



## Geospatial Technology Advances in Farming

8 December, 2004

Producers are increasing their use of geospatial technology in machinery operation and farm management. The technology includes equipment guidance systems, harvesting yield monitors, variable rate application and spatial crop management, according to John Nowatzki, North Dakota State University Extension Service geospatial specialist.

Producers using these technologies are able to apply crop inputs faster and more accurately with less overlaps or misses, allowing fertilizer and chemical applications where they are most needed," Nowatzki says. "The technologies can reduce operator stress while increasing efficiency."

Tractor and machinery guidance systems are the most common geospatial technologies used on farms today. Guidance systems use the satellite Global Positioning System (GPS) to identify a starting line in a field. Guidance systems use a mapping program in a computer built to guide the tractor along lines parallel to the starting line. Guidance systems have a display monitor or light bar in the tractor that uses audible tones or lights as directional indicators for the operator. The guidance system allows the operator to monitor the display to maintain the selected distance from the previous round in the field. Guidance systems require two principle components: a display monitor and a GPS receiver.

Yield monitors on harvesting equipment, particularly combines, are being used more frequently too. Crops are being harvested with GPS monitored yield monitors that measure crop yield every few seconds as the combine goes through the field. Producers often use the same GPS unit with their yield monitor that they use with their GPS guidance system.

Some farmers use GPS-equipped variable rate fertilizer and chemical application equipment to apply different amounts of crop inputs at various locations across fields, which is based on projected crop needs for those locations. Variable rate technology requires a GPS receiver, computer controller and regulated drive mechanism mounted on the applicator. Crop input equipment such as planters or chemical applicators can be equipped to apply one or several products simultaneously. Variable rate technology is used to vary fertilizer, seed and pesticides rates and for adjusting irrigation application.

Producers also use GPS to mark field boundaries and unique or problem areas in fields, such as weed patches or large rocks. Managing this digital data, as well as the yield monitoring data and variable rate application maps, requires producers to use some kind of computerized mapping program. Mapping programs are available from major farm equipment manufacturers and computer software companies.

Remote sensing technology is another geospatial technology increasingly used by farmers. Remotely sensed images from satellites or aircraft can be used to identify nutrient deficiencies, diseases, water deficiencies or surpluses, weed infestations, insect or herbicide damage and crop populations. Information from remote sensing also is used as base maps to determine variable rate fertilizer application maps.

More information about geospatial technology is available from the NDSU Agriculture and Biosystems Engineering Department Web site at <http://www.ageng.ndsu.nodak.edu>. Follow the links to Extension Programs and Geospatial Technology Education.