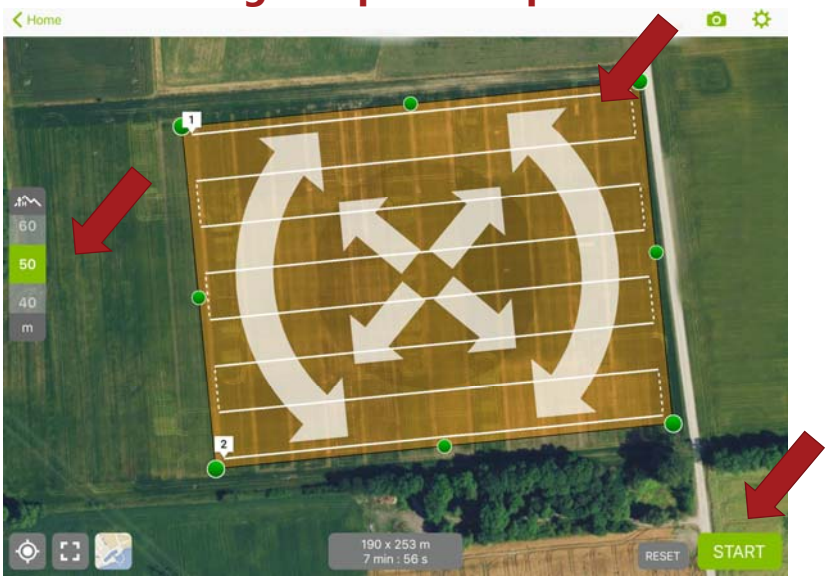
Image acquisition plan



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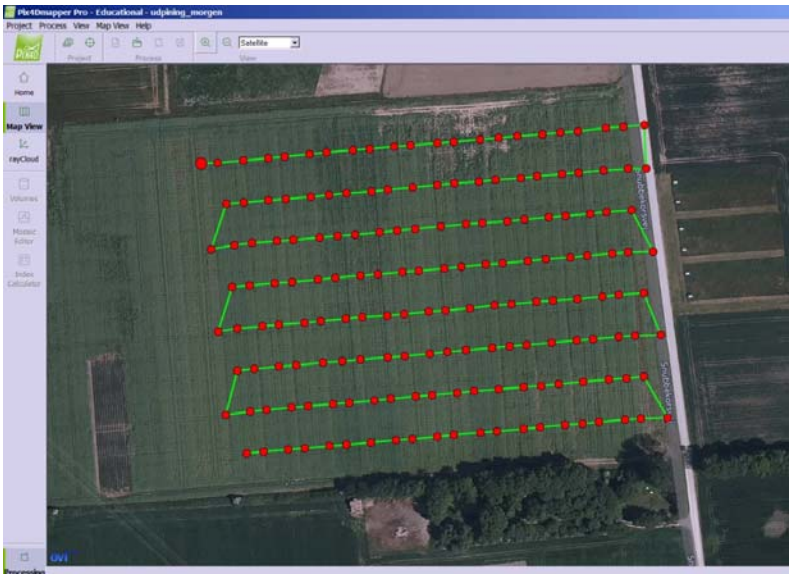
Overlapping geo-tagged images



Task	Status
Image acquisition	Easy, fast and safe
Geo-referenced ortho-mosaics (= Field maps)	**Routine (several software packages exist)**
Image analysis = detection of thistles = Weed maps	
Application maps	
Patch spraying	
From drone to patch spraying	

Ortho-mosaicking

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Task	Status
Image acquisition	Easy, fast and safe
Geo-referenced ortho-mosaics (= Field maps)	Routine (several software packages exist)
Image analysis = detection of thistles = Weed maps	**Routine with "Thistle Tool" programmed in MatLab**
Application maps	
Patch spraying	
From drone to patch spraying	

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Ortho-mosaicking and detection of thistle patches

Accuracy from 85% to 95%

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Task	Status
Image acquisition	Easy, fast and safe
Geo-referenced ortho-mosaics (= Field maps)	Routine (several software packages exist)
Image analysis = detection of thistles => Weed maps	Routine with "Thistle Tool" programmed in MatLab
Application maps	**Routines need to be improved (GIS)**
Patch spraying	**2016: Challenging - many difficulties were encountered on farms**
From drone to patch spraying	

