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Precision Ag

DEP

Agriculture Advisory Board

What Is GPS?

- Global Positioning System
- 24 Satellites provided by US Military
- Provides signals to a receiver for establishing a particular point on earth
- Accuracy is +/- 300 ft without differential corrections
- Signal acquisition is free to the public

What are Differential Corrections

- Signal from another GPS source that corrects the signals from the 24 military satellites to gain a certain level of accuracy
- Can be a free source or a paid source
- Accuracy depends on this correction
- Has a big impact on price of system

What is Accuracy

- PASS TO PASS
  - Accuracy measured between passes in a 15 minute time period
- REPEATABLE
  - Same level of accuracy to a specified point
  - Year to year accuracy

GPS accuracy (x-track error)

RTK Fixed 1-2cm (Sub-inch)

Row crop planting, topo-mapping and leveling+

Omni*HP 5-10cm

(2-4 inch)

Row crop planting +

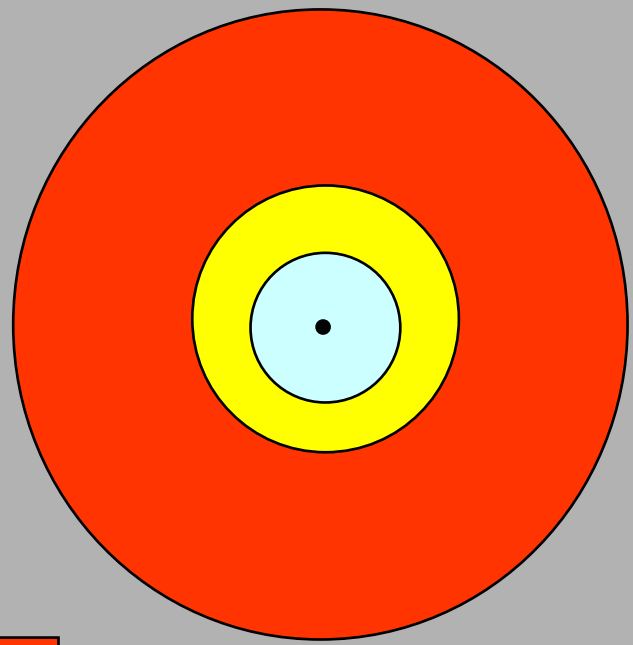
DGPS 0.15-0.3m

(6-10 inch)

