

# UAV's in Precision Agriculture

Brent Johnson-Labre Crop Consulting



[www.fieldimagery.com](http://www.fieldimagery.com)

[www.gpssoilsampling.com](http://www.gpssoilsampling.com)



# Image Differences

Video

Pictures



# 2014 Easy Results

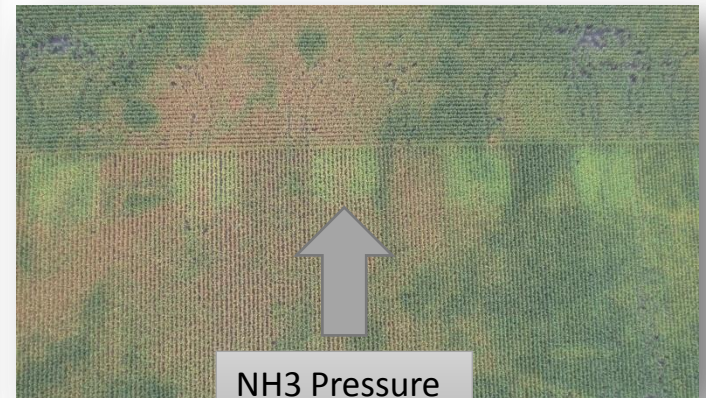






NH3  
Plugged  
Knife

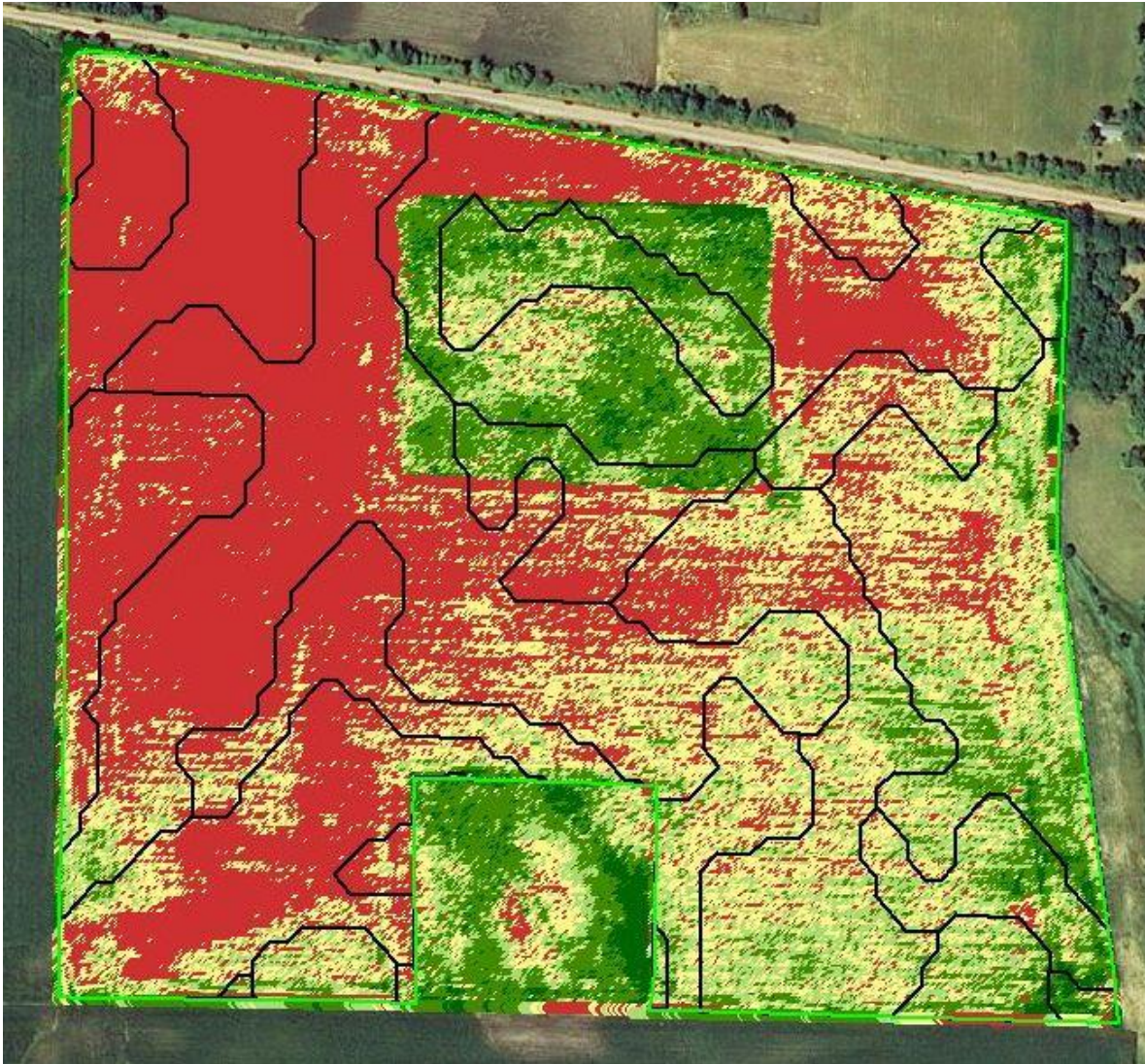
**Image Acquired:** Sept. 29, 2013  
**Source:** eBee Flight  
**Resolution:** 3.5 cm/px  
**Crop/Stage:** Corn/R5



