2nd SIGHT BIOSCIENCE

Engineering Better Solutions for the Ag Industry

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Issues in Automation

1. Automation in Any Organization: Technogeeks, Pragmatists, Naysayers

2. Automation usually requires a change in process and/or procedure
   - It is Neither efficient nor cost effective to automate exactly what you do now
   - Robots/automation are not human

3. It cannot solve all of your problems

4. 80% of the problem can be resolved with 20% of the cost – use a human to cover the rest!

5. Automation can make fewer people more efficient. Doesn't necessarily mean that you want to let those people go.

6. Works best on repetitive processes that humans find tiresome/boring

7. Needs to be as uniform and consistent as possible.

2019 Twine Testing

BioTwines: Bioplastic made from corn. Comprised of PLA (Polylactic acid). Compostable and Biodegradeable

2019 Twine Testing Results

Partners

- Roy Farms
- Wyckoff Farms
- Perrault
- Congdon
- Oasis
- Olsen Brothers
- Golden Gate

Varieties

- Pekko, CT2, Centennial
- Azacca, Zeus, Summit
- Pahto, Eldorado, Cascade
- Citron, Mosaic, Simcoe, Palisade, etc.
- various baby varieties

Test

- 2nd Sight provided 21’ lengths of twine to Growers
  Either PLA from Lankhorst (brown) OR
  PLA from SiCor (white)
  100 lb tensile strength
  (28,600 of each)

