GreenAtlas

Cartographer

Yield estimation, Mummy mapping & Hull rot detection

James Underwood

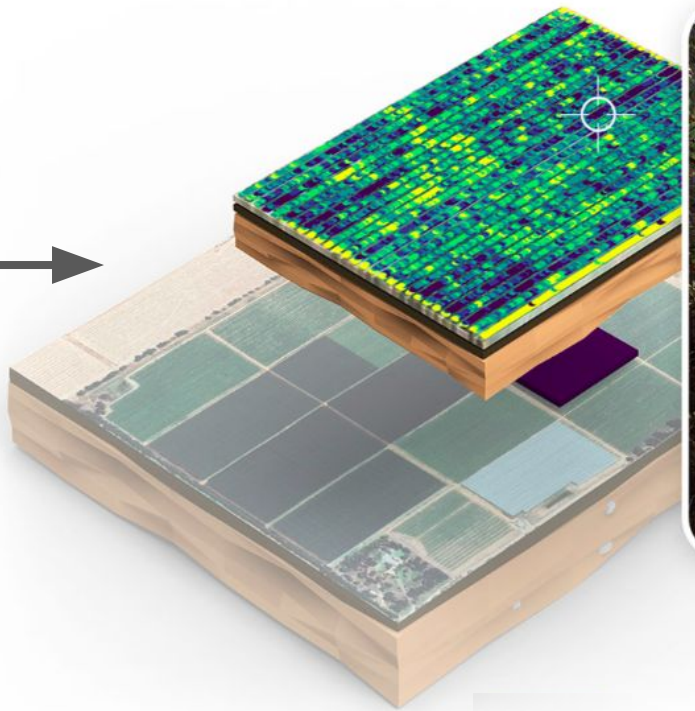
GreenAtlas

From R&D to commercialisation

Australian Centre for Field Robotics (ACFR)
The University of Sydney

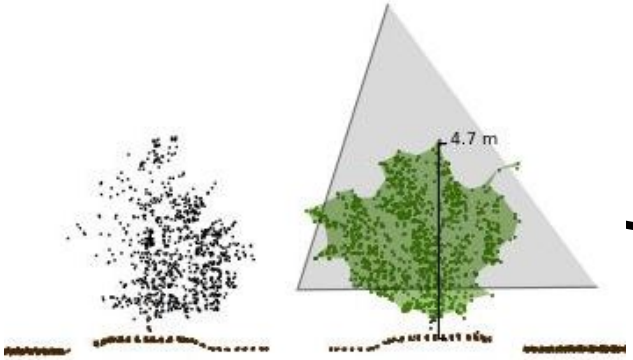
- Founded in 2018
- Commercial product: ***Cartographer***
- Fast. Reliable. Accurate. Economical.
- Backed by science, engineered for farms
- Supporting farm management globally