NH3 Pressure

**Image Acquired:** Sept. 7, 2013  
**Source:** eBee Flight  
**Resolution:** 3.5 cm/px  
**Crop/Stage:** Corn/R4





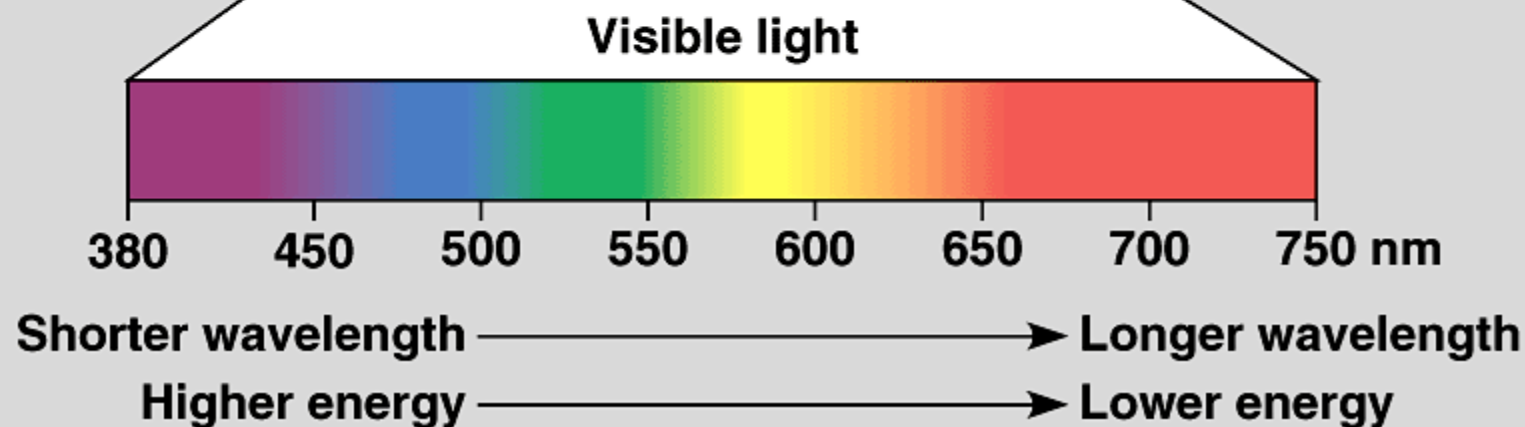
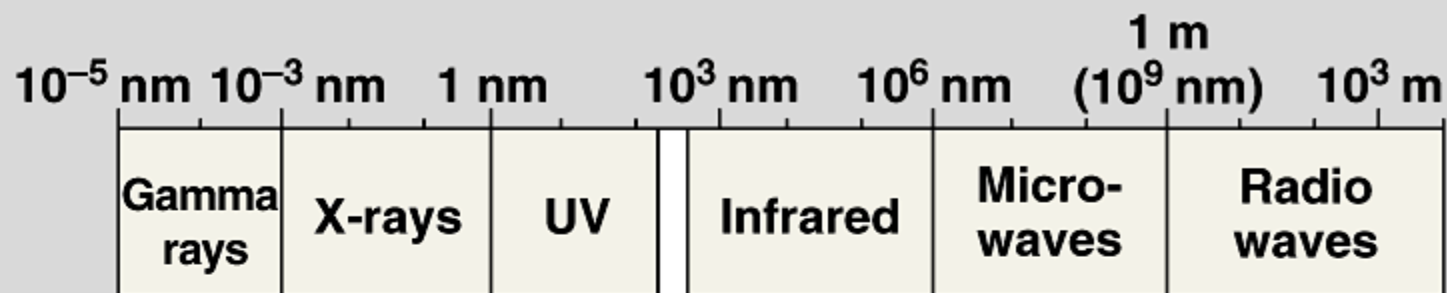
- Aerial Pictures
- Farmsteads
- Equipment