- Growers hand tied twine as usual testing hop growth on 1 or more varieties

- 2nd Sight tied twines via a metal wrap at Olsen Brothers

- Growers harvested as usual

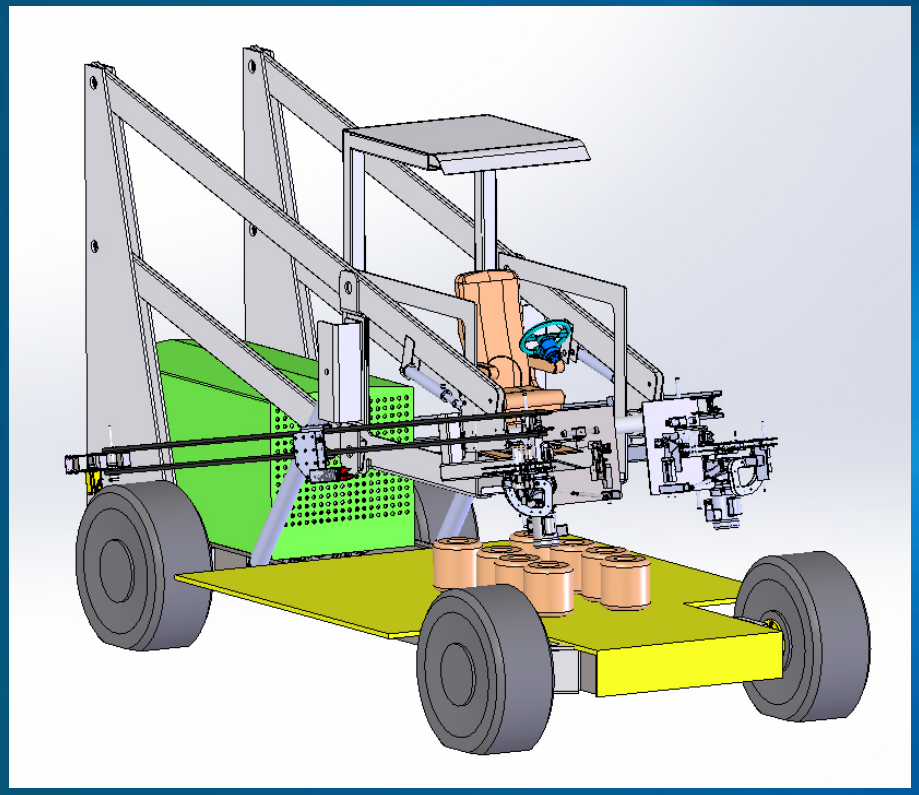
Results

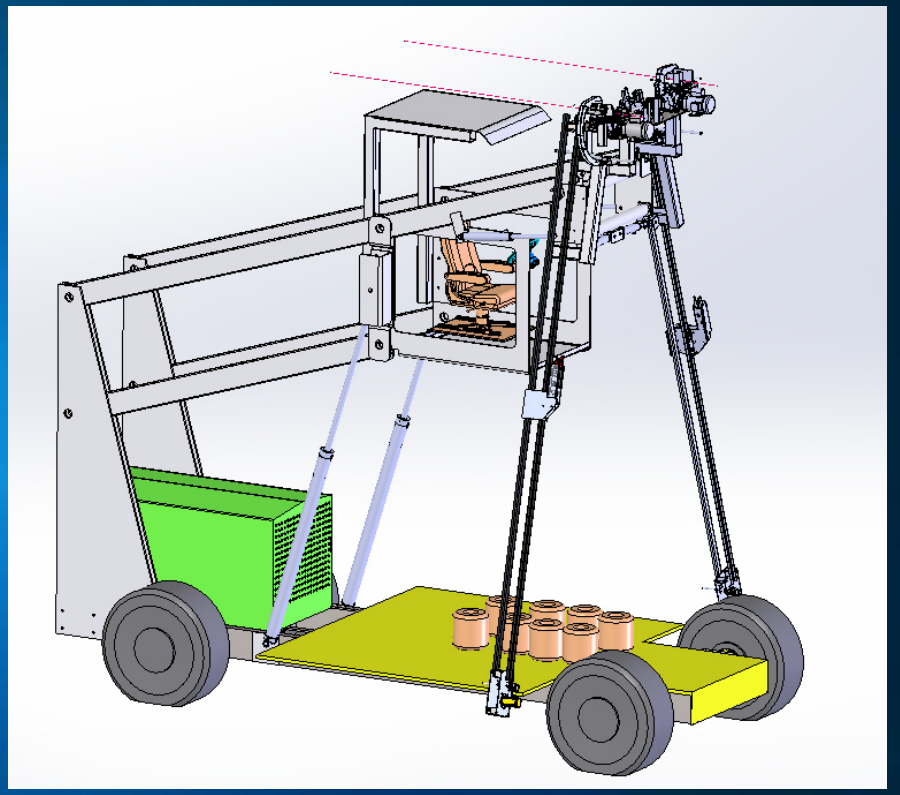
- Tiers HATE this material: Too limp to tie by hand.
- ALL tested varieties grew normally
- No breakage of any twines
- Initial Breaking Strength (~100 lbs)
- Harvest Breaking Strength (~92 lbs vs. 45 lbs)
- Top Cutters Harvested OK – some binding
- Processed OK – some issues with tangling in choppers

Twine Comparisons

PLA*	Pros: consistent, strong, automation friendly Cons: new, supply
Paper	Pros: consistent, available Cons: not automation friendly, Cu treat
Coir	Pros: standard Cons: not consistent, treatment, degrades, supply
Jute*	Pros: consistent, strong, automation friendly Cons: new, supply
Hemp*	Pros: consistent, strong, automation friendly Cons: new, supply

Fully Automated Twining and Staking System (FATSS)





**Base Platform for attachment of multiple implements

Fully Automated Twining and Staking System (FATSS) Test Bed

Fully Automated Twining and Staking System (FATSS)

Specifications:

Twine and Stake 250 acres in ~6 weeks

Need	~7 sec/operation
	~1/10,000 failure rate

Twining Costs

Costs/Acre	**2020**	
Labor	$ 210.00	Range $190-$220/acre
twine (3,000/acre)	$ 338.25	Coir @ $0.0055/ft
twine processing	$ 50.74	labor for soaking, etc.
twine holding	$ 6.77	Cost to hold 6 months
Overhead	$ 175.67	29% of above costs, low estimate
Stringing Losses (2%)	$ 30.00	50% restring
	$ 150.00	50% Loss
Total Cost/Acre	$ 961.42	
Cost/500 Acres	$ 480,710.36	

FATSS Schedule

2020: Finish design and build of mobile platform
Beta test tying test bed on mobile platform
Goal: to twine ~20 acres
Finish design of staking mechanism
Test staking mechanism in Fall 2020
Test twines over winter

2021: Supply 4-6 units on initial lease
Systems may/may not have staking
Engineers in area during testing for support

2022: Release 4-6 units
2023 and beyond: Release units as needed

FATSS Lease Program

Cost: Approximately $240,000/year
5 year lease

FATSS Mobile Platform

Service and Support
- 1 prestringing visit
- 1 post stringing visit
- Repair service during season
- Driver Training

Twine
- 2nd Sight will source, order, and deliver

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Thank You!

Questions?