Applications for UAS in Kansas Agriculture

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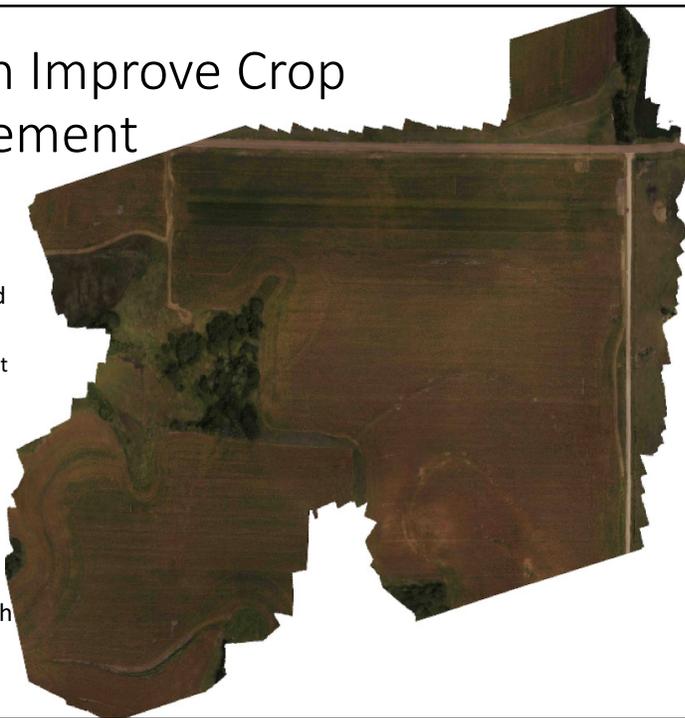ara4747@ksu.edu

