Drones around the Farm
A small producers introduction to drones

Disclaimer: Any member of any regulatory agency that controls drone traffic please disregard the next twenty minutes. I have only used drones for pleasure and there has been no financial gain from the use of these drones or more recently, farming in general.
About me: Allen Druffel

- Located in Eastern Washington and North Idaho
- Fields from 50 - 400 acres
- Farm spread over 50 miles
- Lots of different terrain and climates
- Diverse cropping system
- Raised to believe Direct Seed is conventional farming
- Rapid adopter of technology
- Not a drone expert
Government Regulations

- Fly below 400 feet and remain clear of surrounding obstacles
- Keep the aircraft within visual line of sight at all times
- Remain well clear of and do not interfere with manned aircraft operations
- Don't fly within 5 miles of an airport unless you contact the airport and control tower before flying
- Don't fly near people or stadiums
- Don't fly an aircraft that weighs more than 55 pounds
- Don't be careless or reckless with your unmanned aircraft; you could be fined for endangering people or other aircraft
Why I became interested?

- INPUT MANAGEMENT
  - Fertility
  - Water
  - Canopy
  - Mapping
  - Lower Input Costs
Costs of Drone

- You get what you pay for
- Very simple phone drone
- Complicated fixed wing platforms
- Parrot BeBop Drone $430
- DJI Phantom 3 Professional $1300
- DJI Phantom 3 Professional w/NDVI conversion $2200
- AgEagle $13,000
Loss of Drones

- Be aware of drone location
- Watch for altitude
  - It doesn’t know if you’re flying into a hill
- Wind can affect distance of flight
- Mechanical problems
- Battery Life
- Don’t drink and drone
  - I heard this from someone
My First Drone

- DJI Phantom 2 with GoPro Hero 3
  - Manual Flight control
  - No base station monitor
  - Ready to fly out of the box
  - Price is right
  - Great drone to start with

- What I got
  - Great aerial photographs of fields
  - Lesson in flight
What it took to succeed

- Autonomous flight
  - Guidance paths
- Base station monitor
  - Ability to stream video live
First Information

- Seed your headlands last
Experiment Check

- Side Dressed Nitrogen
  - 90 Lbs. applied with seed
  - 50 Lbs. applied during flag leaf
  - 15 Bushel yield Gain
    - More fertilizer = more yield
    - Cutting edge science
- Plant health gain
- Yellow spots on left
Equipment Check

- 1890 Drill
- Did not switch Left and Right openers
  - I did after this photo
Wedding Planning
Fixed Wing or Quad

- Portable
- Easy Landing
- Widely Available
- Slow or Fast
Next Drone

- All in one
- Simple to Fly
- Inexpensive
- NDVI Adaptable
- Good batteries
- Compatible software package
- Georeferenced Pictures
- Fast moving technology
- Quick Deployment
What is NDVI?

- Normalized Difference Vegetation Index (NDVI)
  - NDVI is simply a ratio of near infrared (NIR) reflectivity minus red reflectivity (VIS) over NIR plus VIS

- Why NDVI is important
  - Quickly identify which leaves are healthy

- Conjunction with tissue tests
  - What am I deficient in?
Drone Deploy

- App compatible with DJI and AgEagle
- Software compatible with any geo referenced image
- Stitches photos through the cloud
- Continue mission capability
- Terrain following ability
Drone Deploy

- NDVI Map
  - Identifies Areas in need of inputs
Weed Scouting

- Identify Problem areas
- Print Maps for Employee
- Target problem areas
  - Make a Morning Glory Map?
Future of Drones?

- Weed Identification and Removal
- Precision Nutrient Placement
- Fully Autonomous
  - Base station
  - Pre planned and timed flights
  - Automatic Upload
Autonomous Farms

- R2Plant2
- Lots of small robots
- Operate together
- 24 hours a day
- Little to no compaction
- The technology to operate drones could control these robots
- Soil samples
- Tissue tests
My Drone video

- Snubbed at Golden Globes
- Aerial views give you a whole new perspective
Questions?