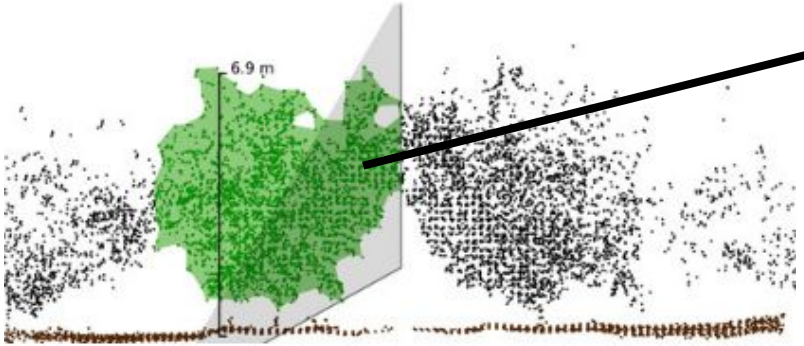
What is it and how does it work…

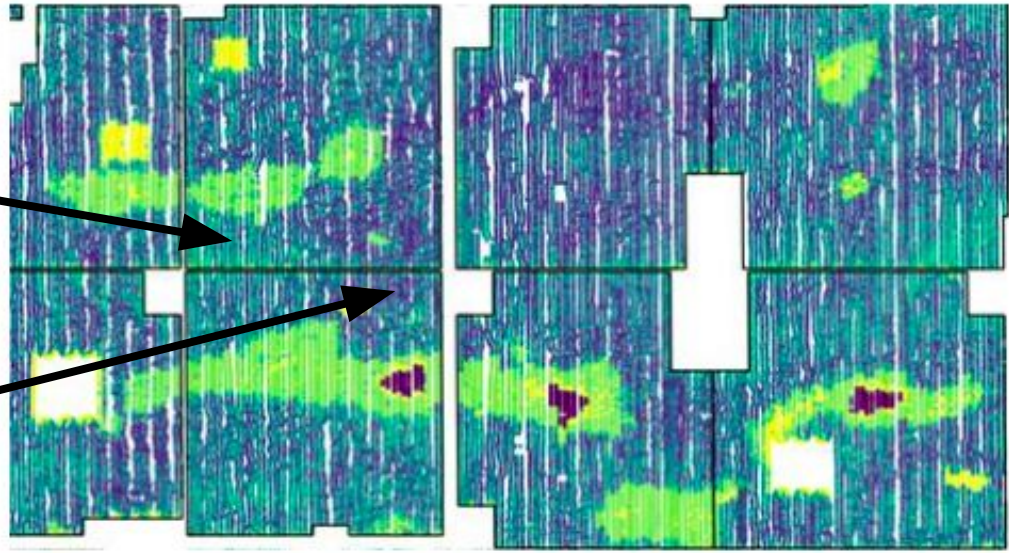


How it works: capture and analyse photos

How it works: canopy geometry







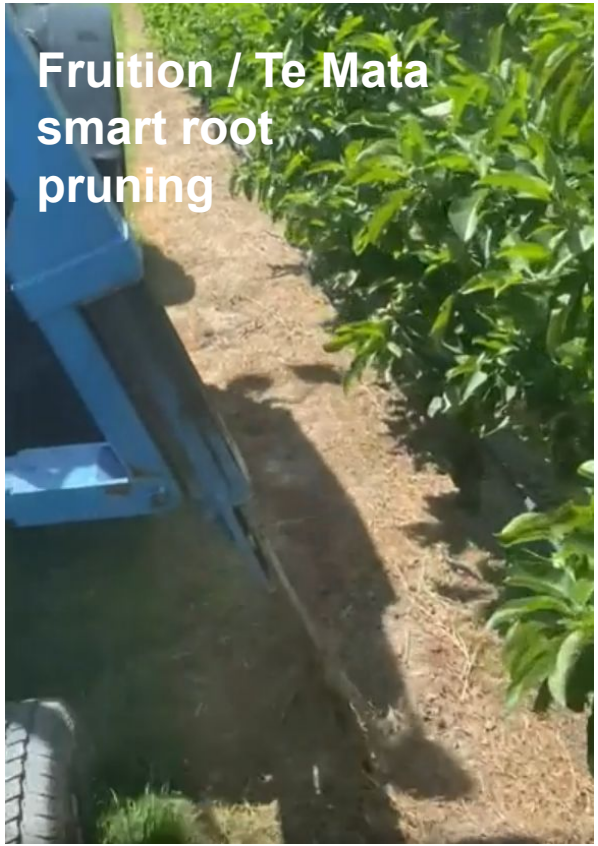
Using data to solve problems

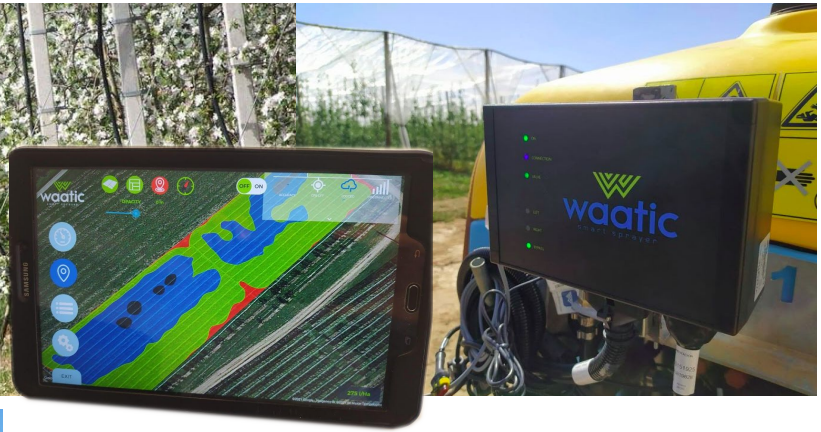
- Orchards of all crop types, in all countries want accurate yield estimates prior to harvest

But also…

- French orchards precisely spray chemical flower thinners per tree
- California vineyards map out regions affected by leafroll virus to manage the spread
- Australian macadamia orchards find locations of mistletoe infestations for targeted removal
- Chilean cherry farms map spurs for precise pruning management
- Italian orchards assess extent of hail damage in apple orchards
- Australian prune farms use fruitlet maps for precise shake-to-thin programs