Spraying, spreading, tillage, harvesting

Autonomous 1-5m

Hiking, boating, vehicle tracking



Precision Ag

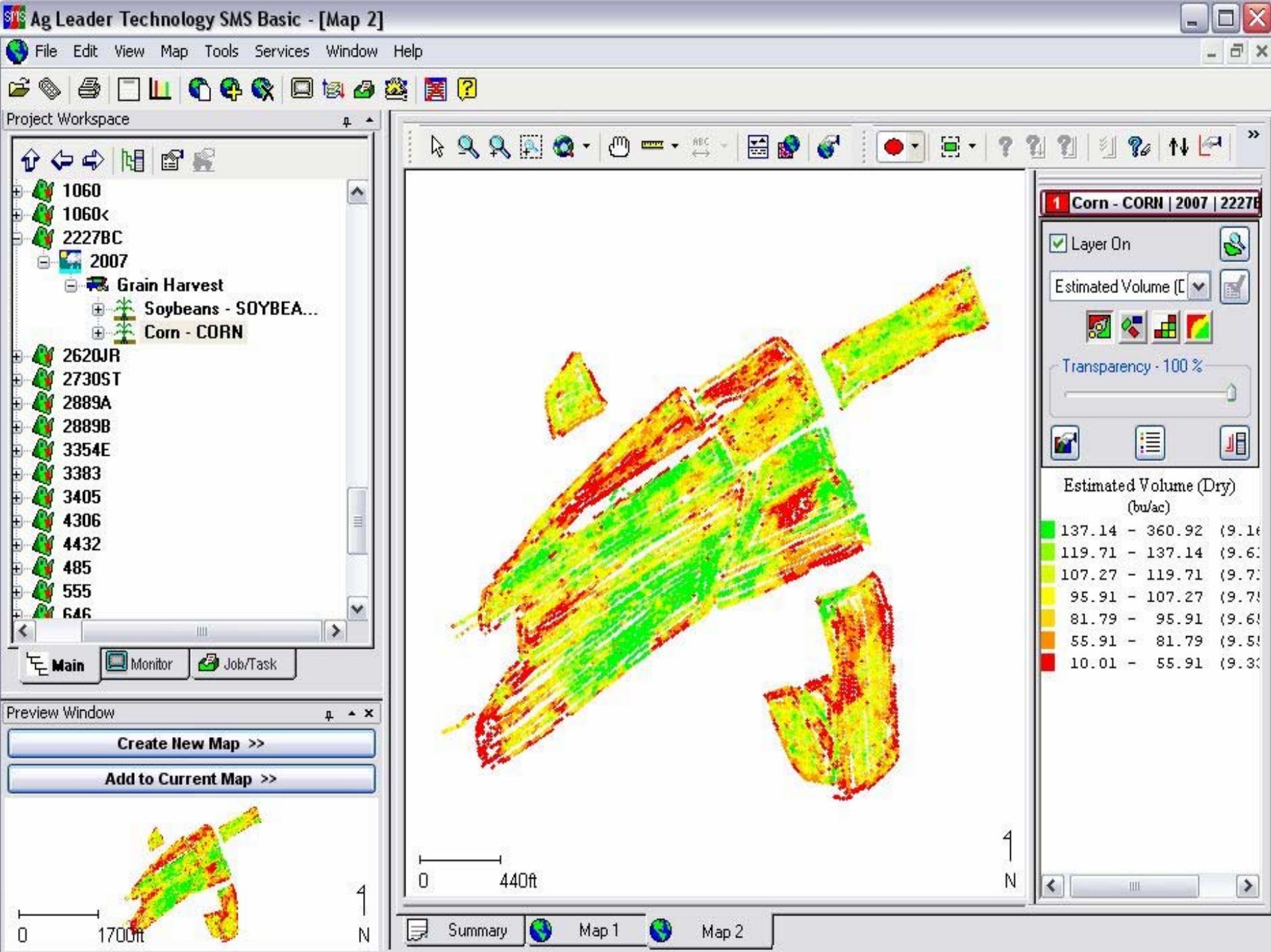
- Information Management
- Decision Making
- Machine Control
  - Swath Control
  - Rate Control
  - Boom Control
  - Variable Rate
- Guidance

Information Management

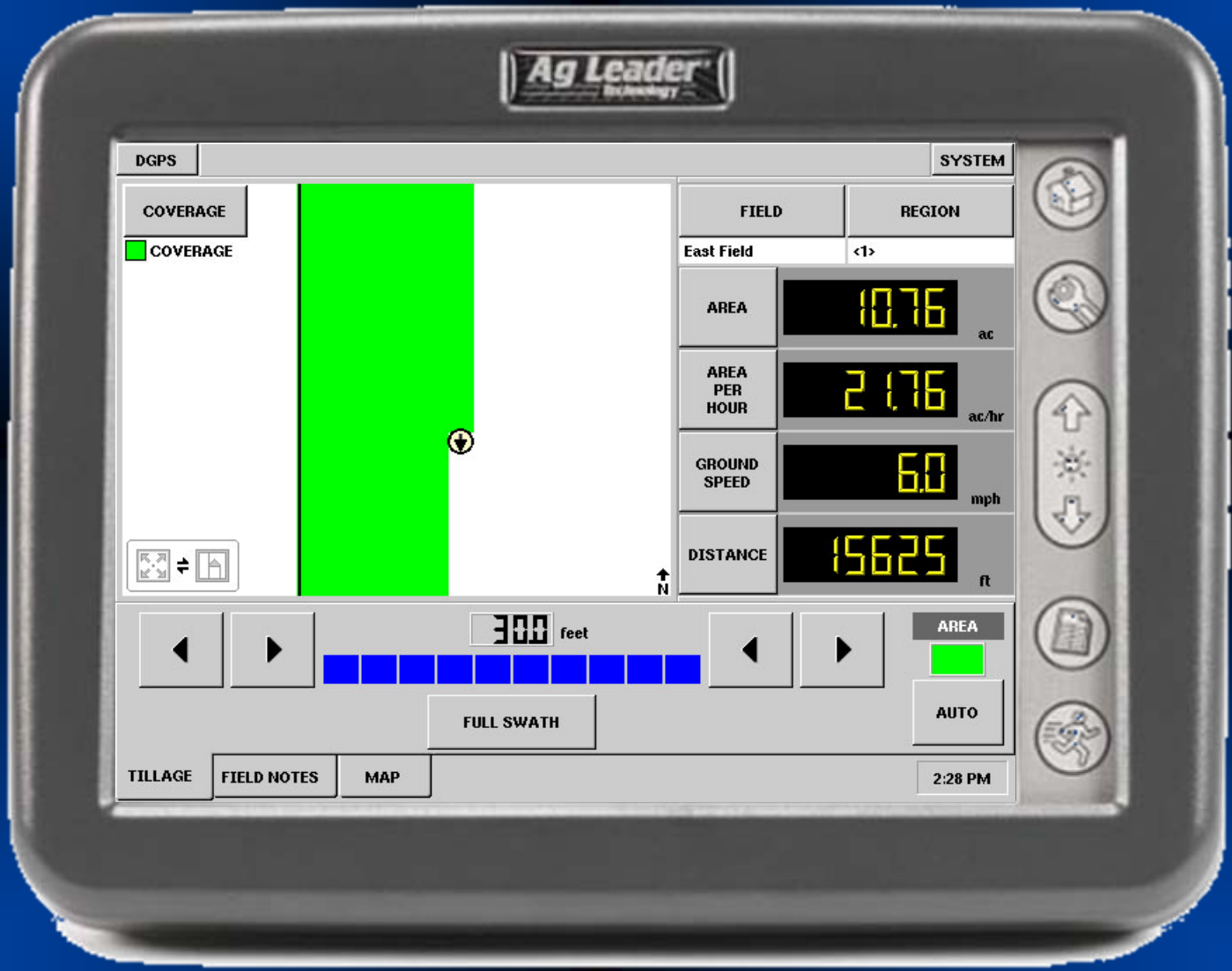
- Yield Monitoring
  - Yield
  - Moisture
  - Elevation
  - Weeds, Holes, Etc.
- Site Verification
  - Tillage, Lime & Fertilizer Spreading

