



Drones *for* Agriculture

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Drone

- Smart Machine
- Fly
- Autonomous
- Battery Powered
- Carry Payload



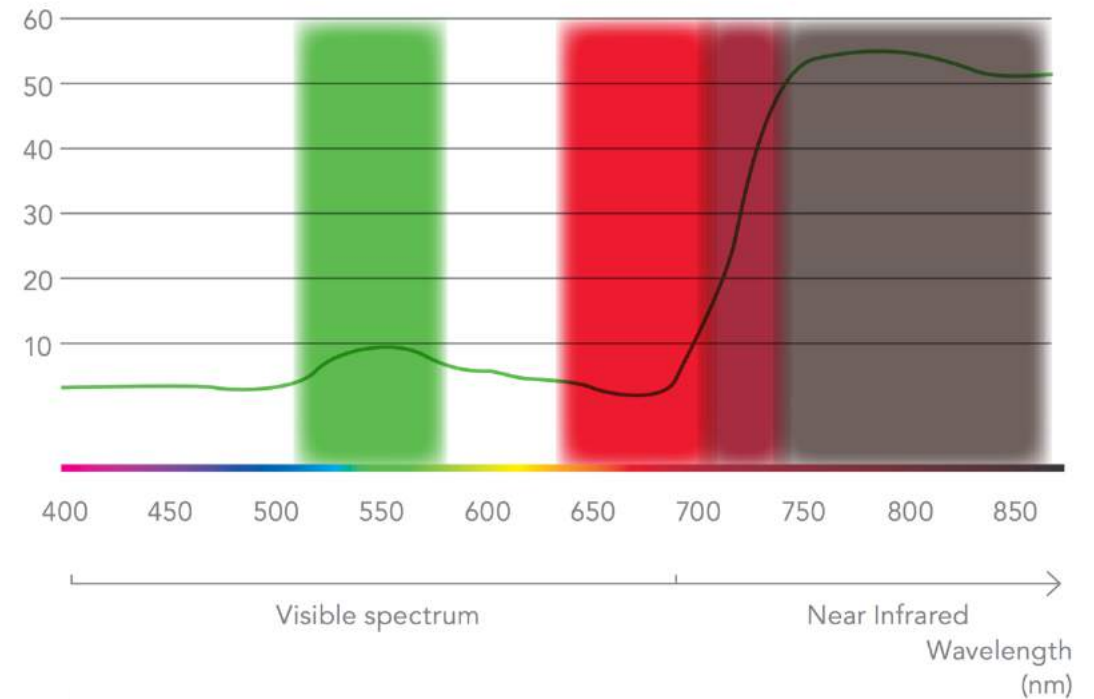
Payload

- Custom Container
- Keep/Hang
 - Cargo Box
 - Spray Tanks
 - Sensors
 - GPS
 - LiDAR
 - Visible Spectrum: RGB
 - NIR: Multispectral



