



Ag Technology in 2017

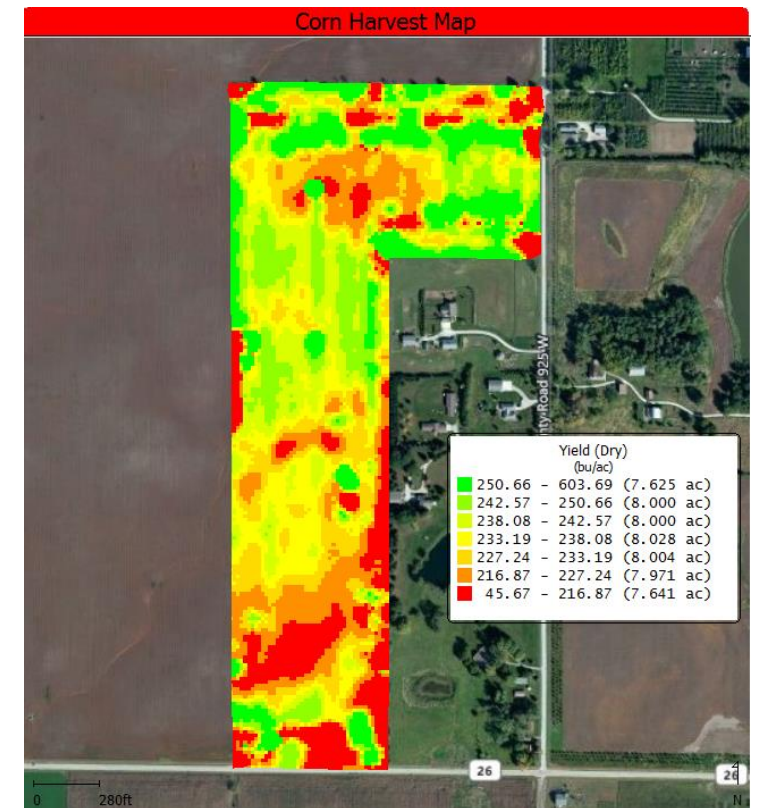
What are some of the technologies that farmers are using on your farm?

- GPS Mapping and System Controls
 - Application and Yield Mapping
 - Equipment Controls
- Machine Innovations
 - Planter Parts
 - Nutrient Application Equipment
- Information Systems
 - Weather Stations
 - Drones and Remote Sensing



GPS Mapping and System Controls

- Farmers have been using GPS for guidance (auto-steer) and boundary mapping for years, but continuous innovation with GPS technology has allowed it to be used for other applications as well.
- **Yield Mapping:**
 - Farmers are able to save millions of data points as they harvest a field. A yield monitor records data from a mass flow sensor in the combine as it goes through the field. Using GPS, these readings are used to create a map.
 - This allows growers to track good and bad areas in the field and make corrections if needed to problems such as drainage, compaction, and fertility.
 - Yield mapping also allows farmers to evaluate decisions that have been made on the farm. This might include products that were used, application rates, and operation timing.