InSight

Harvest


Ag Leader Technology SMS Basic - [Map 2]
File Edit View Map Tools Services Window Help
Project Workspace
1060
1060<
2227BC
2007
Grain Harvest
Soybeans - SOYBEA...
Corn - CORN
2620JR
2730ST
2889A
2889B
3354E
3383
3405
4306
4432
485
555
Main
Monitor
Job/Task
Preview Window
Create New Map >>
Add to Current Map >>
0
1700ft
N
0
440ft
N
1 Corn - CORN | 2007 | 2227B
Layer On
Estimated Volume (D
Transparency - 100 %
Estimated Volume (Dry)
(bu/ac)
137.14 - 360.92
119.71 - 137.14
107.27 - 119.71
95.91 - 107.27
81.79 - 95.91
55.91 - 81.79
10.01 - 55.91
Summary
Map 1
Map 2

InSight



Tillage

Decision Making

- Most all decisions about any given field start with a yield monitor that is georeferenced
  - The ultimate goal is to get the most yield out of any given acre while keeping the input costs at an absolute minimum
  - Yield history is needed to help make these decisions on a per acre basis

Decision Making

- Soil Sampling
  - Which fields and what areas of that field
  - How big should the grids be in the field
- Fertilizer, Phosphate, & Potash
  - How much of each component
  - Where to place these components
  - What kinds of each component

Decision Making

- Crop Type
- Crop Variety
- Plant Population
- Till or No-Till?
  - Manure Incorporation
  - Compaction Issues
  - Different Farming practices