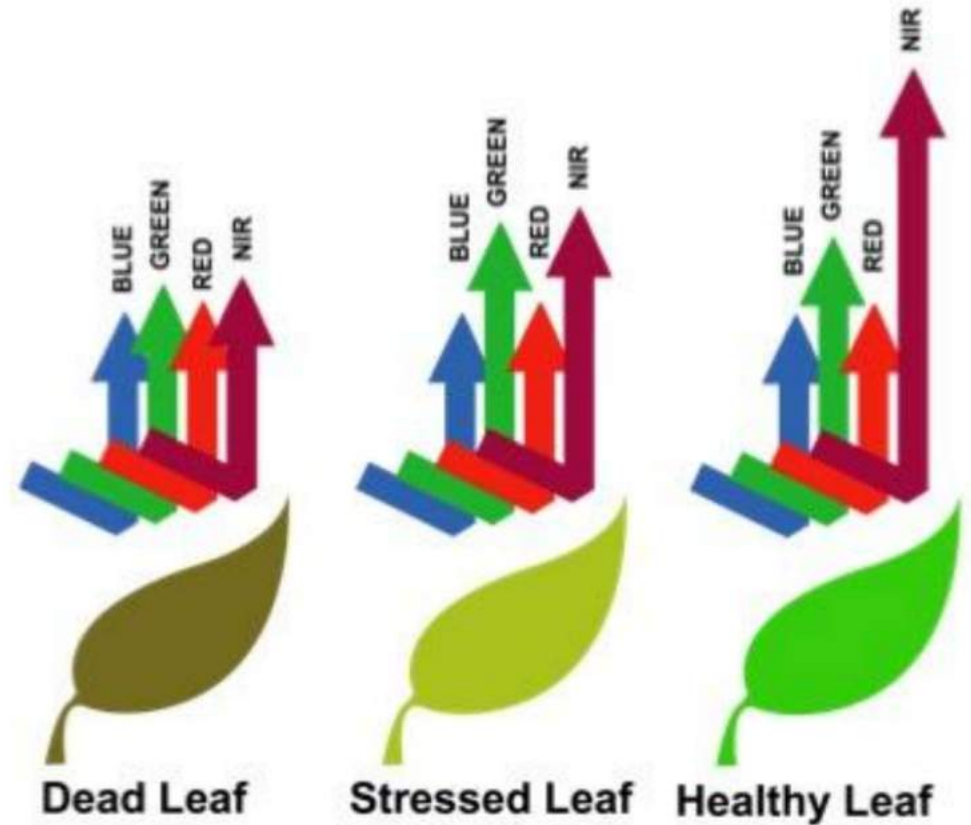
Multispectral Sensor

- Red, Green (390nm-700nm)
- NIR, Red Edge (>700nm)



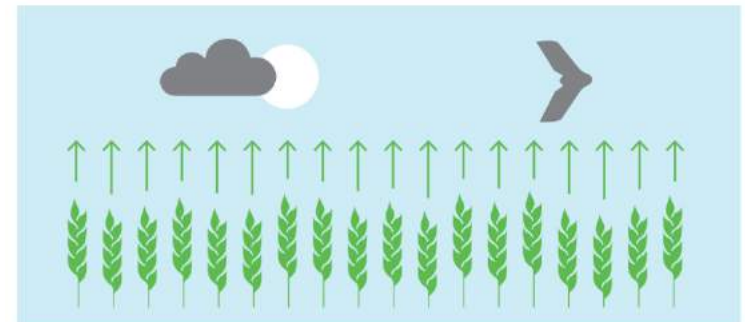
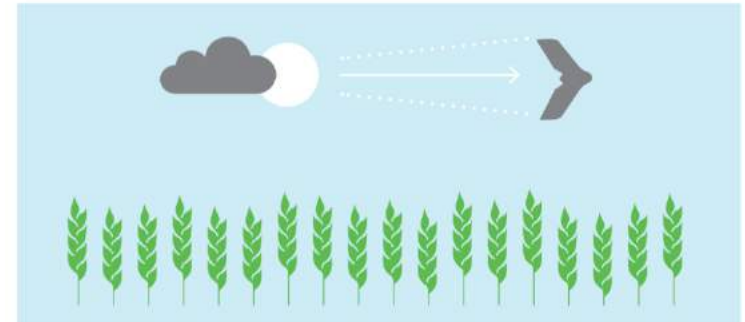
Botany

- Plant Stress
 - Biotic Stress
 - Fungi, Insects, Bacteria or Weeds
 - Abiotic Stress
 - Freezing, Heat, Temperature Shock, Salinity, Solar Radiation, Wind and Lack of Nutrients or Water
- Spectral Signature
 - Visible light for Photosynthesis
 - NIR photons: Energy $\downarrow$; Heat $\uparrow$
 - Reflect NIR when Healthy



Sum-up

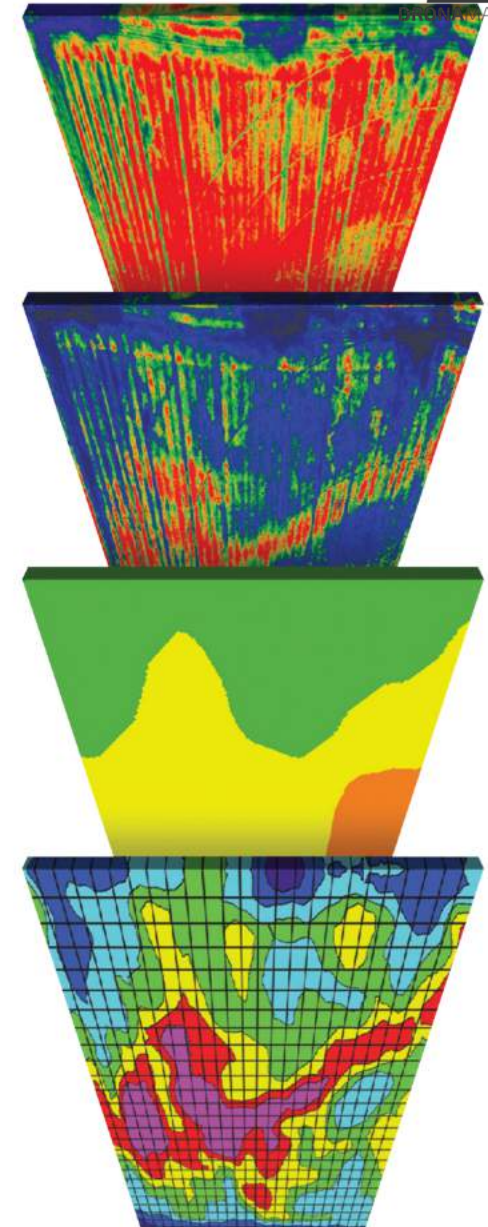
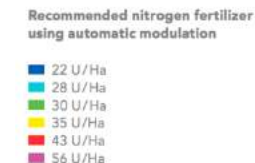
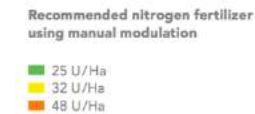
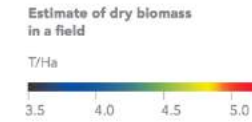
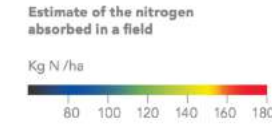
Drone
+
Multispectral Sensor
+
Farms



