

SPAA Crop Scanning Conference
 Crop Management with Active Sensors
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 precision farming solutions



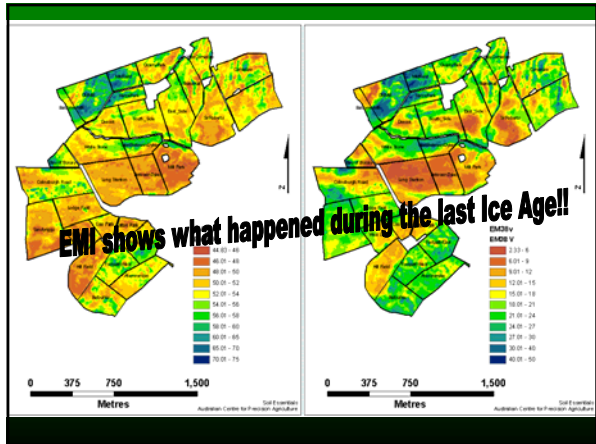
Crop Management with Active Sensors

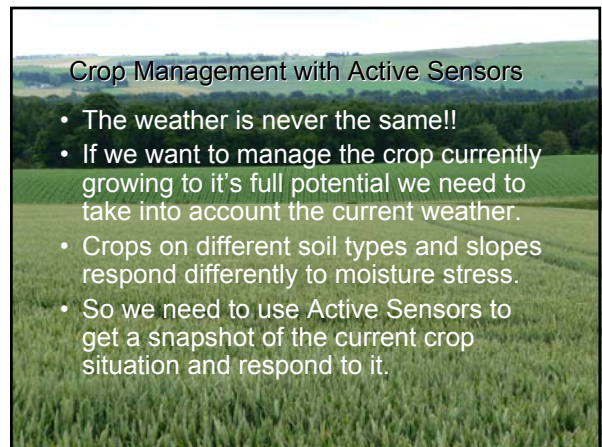
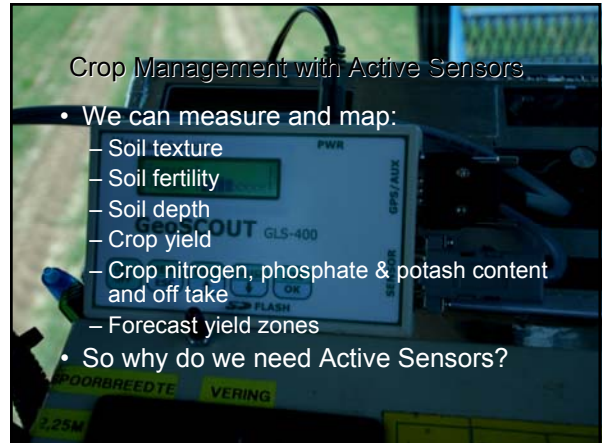
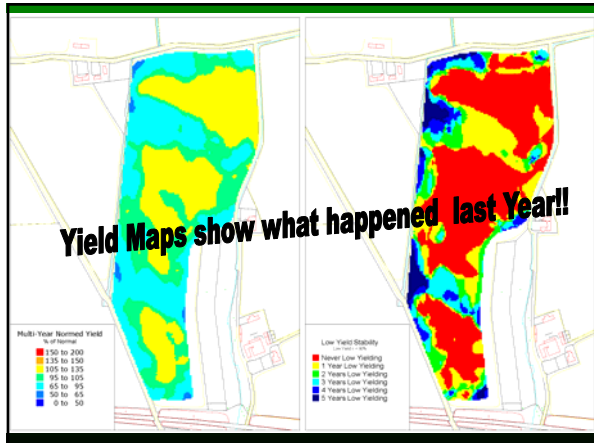
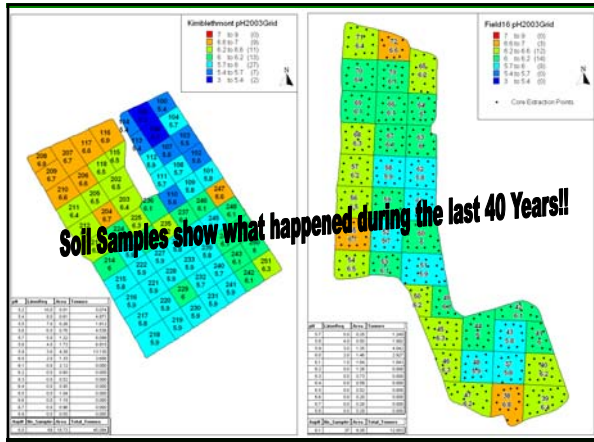
- Until recently P.A. has mainly consisted of relating historical data to current crop and soil management.
- This works well to measure and manage characteristics which only change slowly over time like:

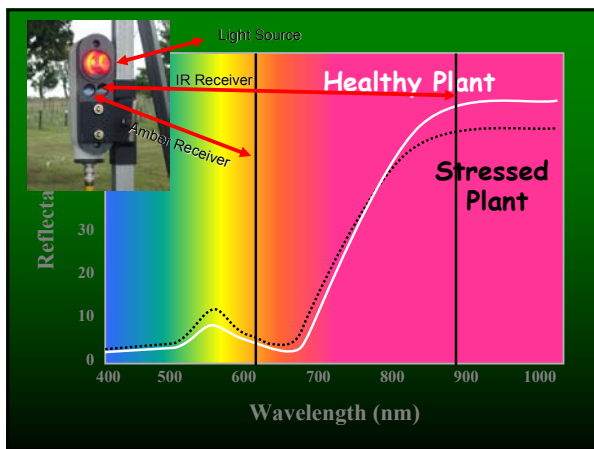
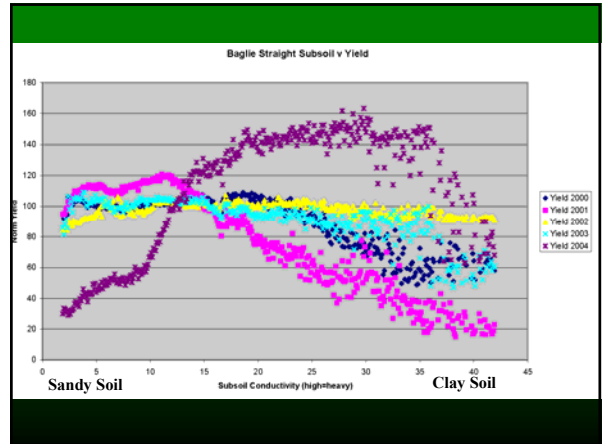
Crop Management with Active Sensors

Soil Texture

Gamma Radiometer	EM 38 Soil conductivity meter
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- Sensing crops is easy!
- The difficult thing is deciding how much nitrogen to apply to the variable areas
- Main job of an active sensor is to redistribute the N to where it will give the greatest nitrogen use efficiency (N.U.E.).

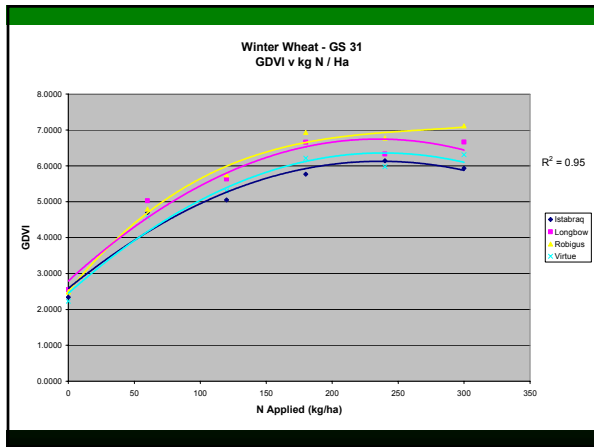
Crop Management with Active Sensors

- The easiest way to increase N.U.E. is not to apply nitrogen to unresponsive areas.
- Sensor values can also help when deciding on field N rates.
- Soil Mineral Nitrogen is very variable - especially where organic matter is applied.