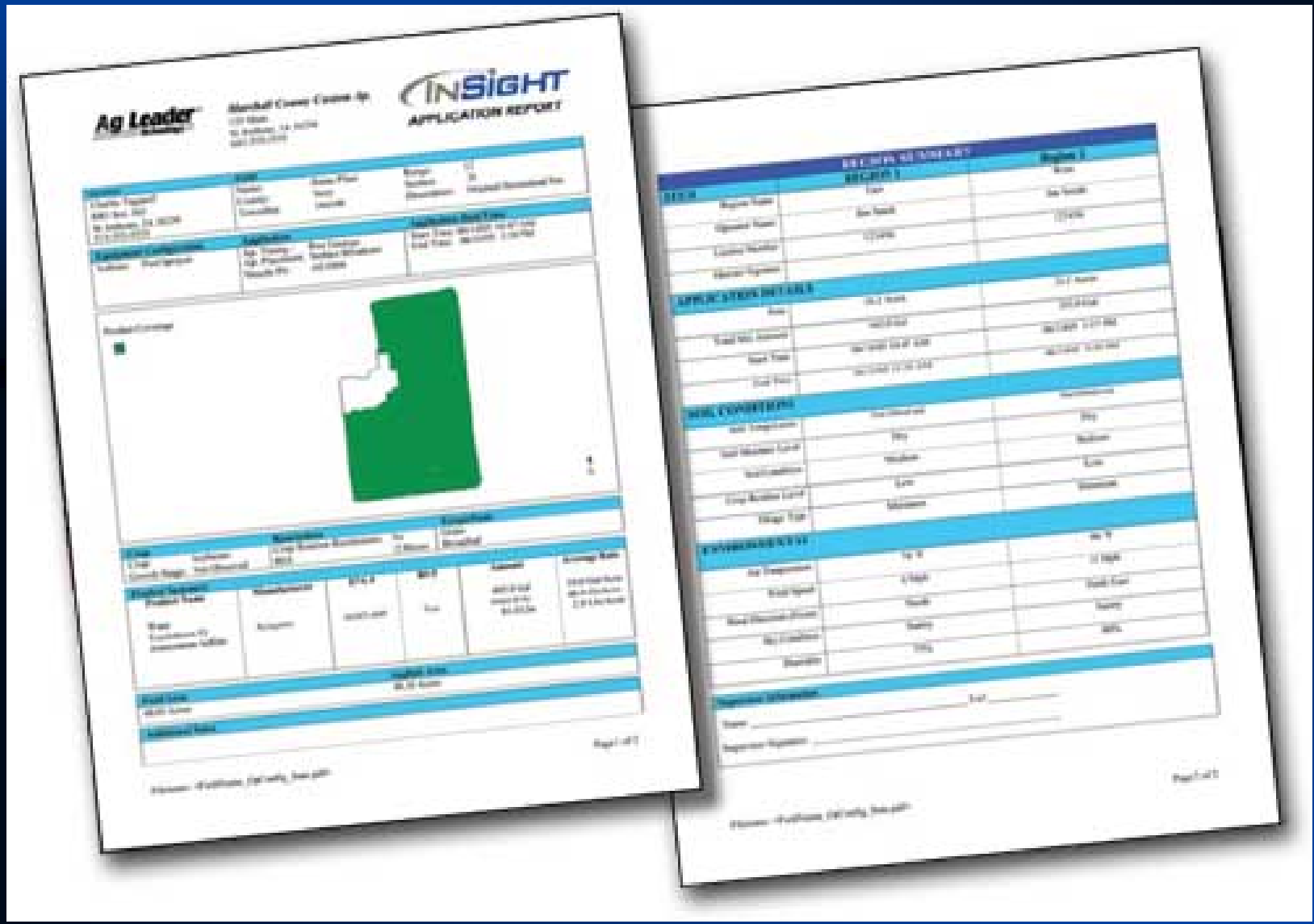
Decision Making

- History is your biggest asset
- Need at least 3 years history
- Some decisions can be made in 1 year
  - Tile lines
- Other decisions take more history
  - Hybrids
  - Populations
  - Fertilizer Rates

Machine Control

- Sprayer
  - Automated Rate Control
  - Automated Swath Control
  - Automated Steering
  - Automated Boom Height
- Fertilizer Box
  - Automated Rate Control
  - Automated Steering