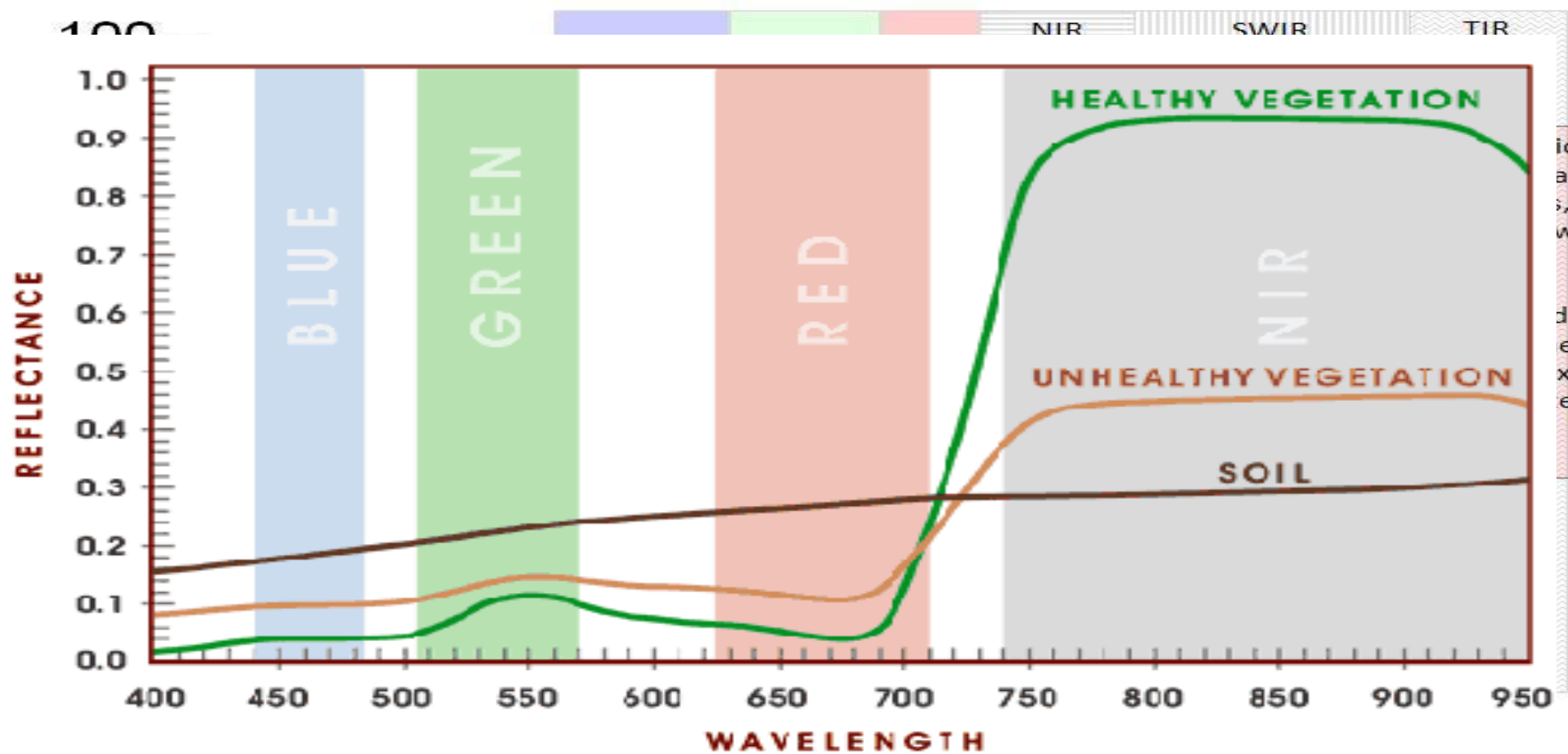
- Equipment Issues
- Crop Scouting

- How can I use this tool?