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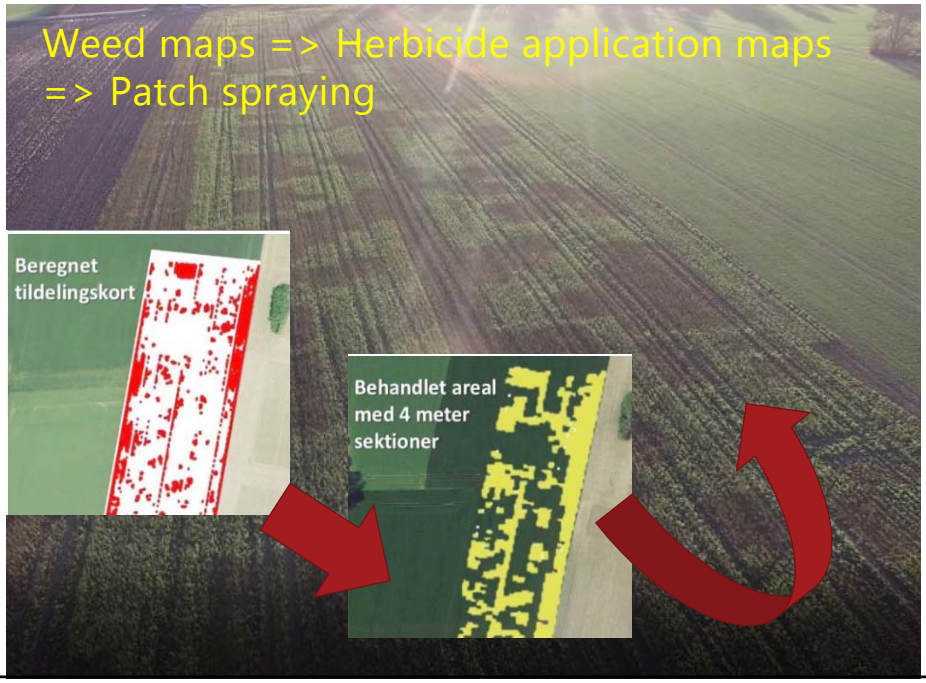

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Spraying based on digital maps

Full video: https://www.youtube.com/watch?v=HItCPk4z9uQ

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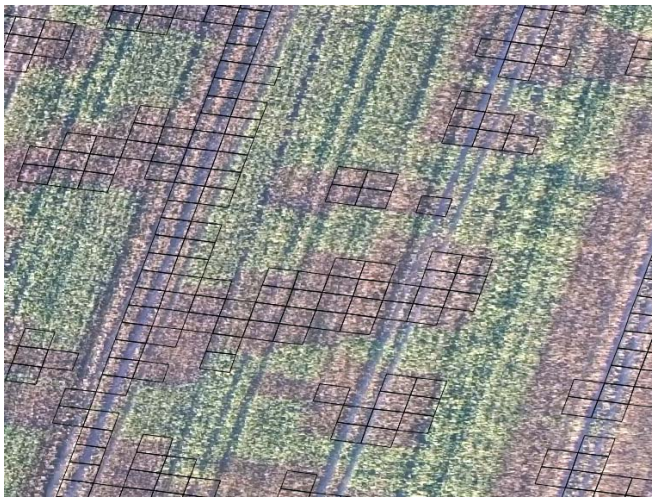
Application map and sprayed area



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Task	Status
Image acquisition	Easy, fast and safe
Geo-referenced ortho-mosaics (= Field maps)	Routine (several software packages exist)
Image analysis = detection of thistles => Weed maps	Routine with "Thistle Tool" programmed in MatLab
Application maps	Routines need to be improved (GIS)
Patch spraying	2016: Challenging - many difficulties were encountered on farms
From drone to patch spraying	**2017: We expect to run all steps without problems on commercial farms**

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This presentation is based on two projects funded by The Danish Environmental Protection Agency

- Droner til monitering af flerårigt ukrudt
- Droner og sted-specific bekæmpelse af tidsler før kornhøst

The following persons have contributed to the projects

- Jon Nielsen and Jens C. Streibig, PLEN, University of Copenhagen
- Søren I. Olsen and Kim Steenstrup Pedersen, DIKU, University of Copenhagen
- Jens Erik Jensen and Rita Hørfarter, SEGES
- Bo M. Secher, DLS

Further information:

http://mst.dk/service/nyheder/nyhedsarkiv/2017/jan/droner-til-ukrudtsmonitering/

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