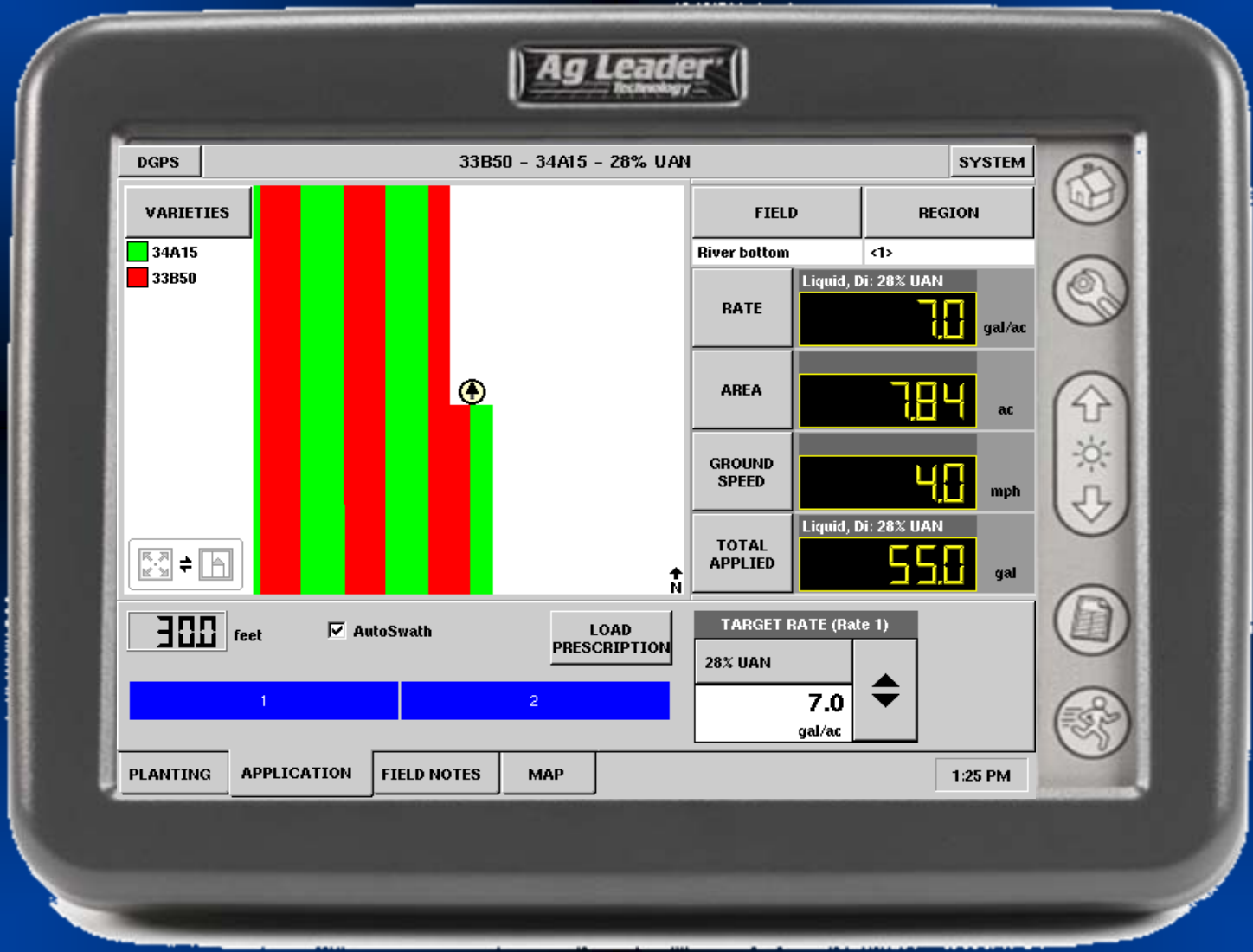
Application Report



Machine Control

- Planter
  - Automated Fertilizer Rate
  - Automated Seed Population
  - Automated Swath Control for seed & fertilizer
  - Automated Insecticide Rate
  - Automated Swath Control for Insecticide