- How do I make \$?
- So what's so hard?







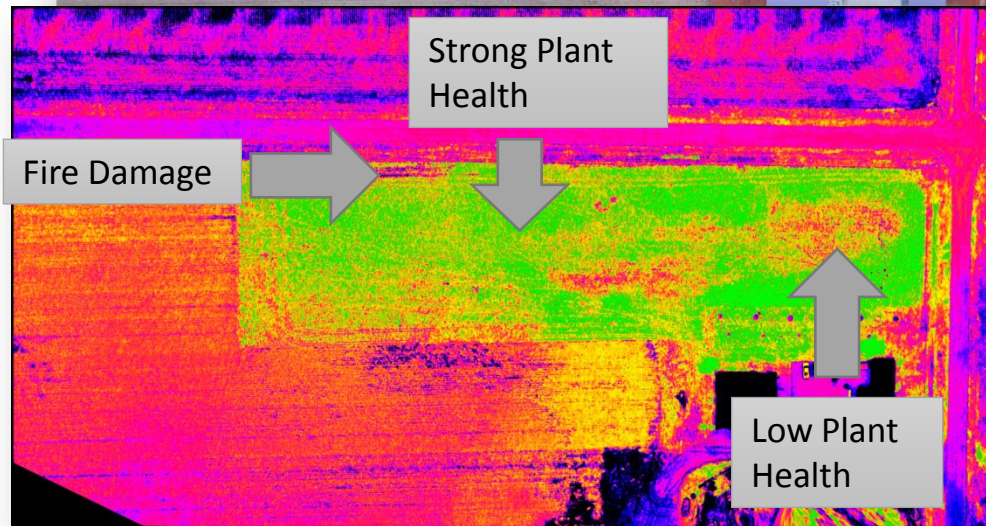


wavelength (µm)



