Enables those who feed the world.

Immediate and Ongoing Needs
  + population growth (more to feed)
  + urbanization (decrease in arable land)

Double food production by 2050 to meet world demand.

To meet this need – every inch matters.
GPS Enabled Precision

Increases:

- Yield
- Efficiency
- Productivity
- Safety

Decreases:

- Environmental Impact
- Inputs
- Costs
- Theft
Precision Seeding
GPS Enabled Precision Ag

Field Planted **without** Swath Control

Field Planted **with** Swath Control Pro™
GPS Enabled Precision

Sprayer nozzles shut-off when not above crop section.
Overlap used to be measured in feet.

With precision GPS, overlap is now measured in inches.
GPS Enables Operator Efficiency

- Decreases Fatigue
- Increases Health & Safety
- Enables Night-time Operation
Water Optimization & Precise Planting
Precision Enabled Decision Making

Record and Adjust While Operating

Actionable Information for Analysis and Decision Making.
Improved Agricultural Productivity

Yield Mapping – used by 80% of grain combine customers in US

- Provides insight for precise seed placement, pesticides and fertilizers

Auto Guidance – used by 65% of the large agriculture producers in US

- Reduced errors in overlap of tillage, seeding and spraying
- Reduced operator fatigue
- Opportunity to use local unskilled operators

Improved Output

- Reduced overlap = fewer passes through the field
- Less compaction implies higher yield
- Less tillage required – less fuel, less carbon release and lower food cost

Future Gains

- Additional advancements needed to feed a growing population
Specific Input Cost Savings

• **Annual Cost impact: $8.2 billion**
  - Reduced chemical and fertilizer: $4.8 B
  - Reduced seed costs: $1.5 B
  - Reduced fuel consumption $0.5B
  - Labor savings $1.4 B

• **Other Cost impacts**
  - Operation in darkness, fog and high winds
  - Optimal planting time can result in difference of 1% yield per day
Improved Environmental Impact

Reduced pesticide and fertilizer usage

• GPS has saved between 7% to 10% (17.5 to 25 million acres) annually from receiving unneeded pesticide and fertilizer applications.

USDA data shows technology impact on corn production—compared to 1987 (Impossible without GPS)

• Land required to produce a bushel of corn reduced by 37%
• Precision tillage has reduced soil loss by 69%
• Energy required for production reduced by 37%
• Carbon emissions reduced by 30% per bushel
Summary – Two Examples

Jonathan Andrews – Central California

• Use of auto guidance annually saves approximately:
  • $12,500 in seed
  • $25,000 in fertilizer
  • $5,000 in fuel
  • Can work in heavy fog which is often present

Kip Tom – Leesburg Indiana

• Saves over $180,000 per year using GPS technology
• Ascribes 11 bushels per acre of increased yield from use of yield mapping and variable rate seeding.
• Increased total yield amounts to 190,400 bushels with a value of more than $1 million in today’s prices
Summary of Economic Benefit of GPS in Ag

Minimum of $8.2 billion annual input savings

Minimum of $6 billion annually in improved yield

Total of savings and yield improvement of over 14 billion annually

Also saves over-application of pesticides and fertilizer on 17.5 to 25 million acres of land per year.