Successful Implementation Of Real-Time Networks And Advanced GPS

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GPS technology continues to evolve and be an integral sensor for implementation of precision agriculture (PA) technologies. Access to GPS by civilians in the early 90's allowed for realization of precision agriculture as we know it today. One critical component of GPS was differential correction providing users accurate positions within a few meters. Today, new correction signals for GPS receivers have reduced spatial errors down to 1 meter or less. Real-time kinematic (RTK) permits centimeter level accuracy during field operation and continues to increase in adoption across the US. However, practitioners are faced with a variety of RTK correction solutions which at times can become confusing. Further, GPS technology has changed such that now receivers are capable of tracking and using other satellite navigation systems beyond just GPS. These receivers carry the term GNSS to indicate their ability to use multiple satellite systems. Therefore, this presentation will overview current RTK and advanced GPS options for agriculture applications. RTK and other differential correction options along with GNSS capabilities are important to understand when purchasing and updating GPS-based, precision agriculture technologies. From a PA practitioner's perspective, understanding the options available is important to ensure the correct GPS/GNSS technology is adopted. Matching needed spatial accuracy (sub-meter vs. centimeter or pass-to-pass versus year-to-year) for specific field operations ensures that expectations are met. The goal with precision agriculture is to improve the metering and placement of inputs thereby the performance of GPS/GNSS receivers can impact application accuracy. A recent Auburn study showed that RTK can provide reliable centimeter level accuracy over time whereas other correction types could be several feet off. Other results evaluating RTK accuracy in terms of distance from a CORS base station indicated spatial errors increased but not to a level which would impact field operations at the farm. This evaluation was conducted with baselines between 0.4 and 43.8 miles. On the other hand, reliability of real-time network corrections has become more important than accuracy for agriculture applications. Practitioners cannot afford to wait on "RTK-fix" to continue with field operations during critical periods such as planting if network or cellular connection is lost. However, the loss of RTK-fix or network connection can be contributed to different factors such as loss of network correction, cellular service, or issue within the technology. Our evaluations in Alabama suggest that a network issue, not cellular service, is the main problem related to reliability. All these factors and current GNSS technology will be further discussed help precision ag practitioners can select the correct options for their operation while maximizing technology benefits. Δ

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