

# **2014 Crop Management Diagnostic Clinics – Precision Ag**

## **Richard Ferguson**

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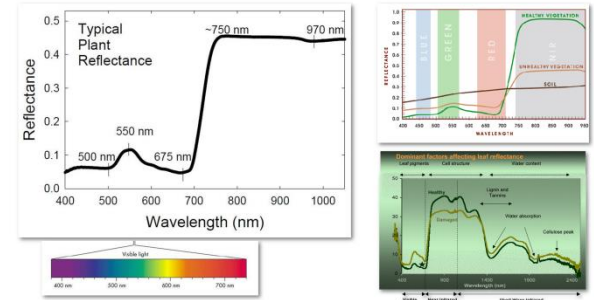
## Benefits and Issues With UAV Use

- **Timely information**
- **Guidance for scouting**
- **High spatial and temporal density of data**
- **Early stress detection**
- **Learning another equipment system**
- **Data processing time**
- **Regulatory uncertainty**



2014CMDCPrecisionAg-FERGUSON (1)

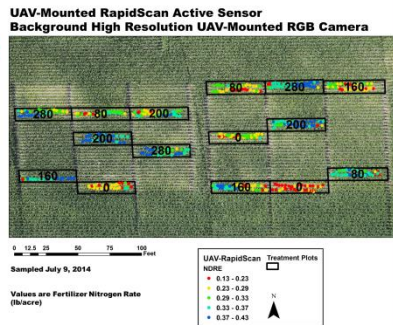
## Evaluating Crop Stress with Aerial Optical Sensing Platforms



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## Sensors for UAV Use in Agriculture

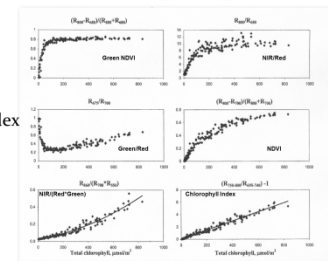
- **Passive optical**
- **Active optical**
- **Thermal**
- **Distance ranging – acoustic or LIDAR**
- **Other?**



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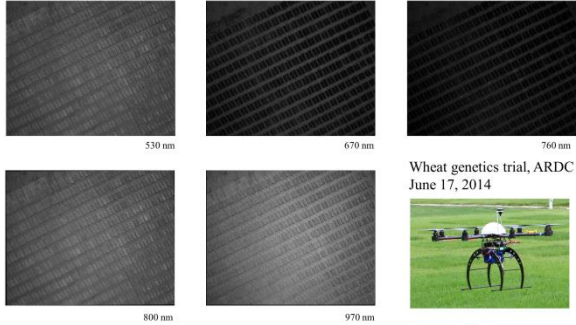
## Vegetation Indices

- ❖ Normalized Difference Vegetation Index (NDVI)  
 $(NIR_{760} - VIS_{670}) / (NIR_{760} + VIS_{670})$
- ❖ Normalized Difference Red Edge (NDRE)  
 $(NIR_{760} - RE_{720}) / (NIR_{760} + RE_{720})$
- ❖ Chlorophyll Index (CI)  
 $(NIR_{880} - VIS_{590}) - 1$
- ❖ DATT  
 $(NIR_{760} - RE_{720}) / (NIR_{760} - VIS_{670})$
- ❖ Meris Terrestrial Chlorophyll Index (MTCI)  
 $(NIR_{760} - RE_{720}) / (RE_{720} - VIS_{670})$
- ❖ Water Index (WI)  
 $(NIR_{900} / NIR_{970})$



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## Multispectral UAV Sensor: Tetracam Mini-MCA



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