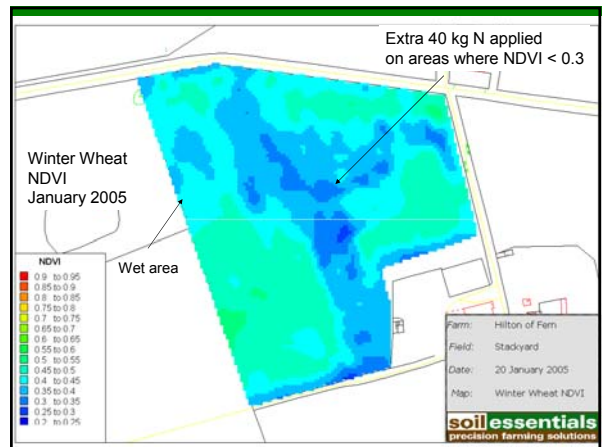
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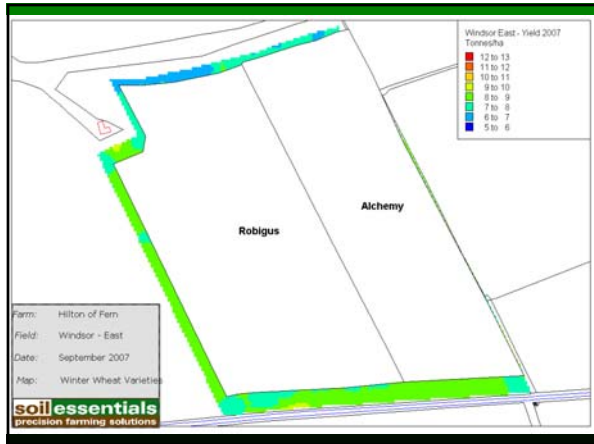
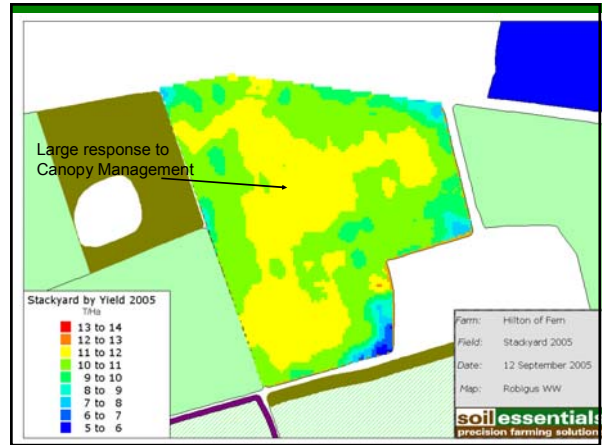
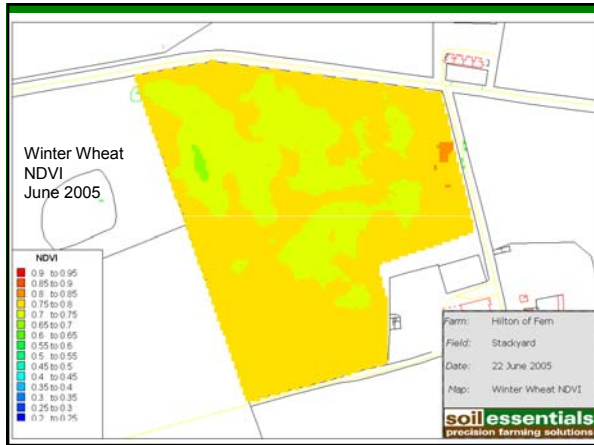
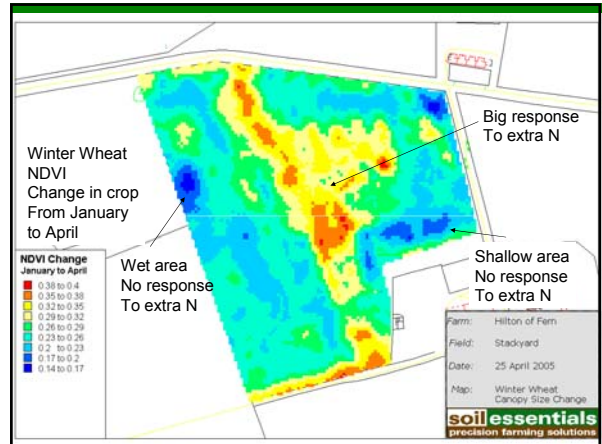
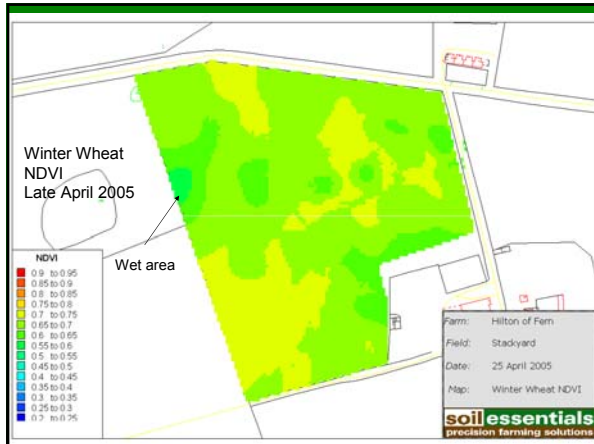
- Beware of other limiting factors.
- Many different strategies to variably apply N
- CropCircle uses the Wheat Growth Guide from the HGCA to manage the canopy.
 - In Wheat 1 GAI = 30 kg of N
 - In Barley 1 GAI = 29 kg of N
 - In Canola 1 GAI = 50 kg of N



Crop Management with Active Sensors

- In Europe 3 Applications of N
 - 1st Application
 - apply more on poor, less on good
 - 2nd Application
 - Apply more on poor, less on good,
 - 3rd Application
 - Apply less on poor, more on good.