**Image Acquired:** Oct. 8, 2013  
**Source:** eBee Flight  
**Resolution:** 3.5 cm/px  
**Crop/Stage:** Alfalfa

$$NDVI = \frac{(NIR - VIS)}{(NIR + VIS)}$$



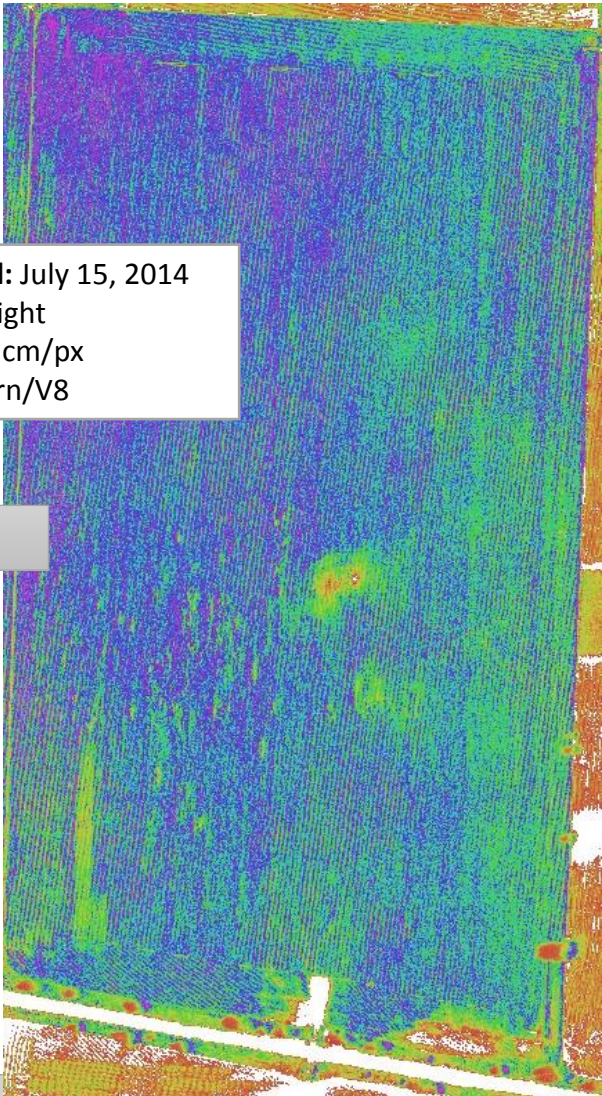
Benefits:

- *Size and Location of Stressed Area*
- *Identify Zones*
- *Create Custom Treatments*
- *Track Progress of Health*

*VIS = spectral reflectance measurements acquired in the visible*

*NIR = spectral reflectance measurements acquired in the near-infrared regions*





**Image Acquired:** July 15, 2014  
**Source:** eBee Flight  
**Resolution:** 3.5 cm/px  
**Crop/Stage:** Corn/V8

NIR Only

### Benefits:

- *High Resolution Yield Map*
- *Make Marketing Decisions*
- *Plan Harvest Logistics*
- *Anticipate Insurance Claims*



