

Project Title: Precision Peanut Re-planting with a Small Multi-Purpose Autonomous Rover

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Project: Objectives - Accomplishments:

Objective 1: Develop One-row Re-planter - We developed a one-row air planter that is raised and lowered by hydraulic cylinder and controlled by joystick controller. A stepper motor turns the seed plate and matches its speed with the rover speed to drop 7 seed per foot. When the planter is raised with the joystick, a switch turns the power to the stepper motor off and the seed plate stops rotating and the planter stops planting.



As shown above, the soil firmer and closer are adjustable. Speed to raise and lower the planting unit is also adjustable by changing the setting on a hydraulic flow controller connected to the hydraulic cylinder.



Objective 2: Adjust Planter – Planter was tested in the field to 1) determine speed setting of the seed plate to match 7 seed per foot, 2) adjust flow control to hydraulic cylinder to raise and lower re-plant assembly at adequate speed, 3) adjust planting depth to 1.5” and 4) adjust closing wheels to obtain proper seed cover.

Objective 3: Field test – 3 treatments of 5’, 10’ and 15’ peanut plant gaps were re-planted at approximately 2 mph. Gaps were created by removing plants by hand. The machine was driven over the plants and the planting assembly raised and lower at the beginning and end of each gap. Two and three weeks after planting, seedling emergence was counted for each treatment and

the average emergence is shown in the bar chart.

As shown on the right, germination was low, ranging from 1.6-2.3 seed/ft. Seed drop rate was 7 seed/ft. We believe several factors contributed to the low germination, including poor seed to ground contact (improper firming of soil) and the timing of the re-planting. Due to the time it took to get the re-planter ready, the re-planting took place on July 30, much later than normal.

Conclusions and Future: We believe the planter assembly and electronics involved are sound and show the [potential to precision re-planting. We will improve soil firming and conduct re-plant testing 2-3 weeks after planting in the coming year. We are also planning to incorporate a prescription map to automatically raise and lower planter in only the seedling emergence gaps using GPS on the rover and an aerial image of the field 2 weeks after planting.