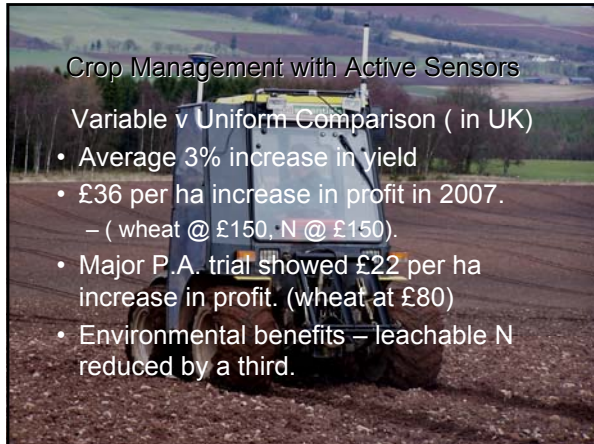




Crop Management with Active Sensors

Variable v Uniform Comparison (in UK)

- Average 3% increase in yield
- £36 per ha increase in profit in 2007.
 - (wheat @ £150, N @ £150).
- Major P.A. trial showed £22 per ha increase in profit. (wheat at £80)
- Environmental benefits – leachable N reduced by a third.



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Conclusion

- Active crop sensors can help you manage the crops currently growing.
- Crop scans and change maps are a powerful tool to find underperforming areas.
- Variable rate N is the last step – beware of other limiting factors.
- The easiest way to increase NUE is not to apply it to unresponsive areas.



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Conclusion

- Active sensors don't know about future weather, varieties, paddock history, trace element problems, etc.
- Farmer / Agronomist should decide the N Rate
- Use sensors to redistribute N to where it's needed.
- You are the best Active Sensor!



Crop Management with Active Sensors

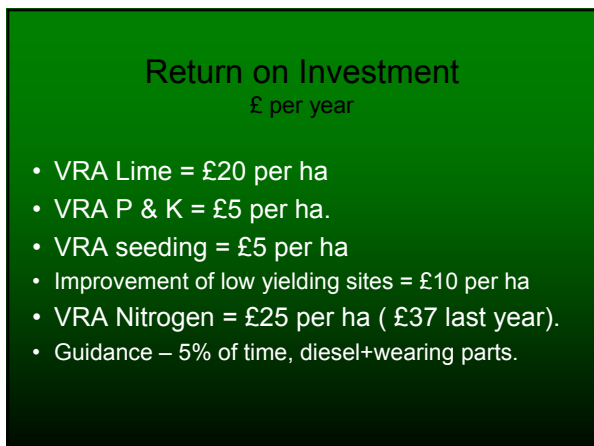
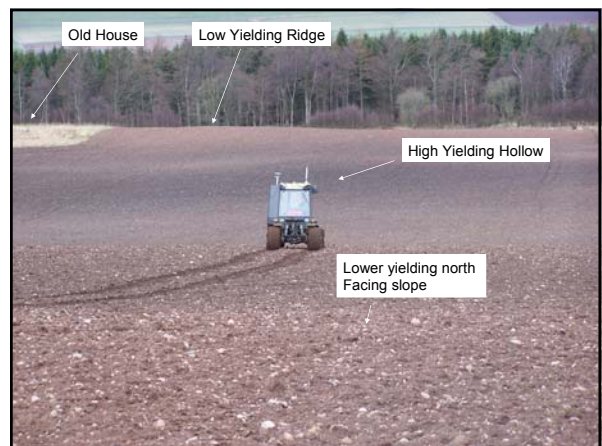
Thank You!



Return on Investment

£ per year

- VRA Lime = £20 per ha
- VRA P & K = £5 per ha.
- VRA seeding = £5 per ha
- Improvement of low yielding sites = £10 per ha
- VRA Nitrogen = £25 per ha (£37 last year).
- Guidance – 5% of time, diesel+wearing parts.

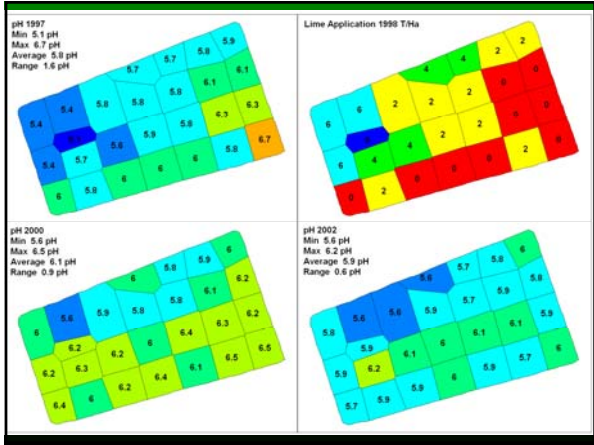



Old House

Low Yielding Ridge

High Yielding Hollow

Lower yielding north Facing slope



Spatial variability in soils and crops

- Not all fields are uniform...
- 1st Type of Variability
 - Management induced variability
 - Caused by the last 40 years of management!
 - Soil pH, Phosphate, Potassium, Magnesium.
 - Compaction, Field History.
 - Soil Mineral Nitrogen (SMN)



