Agriculture Soil Probe Rover

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Being a 5th- generation farmer, it is understood that soil health is vital for crop production. Soil analysis helps to manage the soil resource but is currently a timely process. In addition, precise sampling allows farmers to place nutrients only where needed, reducing input expense and nutrient runoff. The researcher's goal was to design and fabricate an agriculture soil probe rover prototype to reduce labor needed to collect field soil samples. The rover was constructed from recycled parts and supplies such as a computer, motors, servos, a camera, portable drill batteries, and portable drills. New parts included an Arduino, motor drivers, relays, a router and a GPS unit. Specialty parts were fabricated by the researcher using a lathe, mill, and a 3-D printer. The operator's computer was coded with a C# program that communicates over the network to the rover computer which then sends data to an Arduino Mega to control the various mechanical components of the rover. GPS connects to a Raspberry Pi to send live Google maps data over the network to the operator's computer to observe its current geological position. Google maps parses data and displays current location over MUSYM soils maps so specific soil analysis can be conducted. The rover prototype is successful: it is a driver-controlled unit, can drill in specific soil types of a field, communication between the operator and the rover is fluent, and it is relatively compact. Improvements such as speed, versatility, durability, and autonomous function will need to be made.

Awards Won:

Second Award of $1,500

Raytheon Technologies Corporation: Each winning project will receive $3,000 in shares of UTC common stock.