- New Zealand kiwi fruit farms precisely control every management stage from bud to fruit
- Australian apple farms use fruit size and colour to determine harvest schedule
- **Australian almond farms map mummy nuts for targeted sanitation**
- **Australian almond researches map hull rot strike towards localised intervention**
- **Australian almond farms map fruit density for yield estimation and precise fertilisation**

Prescription maps for smart equipment





Yield estimation and mapping

- Accurate forecast of yield helps marketing, sales and harvest logistics
- Yield mapping enables precision management during the season

- Why is it so hard?

Satellite Imaging Corporation (website 2025-10-16)

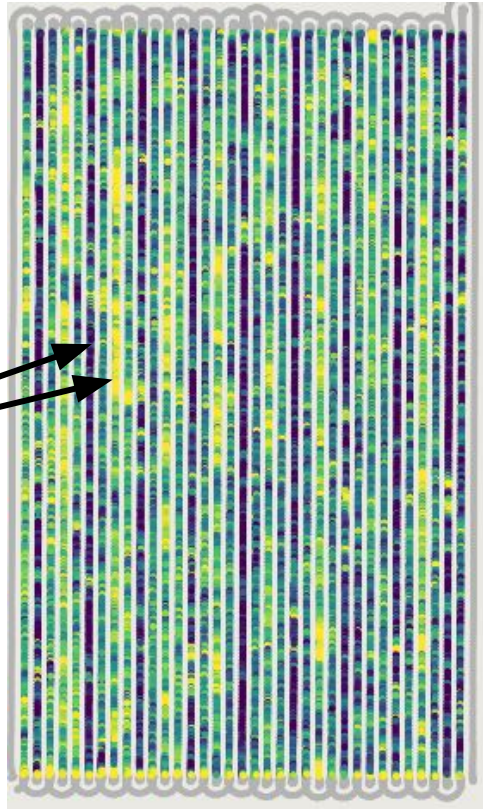
Photo by RitaE via Pixabay

Yield estimation and mapping

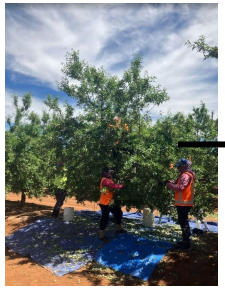
- To know how many nuts are on the trees…
- You have to count the nuts on the trees

