

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”



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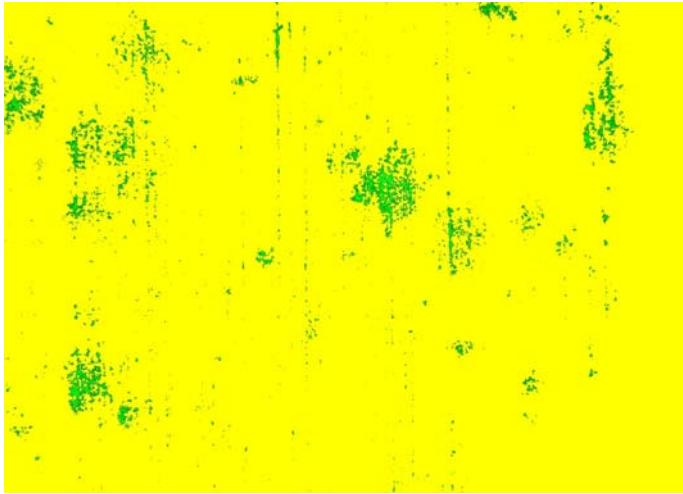
Colours are (relatively) easy to distinguish



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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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From drone to patch spraying	

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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

The screenshot shows a software interface for planning aerial image acquisition. The main area displays a field with a circular flight pattern indicated by white arrows on a yellow grid. A legend in the top left shows scales of 60, 50, and 40 meters. In the bottom right corner of the field boundary, there are two green dots labeled '1' and '2'. A red arrow points to the '60 m' scale bar. Another red arrow points to the 'START' button at the bottom right. A third red arrow points to the bottom right corner of the field boundary.

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Overlapping geo-tagged images

The screenshot shows a software interface for processing geotagged images. The main area displays a field with a grid of overlapping red dots connected by dashed lines, forming a pattern of overlapping image strips. The left sidebar contains various project management and processing tools. A red arrow points to the bottom right corner of the field boundary.

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Image acquisition	Easy, fast and safe
Geo-referenced ortho-mosaics (= Field maps)	Routine (several software packages exist)
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Application maps	
Patch spraying	
From drone to patch spraying	

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Image analysis = detection of thistles = Weed maps	Routine with “Thistle Tool” programmed in MatLab
Application maps	
Patch spraying	
From drone to patch spraying	

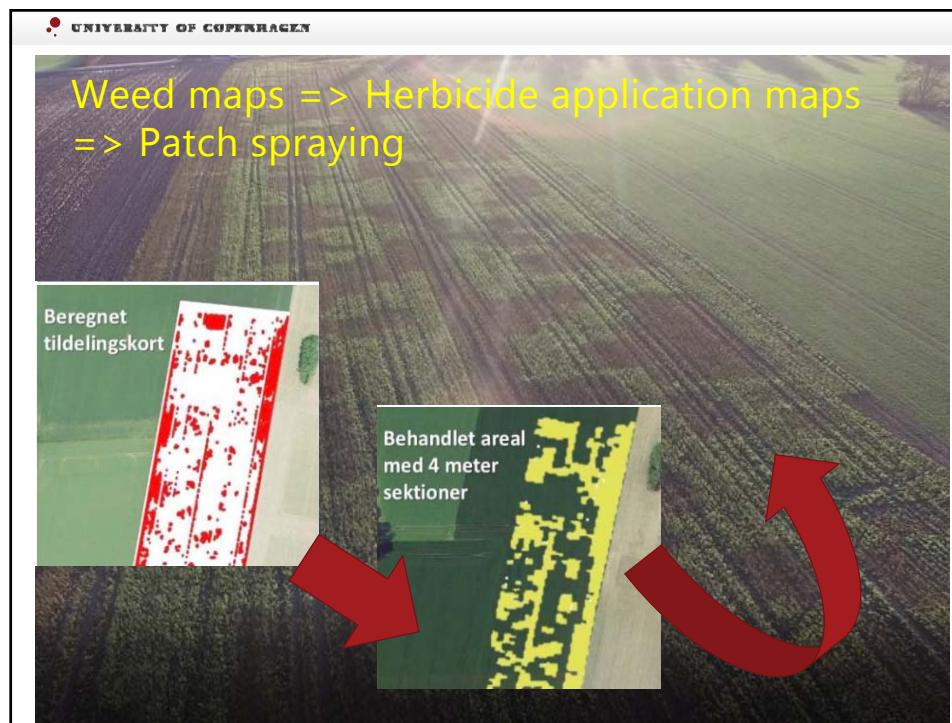
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Application maps	Routines need to be improved (GIS)
Patch spraying	2016: Challenging - many difficulties were encountered on farms
From drone to patch spraying	

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Spraying based on digital maps

Pletsprøjtning
baseret på kort over
tidselforekomst

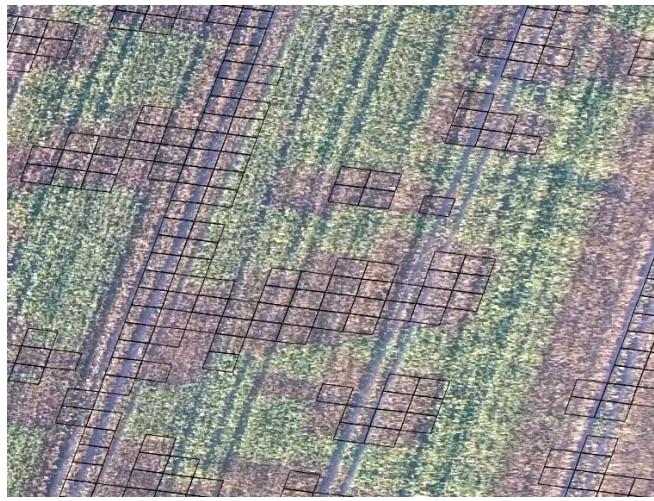
Udsprøjtet sektionsvis

[Full video: https://www.youtube.com/watch?v=HItCPk4z9uQ](https://www.youtube.com/watch?v=HItCPk4z9uQ)

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Application map and sprayed area

An aerial photograph of a field with a grid pattern of sprayed areas. The grid consists of numerous small, overlapping rectangular plots, likely representing individual spray passes or sections. The sprayed areas appear darker than the surrounding green grass.

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