**Yield Data Acquired:** Nov. 2014  
**Source:** Yield Monitor  
**Crop:** Corn

Collected  
Yield Data

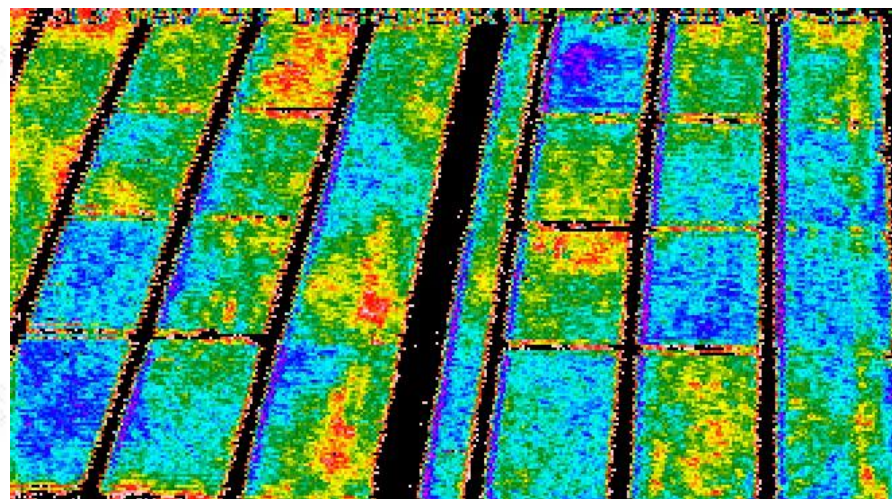
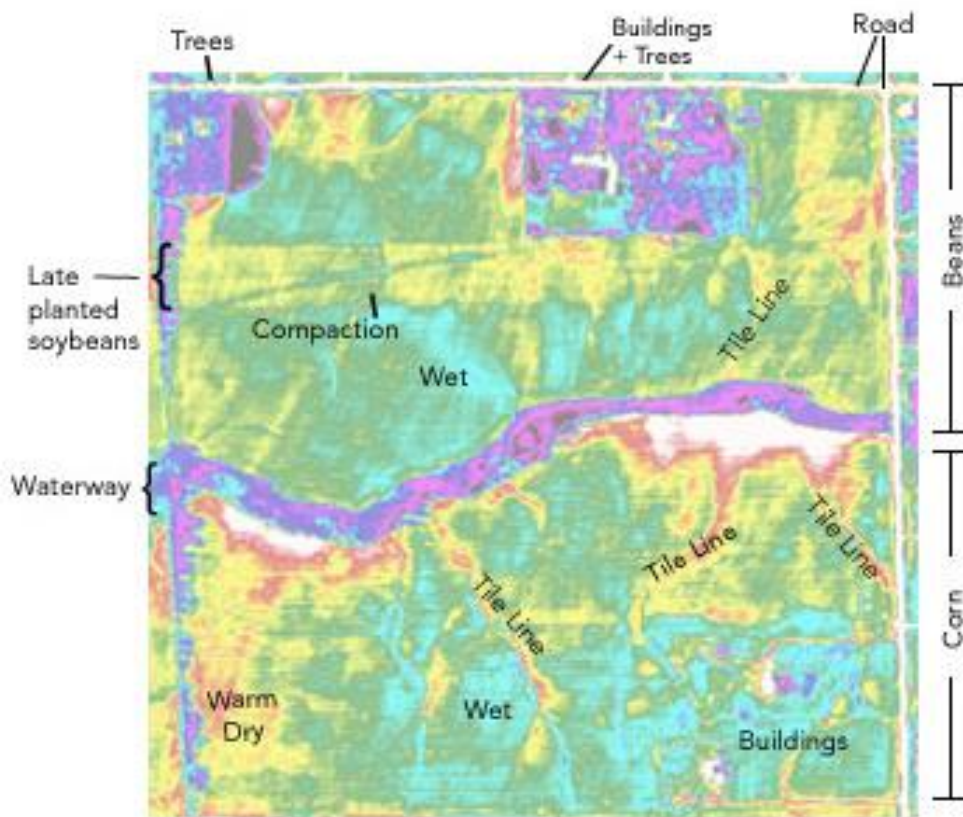


- Plant Identification
- Population
- Vegetation Health
- Beyond the Visible
  - Near-Infrared
  - Thermal-Infrared
- Single Band Analysis
- Multiple Band Analysis
- Per Plant measurements
- Real Follow-thru on data observations



# Thermal Imagery

May 24th - Bare Soil



<http://airscout.com/demo/maps/>

Brian Sutton/Air Scout



airSCOUT







**Image Acquired:** June 6, 2013  
**Source:** eBee Flight  
**Resolution:** 3.0 cm/px  
**Crop/Stage:** Corn/V2-V3

**Image Acquired:** June 10, 2013  
**Source:** Scout Camera  
**Crop/Stage:** Corn/V3



### Method of Calculation:

- *Corn spaced in 30" rows*
- *17.4' represents 1/1000 acre*
- *32 plants counted in 17.4'*
- *Population in area is 32,000 seeds/acre*