NDVI Maps

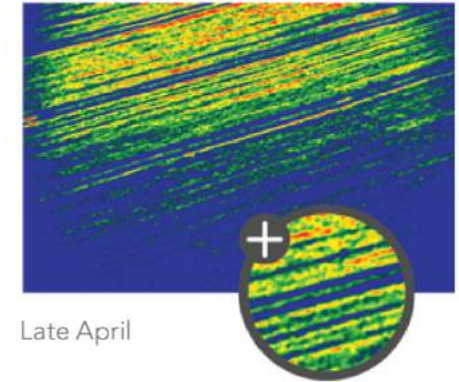
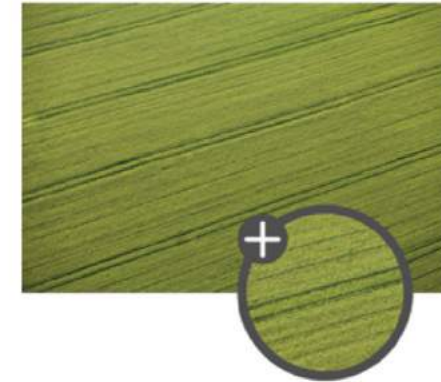
- Green, Red and IR
- Normalized Difference Vegetation Index
 - (NIR – Visible) Reflectance
 - NDVI Value
 - Non-plant objects: {-1, 0}
 - Soil: [0]
 - Plant: [0.1, +1}
- GNDVI
- NDRE

$$\frac{PIR - R}{PIR + R}$$

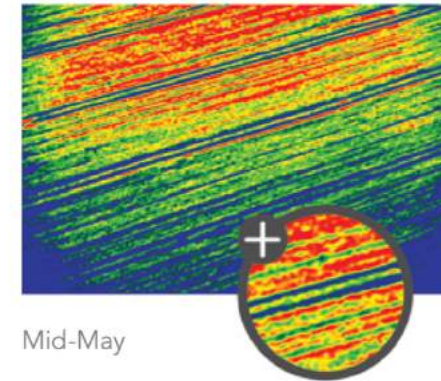


Prescription Card

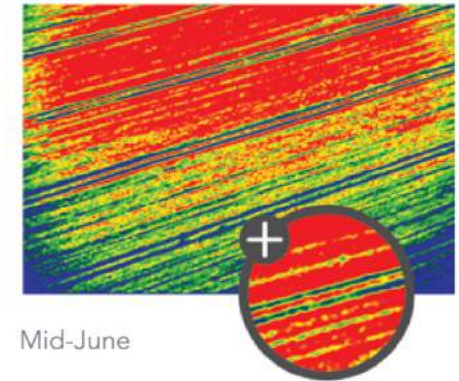
- Early Stage Detection
 - Refine Fertilization
 - Nutrient Deficiency Symptoms
 - Optimize Pesticide Input
 - Early detection of Biotic Stress
 - Control Crop Irrigation
 - Water Stress Detection
 - Crop Yield Estimates
 - Historic Agronomic Indices
- Actionable Insights
 - ↓ Treatment Costs
 - ↓ Environment Harm
 - Optimized Irrigation



Late April



Mid-May



Mid-June

Evolution of agronomic indicators over time

DronaMaps

- Community of Farmers
- Mapping & Processing at Scale
- Field-wise Prescription Cards
- Actionable Insights on Jio Phone
- Per Acre Field Seasonal Cost ↓
- Farmer Income ↑
- Quality ↑
- Yields ↑



www.dronamaps.com



Drones *for* Agriculture



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