

Precision Ag Q&A

Know your Boundaries for Precision Farming

What are digital boundaries?

The word 'boundary' used to mean a post and wire fence around a field. In a digital context, boundaries refer to a digital map of each of the fields that make up a farm, and represent the extent of the cropped area of that field. These digital boundaries enable a machine to understand which field it is in, any work that is planned, and serve as a geofence for machine automation and autonomous (driverless) farming.

Why are digital boundaries necessary for precision agriculture?

The adoption of digital field boundaries by farmers enables them to automate record-keeping of farm operations, and enhances decision making. Accurate digital boundaries are also required for fully autonomous farming equipment to function. Paired with guidance lines, these virtual geofences enable the machine to plot its path through an entire field. Australian farmers are already using John Deere machine automation technology such as AutoTrac™ Turn Automation, Boundary Track Guidance and Section Control.

What is the best way to measure digital boundaries?

The most accurate method of creating digital boundaries requires the farmer to physically drive along them with a GPS receiver on board that has a Real-Time Kinematic (RTK) correction signal enabled. RTK ensures long-term repeatable accuracy within 2.5 centimetres. John Deere displays have built-in functionality to guide you through the process of driving and recording boundaries, or you can contact your local dealer, who may offer RTK boundary mapping as a service.

Boundaries can also be created by using previously recorded coverage, such as a seeding operation. If RTK accuracy was used, this method can be used for data collection and management, as well as machine automation.

Can I create boundaries on the maps on my farm computer?

The simplest but least precise way to create boundaries for a farm operation is by drawing them on a map on a computer. Alternatively, an agronomist or another third party may already have boundaries electronically mapped, and it is just a matter of uploading these into John Deere Operations Center™. But these methods are only sufficient for data collection, management and analysis, and due to drift over time are not recommended when using machine functions such as turn automation or section control.

Investing the time to establish long-term, repeatable boundaries is the best way to prepare your operation and reap the rewards from advancements in data and automation that are already here today, and those newly emerging.

How do I interpret the results?

Not many of us have the time to sit down and analyse all the available map layers for each field individually, but a farm management platform like Operations Centre can highlight where the greatest opportunities may exist.

Boundaries effectively represent a digital folder that automatically stores all relevant data in one place, making it easier to understand trends, and derive insights.

What are some of the benefits of digital boundaries?

With current technology and accurate boundaries established, it's easy for an operator to program the tractor to not only automate end-of-row turning, but also implement product shutoff, raising, and re-engagement onto the next pass. This frees up the operator to focus on monitoring the quality of the operation and optimising machine performance.

Boundaries also provide a base for clearer management decisions, leading to improved outcomes such as reduced inputs or increased crop yield or quality. For example, by looking at historical yield data and pairing this with other available data sources such as soil types, growers can better understand the variabilities that are affecting crop growth.

Can I demonstrate sustainable farm practices through digital boundaries?

Yes. Boundaries not only pave the way for fully autonomous farming, but they represent an opportunity for growers to differentiate their business. We have a supply chain and consumers who are seeking produce from sustainable sources. Once our digital boundaries are mapped, it is a simple process to automatically record every operation or pass that occurs on every field, unlocking the ability to easily demonstrate sustainable farm practices and environmental stewardship without the need for manual record keeping.