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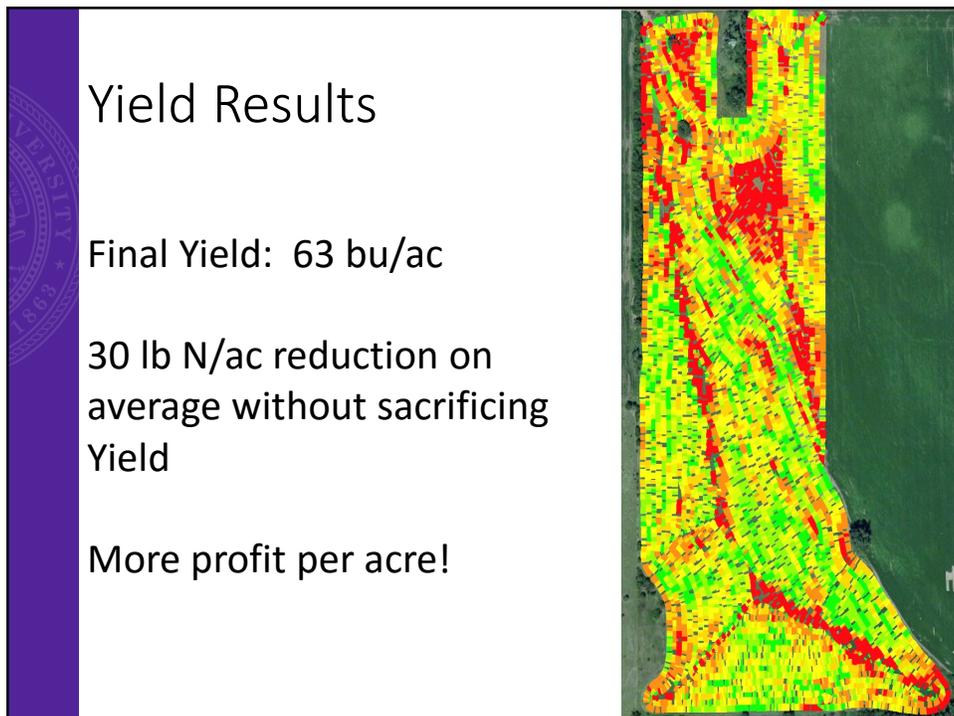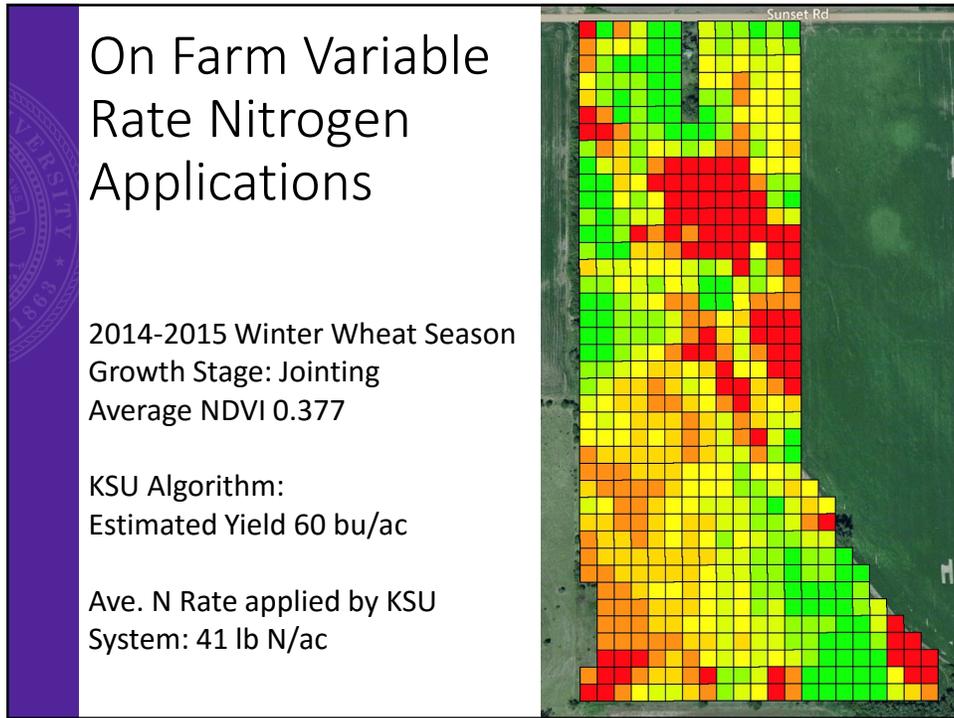

How Does This Field Look to You?

With UAS, We Gain a Better Perspective

UAS can Improve Crop Management

- Variable-Rate seeding
- Variable-Hybrid seeding
  - Currently by management zones
- Variable-Rate Fertilizer
- Grid Soil Sampling
- Yield Monitor
- Planting to Maturity crop monitoring with UAV

On Farm Variable Rate Nitrogen Applications

2014-2015 Winter Wheat Season
Growth Stage: Jointing
Average NDVI 0.377

KSU Algorithm:
Estimated Yield 60 bu/ac

Ave. N Rate applied by KSU
System: 41 lb N/ac

Yield Results

Final Yield: 63 bu/ac

30 lb N/ac reduction on average without sacrificing Yield

More profit per acre!

Finding Disease

- No-till Corn
- Plant Population
- > 30000
- Growth Stage
- R5
- Recognizable patterns