InSight

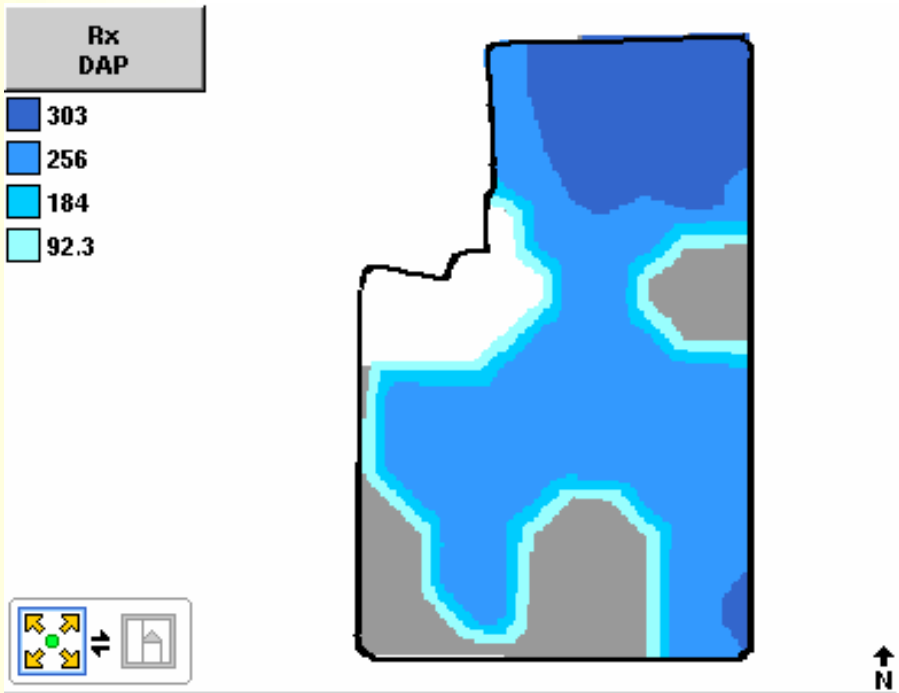


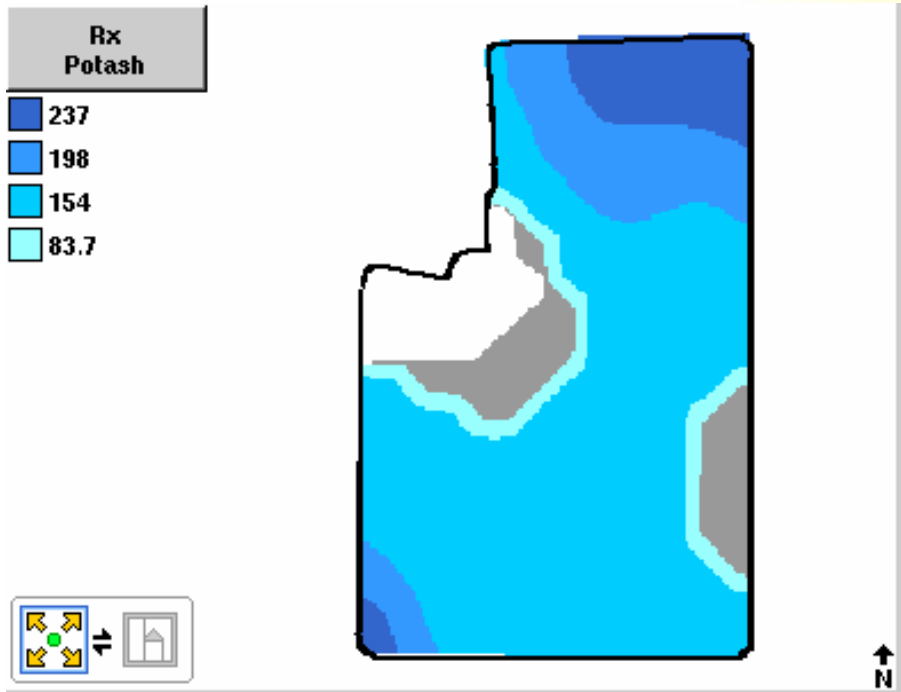
Planting and Rate Control

Machine Control

- Tractor
  - Automated Steering
- Variable Rate Technology
  - Being able to apply the correct components at the correct location at the correct rates in any given field to maximize yields and minimize the harmful affects to the environment