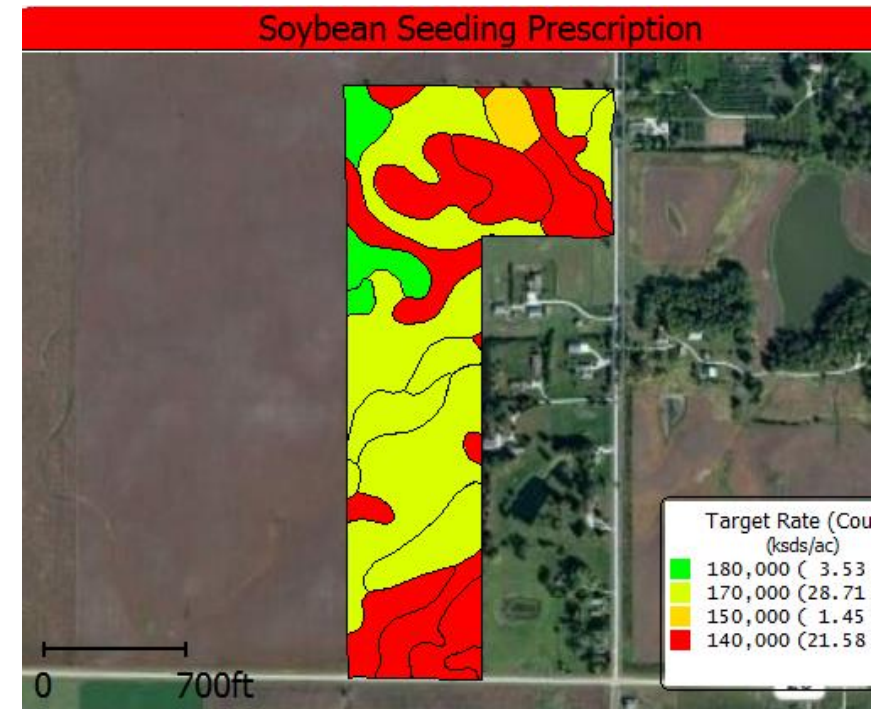
GPS Mapping and System Controls

- **Swath Control**

- This technology greatly increases the efficiency of farm operators. Swath control causes implements to start and stop at precise locations in the field.
- The gains are most easily seen when planting or spraying as it prevents overlap, reducing wasted seed or chemical and improving plant health on end rows. *Notice in the picture of the corn field how the plants stop at exactly the end row, even though it is not a straight line.*

- **Variable Rate Applications**

- Variable Rate Technology (VRT) is used to change nutrient application and seeding rates based on field characteristics. These maps are often created based on soil type, existing fertility rate, water characteristics, and/or differing management practices in the field.
- VRT is used to maximize efficiency, either by reducing input costs or gaining yield. One example that is becoming more prominent is Variable Rate Seeding. This allows the grower to lower seeding populations in poorer areas of the field, and increase seeding rates in areas where the soils are capable of higher yields.



Machine Innovations

- Two of the major areas for technological hardware advancements have been on nitrogen applicators and planters. These pieces of equipment are two of the most crucial elements of producing a profitable corn crop.
- Nitrogen Applicators:
 - One of the biggest innovations in recent years has been the introduction of late season nitrogen applications, accomplished by outfitting a High Clearance Sprayer with a way to drop nitrogen down between the corn rows. This has been done both with a disk that drops down and with “Y-Drops” that are a hose system that dribbles nitrogen directly on the corn roots.
- Planter Developments:
 - Hi-Speed Seed Meters—These new meters allow farmers to plant at speeds in excess of 6 mph while still achieving incredible singulation and spacing.
 - Ride Control—These are air systems that are installed on planters that allow the grower to set the amount of down force, and sometimes an up-force control, to make sure that the seed is planted at a consistent depth even in variable ground conditions
 - Center Fill Planters—A Center Fill, or Bulk Fill, planter allows the farmer to greatly increase his time efficiency when planting.



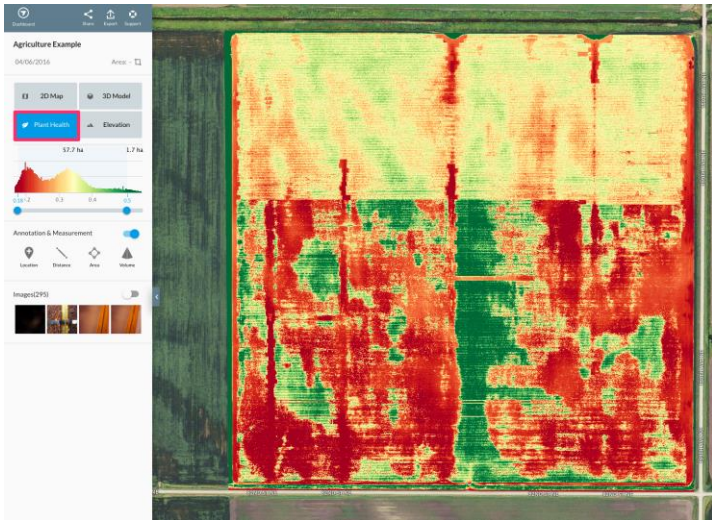
Information Systems

- A large recent shift in agriculture has been the amount of technology devoted to making growers more informed than they ever have been before. Technology is being used to let growers know what is happening in their fields in real time, allowing them to make adjustments in season.
 - Weather Data is especially crucial to let the farmer know about factors like growth stage of a crop, nutrient availability, and ground conditions. Having accurate weather data can help growers make decisions about timing and rates of nutrient applications such as nitrogen and sulfur.
 - This data is obtained through on-site weather stations (pictured right) that collect information on rainfall, temperature, sunlight, and more. Sophisticated radar and interpolation systems are also used.



Information Systems

- Drones and remote sensing are a very exciting part of technology being integrated into modern agriculture.
 - Drones can be very simple or very advanced. The most basic drones used commercially are small “quadcopters” that carry a 4K image camera. More advanced drones are much larger and can carry multiple cameras and sensors (infrared, thermal, NDVI, etc.)
- Any iteration of drone can be used for:
 - Scouting for damage in the field such as herbicide drift, wind damage, or insect feeding
 - Monitoring crop health and uniformity in season
 - Imaging fields to look for soil types, tile drainage, and many other uses





If you have any questions, or want to learn more about how the managers at FarmFirst and the growers we work with use technology on the farm, don't hesitate to ask!

“You are First with FarmFirst”

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