Patterns symptoms

- Confirmed Goss's Wilt
- Upper canopy dead
- Middle canopy still functioning
- Edgelines and high residue areas have increased severity
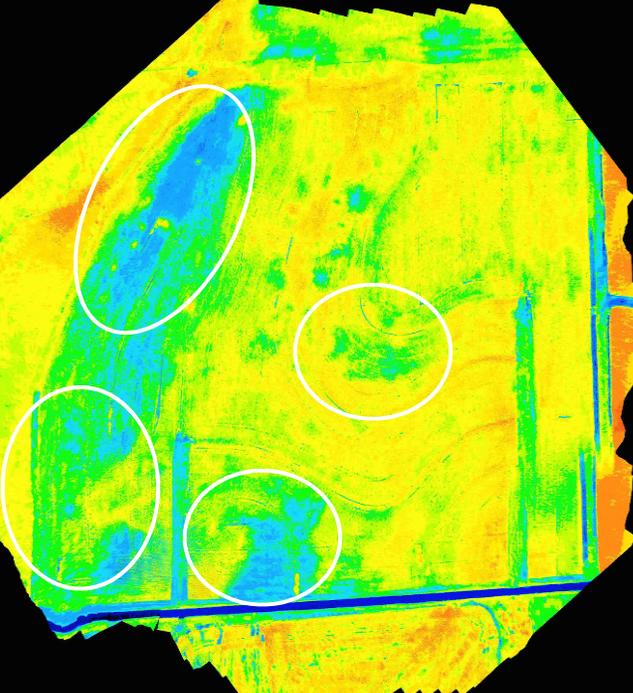
Crop Monitoring beyond our human eye.

Can you see the difference?

Corn is near maturity, does it really matter?
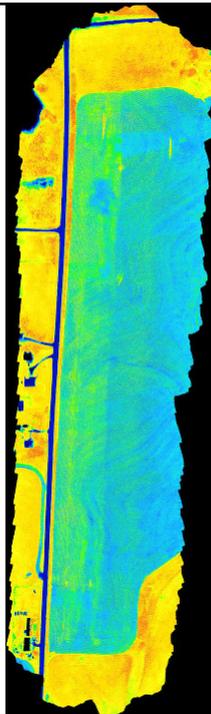
Fungicide

Treated

Importance of Sustaining Photosynthetic Capacity to Black Layer with Modern Corn Hybrids Detected with the use of UAS

Trt

Detecting and Evaluating

UAS can assist in making the right decision

Fungicide Treated Strip

Moisture: 21.9%
Test Wt: 56 lb
Average Girth: 17 kernels
Average Length: 41 kernels

Non-Treated:

Moisture: 19.1 %
Test Wt: 57 lb
Average Girth: 15 kernels
Average Length: 38 kernels

Yield Differences after Moisture:

Treated Strip had a 40 bu/ac advantage over Non-Treated

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Detecting the Competition

The crop is not the only plant in the field

Detecting and identifying weed species can provide useful management information

Understanding weed by environment dynamics can reveal alternative uses for weed species
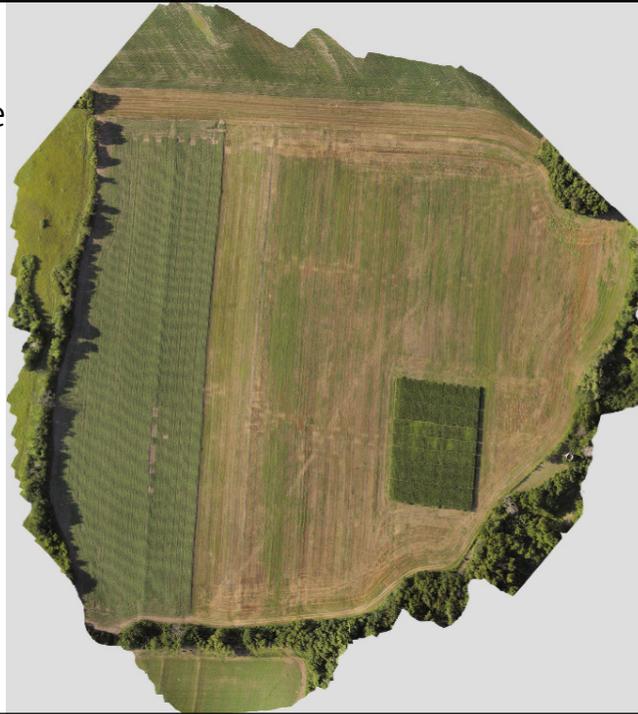
UAS has Numerous Applications in Kansas Agriculture

- Livestock Management
- Crop Insurance
- Range Management
- Irrigation Management
- And many more!

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Current Focus on Crops is Developing Algorithms to Make UAS a Valuable Tool

Questions