Challenges and benefits of in-field multispectral mapping/scouting (using drones)

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Why Multispectral Mapping/Scouting?

- Measurements are important
- Calibrated and accurate maps
  - Data can be compared
  - Changes can be monitored
  - Standardized tests/experiments can be conducted
- Precise timing - at the right crop stage
- Update models, react to developing conditions
- Need feedback from the field paired with data
Example: NDVI Timeline
Example: NDRE Timeline
Challenges Faced

Many problems to solve:
- Geometric corrections
- Sensor calibration(s)
- Environment (cloud vs sun)
- Sun direction and irradiance fluctuations
- Bidirectional reflectance
- Reflectance target
- Multi-step workflow
- Field scale
- Image processing time
- Image alignment
- Limited/no internet upload
- Completed in-field
- Agronomy?
Our Solutions

Camera/Software:
- Hardware improvements/specifications
- Calibration on manufacturing line
- Lens distortions
- Vignetting
- Dead pixel mapping
- Dark current corrections
- Sensor calibrations
- Metadata tags (27 EXIF, 48 XMP)
Our Solutions

Radiometry
- Photogrammetry + radiometry
- Sun angle correction
- Smart pixel blending
- Calibration target (or not)
Our Solutions

Workflow:
- QR codes on reflectance targets
- FastEngine - Edge computing
- Streamlined workflow in-field
- Data sync
- Scouting functions
The Benefits

- Ability to work around (or under) clouds
- Fast processing
  - 5-10 min vs 1.5-2hrs
- No internet required
- Reduction in data uploaded
  - 686MB vs 4.13GB
- Enables the scout
- Merge scouting and maps
- Ability to create prescriptions in-field
- One trip, rapid workflow
- Enables other derivative products
Example: End to End Solution

- Flight planning
- Radiometric target calibration
- Real-time multispectral mapping
- Aerial scouting with RGB video/images
- Ground scouting, media and notes
- Zonation and comparison tools
- Custom index, analysis
- Data sync
- Enterprise level integrations
Sanborn Field - NDVI
Pix4D

160+ global employees
23 nationalities
26 business languages spoken