

Usage of technologies in precision agriculture like drone, autopilot advantages and experiences.

Kapil Nikose

Mechanical Equipment Manager DuPont Pioneer

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- Develop and implement a research equipment strategy that supports plant breeding research operations with a focus on precision ,efficiency, effectiveness and data quality.
- Usage of the current state of equipment for all crops globally and plans to fill gaps by development of new solutions by Engineering or external collaboration. (like planting, harvesting, data collection, etc.)

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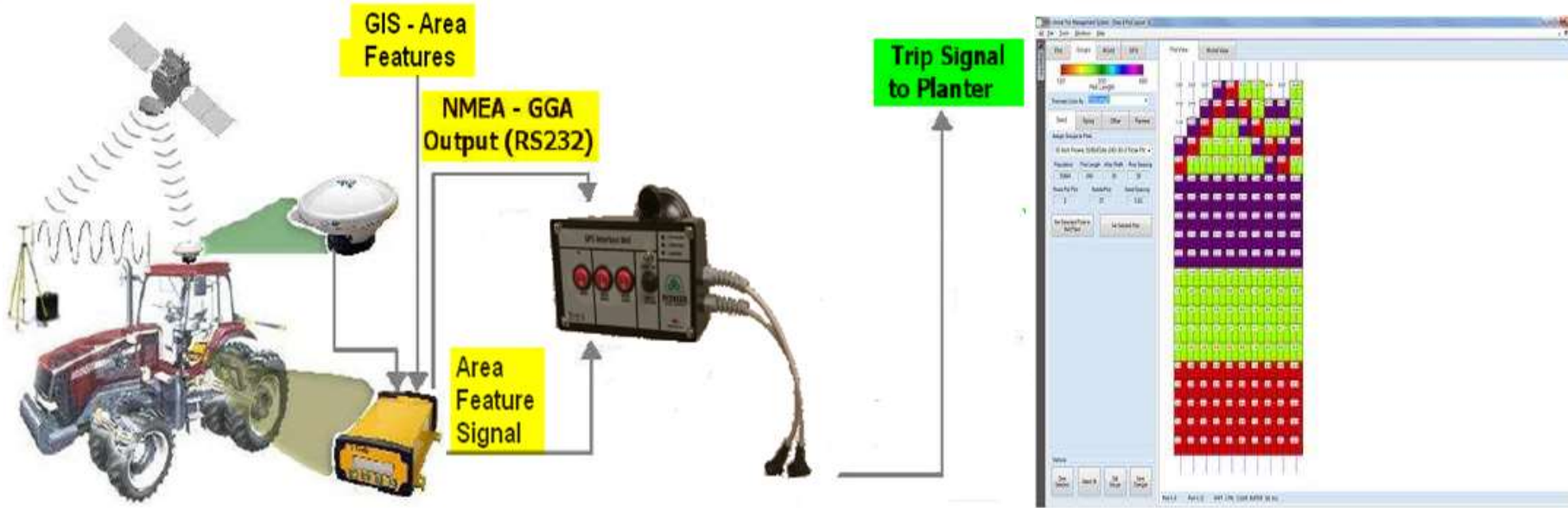
Precision planter with Trimble GPS auto pilot system.



- 4 rows precision planter with vacuum system.
- Hydraulic motor and zero backlash clutches to speed up the seed shaft to align with exact alley width.
- Can plant avg. 3000 plots per day.
- Trimble GPS tripping system to match exact seed dropping and ending.
- Autopilot system for tractor guidance.

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GPS Planter control



Technology to control the planting of the plots themselves without the use of a cable winder or other physical apparatus. Thematic color is done for Plot Length, Population, Seeds per plot, Seed spacing, Alley width, and Rows per Plot.

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GPS planted crop.



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Drone (UAV) technology.



- UAV based agricultural research to observe plants below ground, at the bottom with help of the UAV from above. After scores the results must stand the test in practical use growing on agricultural fields under real conditions. High tech drone and specific sensors will provide data and frequently document progress. Those data make reliable analysis possible.

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Data captured

Signal Source	Project	Research Deliverable
RGB	Plot Quality	Plant Count
RGB	Plot Quality	Plot Quality
RGB	Plot Quality	Early Vigor
RGB	Plot Quality	Weeds
Surface Elevation Model	Plant Height	Plant Height
RGB	Canopy Health	Leaf Diseases
RGB	Canopy Health	Maturity / Drydown / Staygreen
Surface Elevation Model	Plant Height	Stalk or Root Lodging
Multispectral - Thermal	Canopy Health	Leaf Diseases, Pest damage
Multispectral	Canopy Health	Maturity / Drydown / Staygreen
Surface Elevation Model	Plant Height	Model - Growth Rate
Surface Elevation Model	Plant Height	Model - Biomass
Surface Elevation Model	Plant Height	Identification of Offtypes
Surface Elevation Model - Light Sensor	Plant Height	Model - Leaf Area Index

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