Composite Prescription Map

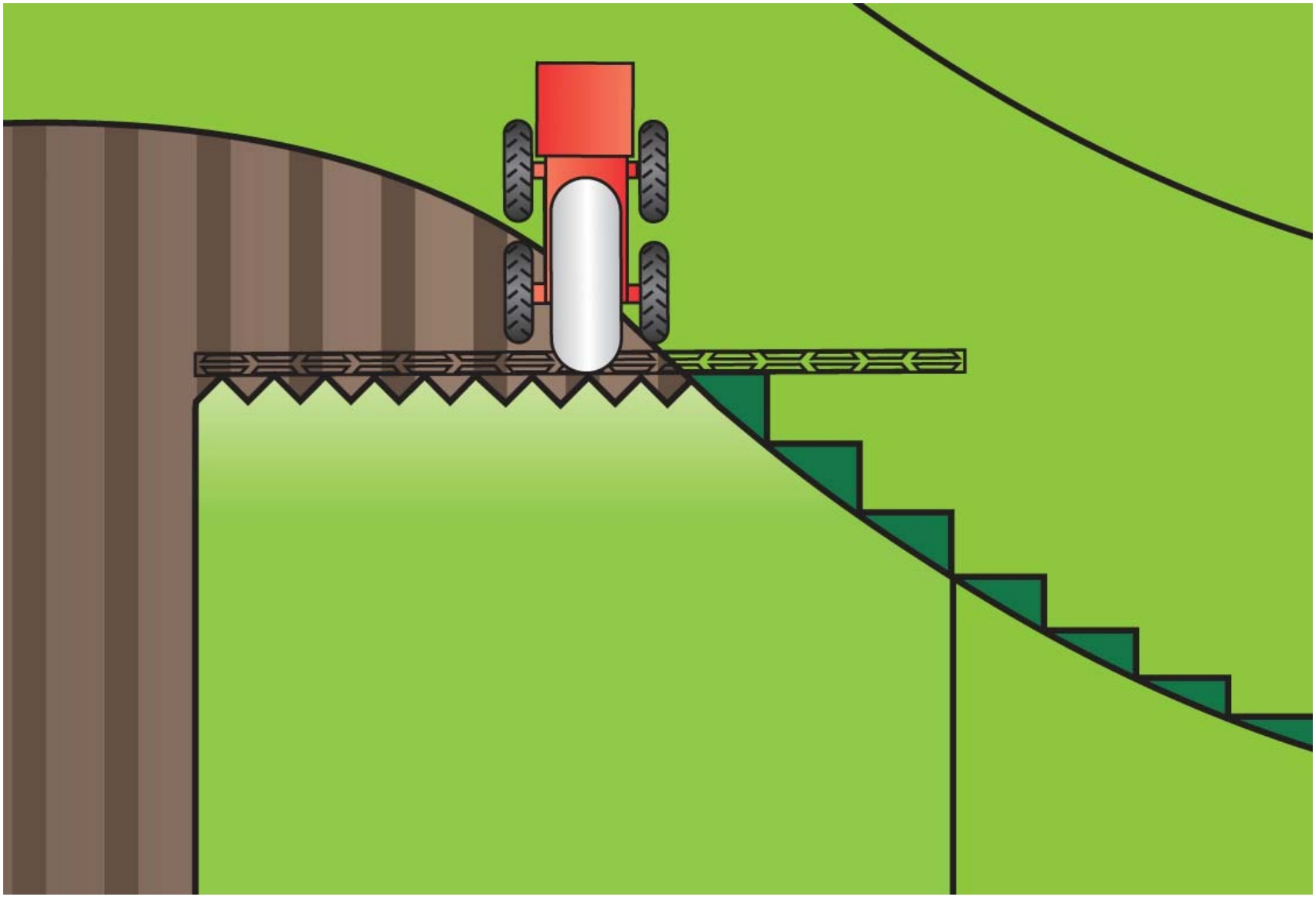




Machine Control

- AutoSwath (Sprayer)
  - Automatically engages and disengages sprayer booms by georeferencing areas sprayed
  - Reduces chemical usage by up to 15%
  - Reduces fertilizer usage by up to 15%
- AutoSwath (Fertilizer Truck)
  - Reduces dry fertilizer usage by up to 15%

Auto Swath Control



Machine Control

- AutoSwath (Planter)
  - Automatically engages and disengages both seed and fertilizer by georeferencing areas planted
  - Reduces fertilizer usage by up to 15%
    - Both starter fertilizer and nitrogen
  - Reduces Insecticide usage by up to 15%

Air Clutches

2 rows per section

Omni-Star HP

Guidance

- Manual or Automated
- Tractor, Sprayer, Truck, Combine
  - Minimizes both skip and overlap
  - Reduces chemical and fertilizer usage by up to 15%
  - Eliminates excess fuel usage
  - Eliminates excess passes in field

InSight

INSIGHT - CAN Based System

Precision Ag

How much does it save?

Consider these Facts

- AutoSwath
  - Eliminates 6% - 15% overlap
    - Chemical, Fertilizer, Insecticide, Seed, etc.
  - Applies to sprayers, planters, fertilizer spreaders, etc.

- Guidance (Manual & Automated)
  - Eliminates 6% - 15% overlap
    - Chemical, Seed, Fertilizer, Insecticide, etc.
    - Applies to planters, sprayers, fertilizer spreaders, manure spreaders, etc.
- Boom Leveling
  - Better coverage with less chemical

- Record Keeping
  - Insurance purposes
  - EPA regulations
  - Landowner records
  - Rent justifications
  - Decision making on products & rates
  - Tax purposes

Hoober Inc

A dedicated Precision Ag Team striving to meet all of your Precision Ag needs