GPS Technology

One of the newest technologies producers are using in their operations is the Global Positioning System (GPS). The GPS is a navigation system used to determine your location in the world based on radio signals to satellites and their ground stations. Currently there are 24 different satellites orbiting the earth, twice a day, to help identify the location being requested. Originally the GPS technology was developed for military purposes but since the 1980s it has been available to the general public. Producers are using GPS in their fields to help plant, harvest and make other passes across the fields to maintain accuracy within the rows.

One of the main uses of GPS technology in agriculture is to apply fertilizers and herbicides. This is because when applying fertilizers it is important to fertilize land based on its productivity levels. Variable rate fertilizers can be applied using GPS technology because after soil sampling has been done low or high areas of fertility can be recorded into the system and when the applicator goes over these areas it can automatically shut off or can apply more fertilizer based on fertility. When applying the herbicide treatment, cost can be cut using the GPS because the accuracy helps to eliminate the overlap of applications. This can be a large savings if there are a lot of acres being sprayed and depending on herbicide costs, can result in less product used.

Tillage equipment is becoming another big use for GPS. When implementing a strip-tillage system, the strips can be made in the fall or the spring, but when they are made in the fall it is important to plant directly in the strips that were previously created. Using GPS, producers can put the coordinates of the field into the GPS in the fall and create the strips and follow up in the spring, select the desired field and plant directly on the rows that were created based on the GPS coordinates. This can eliminate overlapping and crossing of rows reducing the cost of seed, time and labor.

Auto-Steer is a feature of technology that utilizes GPS capabilities. The GPS receiver is connected to the steering hydraulic system of the equipment that is being run, whether it is the combine, tractor, or applicator. In doing this the steering is controlled by the GPS system and can have precise driving. Using auto-steer had benefits to the person using it; the following are some examples:

- Accuracy of rows
- Less driver fatigue
- Savings
    - Labor
    - Fuel
    - Seed
    - Fertilizer/Chemicals

These are important because if the rows are more accurately placed, there is going to be less overlap and less competition between the plants during growth. The drivers are less fatigued because they do not have to stare straight ahead and concentrate on staying within the row while planting or spraying, instead they observe the planter or other equipment behind the tractor and make sure it doesn't plug

up or anything. Farmers who are utilizing auto-steer say they can go long days in the tractor and be up and energized the next morning ready to go at it again for another long day.

Depending on the GPS system you are currently using or are considering purchasing, the accuracy of it will vary. The basic system, which can be handheld, costs less than the higher end systems, but it has an accuracy of about 15 meters. A higher end system costs a significant amount more; however, it can be accurate to ½ inch. These GPS need more than just the satellite and the basic equipment; it also needs an additional base station to be able to obtain the higher accuracy. Real-time kinematic GPS (RTK GPS) is currently the GPS with the highest accuracy, with it as close to one centimeter. The base station with the RTK GPS has its own GPS within it making it more accurate. When transmitting the GPS signal to a handheld unit the signals are transmitted via FM radio signals; the closer the mobile unit is to the base station, the more accurate it is.

GPS technology is one of the newest technologies farmers are utilizing today. Initially getting started may cost a bit more than one would like, but after making the purchase and seeing the advantages of purchasing it, it will be well worth itself in the saving of fuel, seed, fertilizers and herbicides. As the accuracy for GPS increases then there is a chance that more people will be investing in the technology because they can have precision agriculture. Along with increased usage, the costs should go down if there is more interest in the product as long as there is enough production to keep up with the demand of the products.

References

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