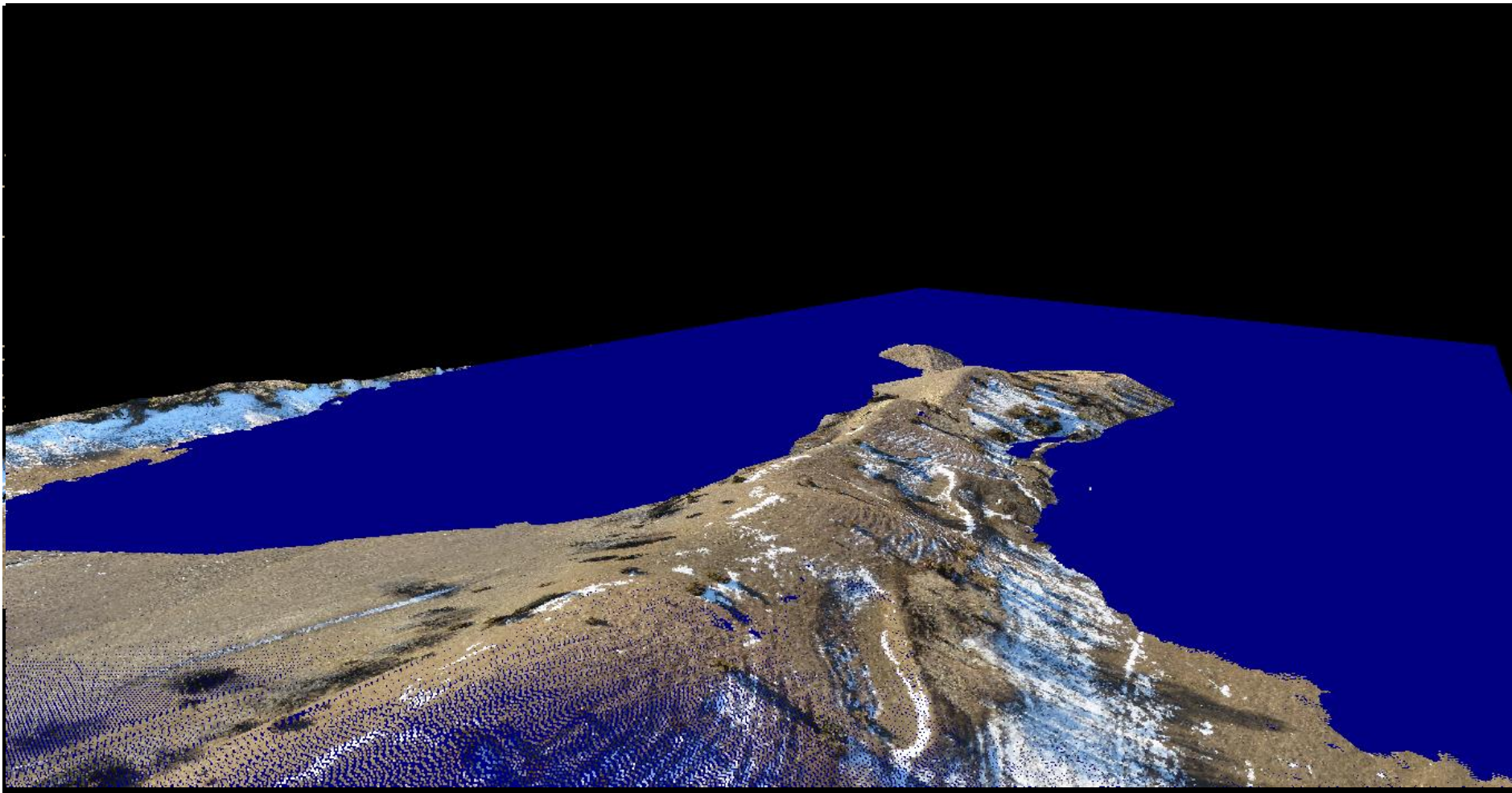


# Image Differences

Video

Pictures

Geo Rectified  
3D Data



Previous Points in 3D

Measurements

Planning





# Final Thoughts

- Very fun and interesting
- Toy vs Tool
- K.I.S.S.
- Will increase field scouting
- Regulations
- HUGE future potential



# LABRE Crop Consulting

Sampling

Data

Equipment

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[www.gpssoilsampling.com](http://www.gpssoilsampling.com)

