

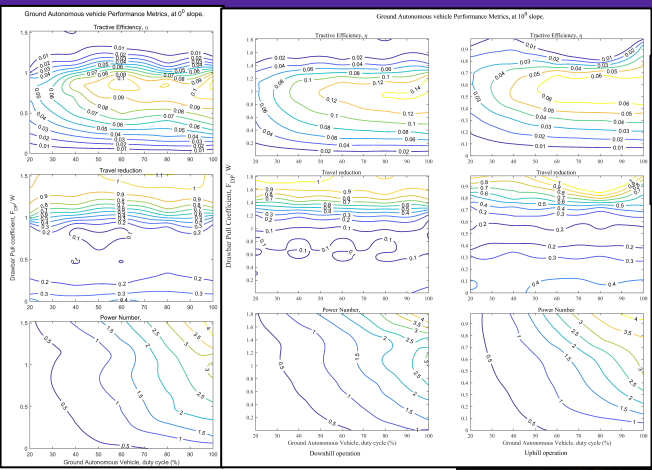
Multi-Robot Farming on Marginal, Highly Sloped Lands

NRI project: 1734510

Kansas State University hosted industry advisors as well as 20 STEM teachers in June 2019 for an update on the NRI2017 and NRI2018 projects as well as a vision casting for robotics in agriculture.



Tests were done on the AgDrone vehicle on different soil types and on varying slopes to find the specific fuel consumption as well as sliding behavior.



FEEDING OVER 9,000,000,000 by 2050?

- 1- "High Capacity smart battery system for small autonomous farming systems", Flippo, D., Welch, S., & Das, S. U.S. Provisional Pat. Ser. No. 62/869,296, filed [7/1/19].
- 2- "Autonomous Robot System for Steep Terrain Farming Operations", Das, S., Flippo, D., & Welch, S., U.S. Provisional Pat. Ser. No. 62/831,986, filed [4/19].
- 3- "Active Power Planter for small autonomous vehicles", Flippo, D., Brokesh, E., & Sharda, A., U.S. Provisional Pat. Ser. No. KSURF Disc. No. Pending

Currently annual percentage crop yield increases are only half those required to meet projected food needs. We are working to expand arable land through advanced mechanization on highly sloped hills that are unsafe for conventional equipment

Simulation done in Unreal Engine 4 places the vehicle in a simulated environment from satellite topographical data. This will be used in the routing optimization algorithm to show vehicle paths, possible maneuvering issues and energy usage.



Harvest Stripper Header: instead of cutting and threshing the wheat the robot will use a stripper header to strip the grain from the wheat stalk. Shown to the right is a prototype stripper header specifically for the AgDrone vehicle.



Drilling wheat in untilled soil is conventionally done with wheat drills that force 300-500 lbs. of downforce. The AgDrone weighs 200 lbs. so new techniques must be employed to get the seed in the ground. Powered tilling wheels have shown the most promise and several prototype designs have been tested and refined. Also a new auger type seed singulation is required to match the slow speed and high slopes.

