

TENTATIVE COMPETITION GUIDELINES AND CONTEST DESCRIPTION

2017 NACTA Precision Agriculture Contest

Hosted by Kansas State University

Sponsored by John Deere

Thursday, April 6, 2017, 1:00 pm

Location: KSU North Agronomy Farm, 2200 Kimball Ave

Contacts: Joe Harner <jharner@ksu.edu>, Kevin Donnelly <kjd@ksu.edu>,

Philip Minaudo <MinaudoPhilipJ@JohnDeere.com>

Competition Guidelines

1. All official contestants and unofficial participants must be currently enrolled in a two-year or a four-year institution and pursuing an undergraduate degree. Two-year and four-year teams will evaluate the same contest components. Separate awards will be made for both team and overall individuals in each division.
2. A school may enter one four-person competing team and its members must be designated prior to the start of the contest. Scores of the top three team members will be totaled for the team score.
3. Schools may enter any number of additional contestants to compete for individual awards, but their scores will not count toward the team score.
4. The contest will consist of four components, with each component allowed 60 minutes for completion.
5. Tie Breakers. Ties for both teams and individual contestants will be broken using scores from contest rotations in the following order: a. Plant b. Protect c. Harvest d. Analyze
6. Contestants must bring a pencil, clipboard, and a hand held calculator to the contest. Some exercises will involve use of apps and/or electronic media. I-Pads will be available with necessary apps installed.
7. No communication with other contestants or anyone else except superintendents will be permitted once the contest has started. Coaches may not communicate with a team or individuals until the contest is finished. No text messaging or conferring during the contest will be allowed. Contestants observed in violation of this WILL be disqualified from the competition.
8. Since some activities will involve working with equipment, detailed instructions and safety procedures will be explained before the contest and must be followed at all times. Any contestant not following prescribed safety procedures will be removed from the event and will not be scored for individual or team awards.
9. Announcements made on the day of the contest will take precedence. Since this is a new contest area and specific activities will be dependent upon available equipment at the time of the event, the contest coordinators reserve the right adjust the content accordingly. Teams should check back for possible updates to the rules before the event.

Contest Description

The contest will be based around activities related to precision agriculture applications for planting, crop protection, and harvest. Within each, three types of activities will occur: component identification, mathematical calculations, and a situational analysis. A final section will involve analysis and interpretation of precision maps and/or data. Some hands-on activities will be completed with planters (or planter units), sprayers (or sprayer table) and combines on site. Such activities may require the use of apps to determine appropriate adjustments or settings on the machines. References are included to help contestants prepare.

Rotation 1: Plant

a. Component Identification on Precision Planter

http://www.deere.com/en_US/products/equipment/planting_and_seeding_equipment/planters/row_units/exact_emerge_row_unit/exactemerge_row_unit.page?int_cmp=BAC_Ag_enUS_emerge_exact_planterSH

https://www.youtube.com/watch?v=XebeXoHOI_0
<https://www.youtube.com/watch?v=Gm14Vio6Y8g>

b. Mathematical Calculations (seeding rate calculations, calibration validation, seed spacing given seeding rate and row width, seed required to meet seeding rate prescription, seeding costs and cost comparisons, etc.)

c. Situational Analysis – May involve one or more of the following:

Troubleshooting problems

Row unit adjustments to optimize performance

Adjustments for switching crops

Use of PlanterPlus™ app for planter optimization before and during planting

<https://itunes.apple.com/us/app/planterplus/id847680062?mt=8>

Create a prescription for planting through My John Deere Operations Center and Agrian Prescription Creator

Operations center: <https://www.youtube.com/watch?v=sDUJ86NeOA4>

https://www.deere.com/en_US/products/equipment/ag_management_solutions/information_management/myjohndeere/myjohndeere.page?

Prescription Creator: <https://www.youtube.com/watch?v=9Fin5Or8JY8>

Rotation 2: Protect

a. Component Identification on Precision Sprayer

https://www.deere.com/en_US/products/equipment/self_propelled_sprayers/self_propelled_sprayers.page?

b. Mathematical Calculations (sprayer calibration calculations, calibration validation, pressure-volume relationships, calculate amount of chemical added to meet label recommendations given tank size and delivery rate, pesticide application costs and cost comparisons, etc.)

- c. Situational Analysis – May involve one or more of the following:
- Troubleshooting problems
 - Nozzle selection based on given parameters and/or label restrictions
 - Adjustments for changing delivery rates, spray patterns, drift potential, etc. to optimize sprayer performance
 - Guidance systems, Boom and nozzle control
 - ExactApply™ Nozzle Control: <https://www.youtube.com/watch?v=tyGJBAijJnA>
 - Use of Nozzle Select app
 - <https://itunes.apple.com/us/app/john-deere-nozzle-select/id992867702?mt=8>
 - Interpretative questions based on demonstrations or test runs
 - Evaluate performance from spray pattern maps
 - Review Field Analyzer maps and answer interpretive questions

Rotation 3: Harvest

- a. Component Identification on Combine

http://www.deere.com/en_US/products/equipment/grain_harvesting/grain_harvesting.page

- b. Mathematical Calculations (combine harvest loss, harvest efficiency, harvesting costs and cost comparisons, etc.)

- c. Situational Analysis – May involve one or more of the following:

- Troubleshooting problems
- Adjustments for changing machine performance
- Machine Optimization through Harvest Mobile (Interactive Combine Adjustment) or GoHarvest walkthroughs
 - <https://itunes.apple.com/us/app/john-deere-harvest-mobile/id984511757?mt=8>
 - <https://itunes.apple.com/us/app/goharvest/id684295661?mt=8>
- Review Field Analyzer maps and answer interpretive questions

Rotation 4: Analyze

The final section will involve an analysis and interpretation of field data and/or maps. The focus will be on assessing and managing field variability. Data may include recent or historical yield maps, NDVI imagery, grid sample soil maps. Field Analyzer maps, remote sensing data (crop or soil), on-the-go sensing data (ie. Veris map), etc. Contestants will need to assess the primary reasons for any spatial variability observed in the data/maps, identify potential production problems/limitations revealed by the data/maps, and suggest site specific management practices using precision agriculture technology to optimize crop production for the next cropping season. This could involve creating prescriptions for planting, nutrient application and/or pest control.