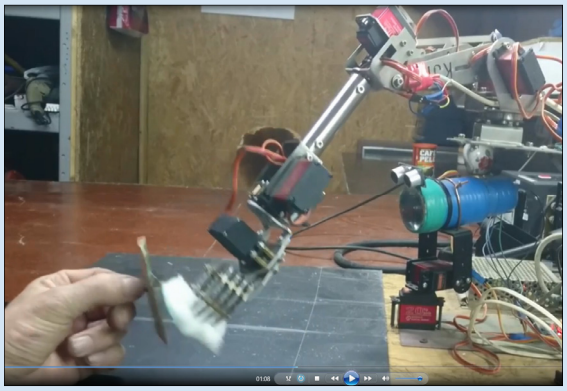
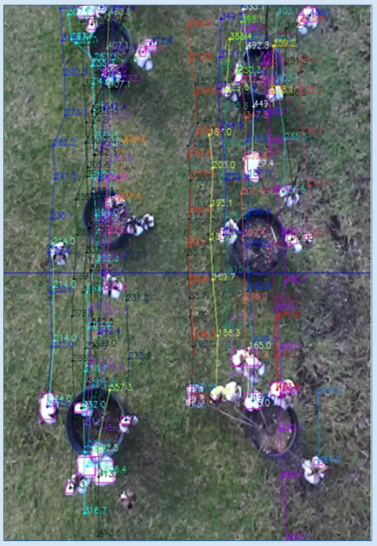
Field Robots – A New World for Cotton

Ed Barnes & Kater Hake – Cotton Incorporated

What can field robots do now?



- Harvest fruit in the field
- Weed fields
- Scout fields
- Find open bolls in the field
- Pick cotton in the lab



What value do small robot harvesters bring to cotton?

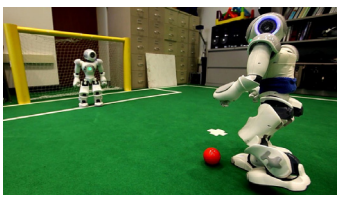
- **Improve fiber & seed quality** – Harvesting open bolls from a green plant every 3 to 4 days will create a highly uniform fiber that has not been exposed to rain, dust or insect residue nor contaminated with plant material or field plastic. Ginning and spinning of clean, highly uniform fiber will create superior yarns. Similar benefits may accrue for cottonseed.
- **Increase value of discount cotton** – The high mic and low mic cotton at the bottom and top of the plant will have expanded and novel utility when not mixed together. Likewise, the premium mic cotton in the middle of the plant can be marketed separately.
- **Reduce weather risk and increase yield** – Extreme rainfall events are more frequent due to climate change. Harvesting cotton as it opens reduces the risk of catastrophic crop loss.
- **Lower harvest cost** – Costs for hand and single-pass machine harvesting is inflated due to the seasonal nature of the work. Field robots can be used year round to weed, plant, scout and harvest. Since small robots are scalable, small and large farmers can purchase similar equipment, further lowering cost.
- **Enhance cotton's sustainability** – Harvesting from a green plant reduces the need for defoliants. Field robots can be solar powered and in the future may also gin individual cotton bolls. Machine harvesting and ginning is now 20% of the energy cost to produce a bale of cotton.

What is needed now?

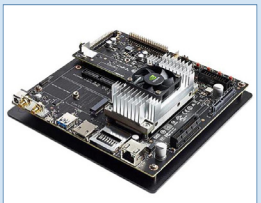
- Economic and operational analyses
- Innovative component design
- Assemble existing components into a prototype that can be field tested

Potential picking head strategies

Single boll gin



automation software



low cost microcomputers

Small LIDAR

Robotic arms

Small imaging sensors

Field robot platform

GPS 3-D locators