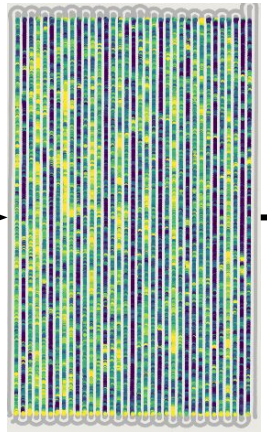
Yield estimation and mapping

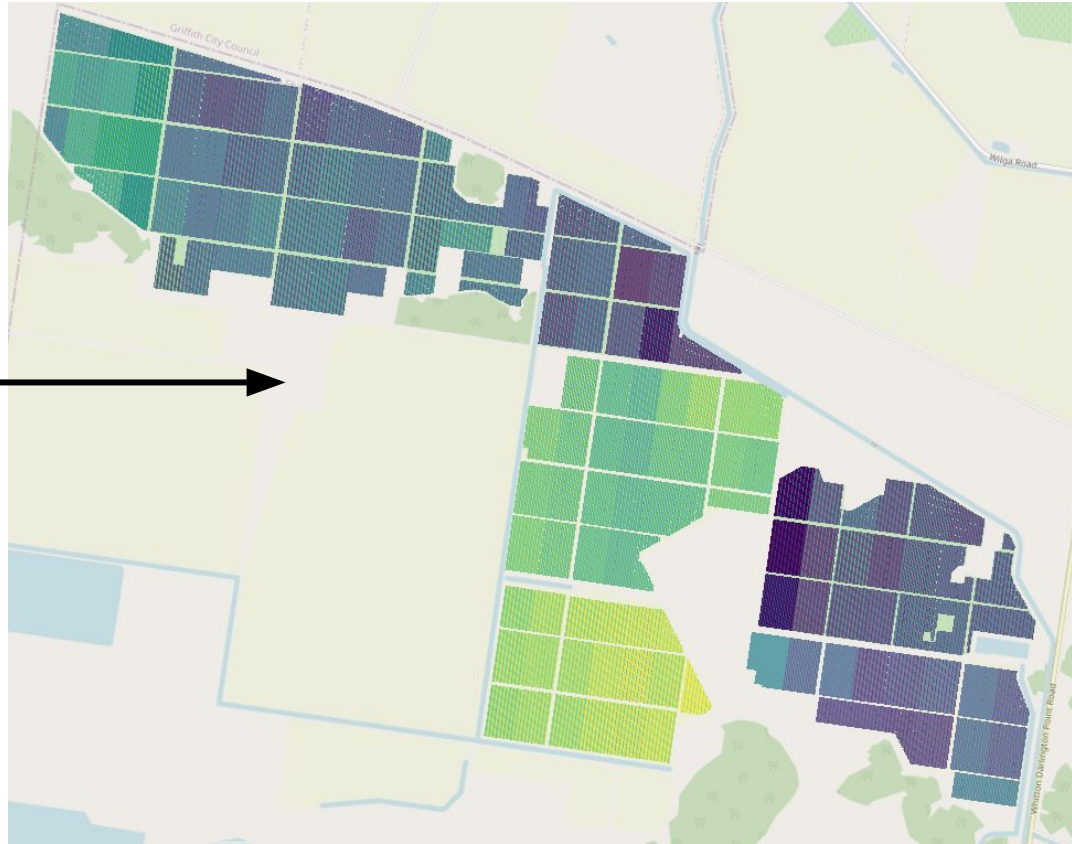
- But due to variability…
- You'd have to count almost every single tree!



Yield estimation and mapping







Kooba Almond Farm

Orchard sanitation: getting rid of mummy nuts

- Mummy nuts provide a winter home for pests like Carpophilus beetle
- The pests damage the new crop
- Average crop loss of 5% to 10% not uncommon*
- As bad as 30% for some blocks**

- Mummy nut removal is an important control
  - Poleing: very effective but expensive
  - Shaking: lower cost but less effective

* Management of Carpophilus Beetle in Almonds, Dr. Mofakhar Hossain, DEDJTR, HortInnovation Report AL15004
** Carpophilus Beetle: Preliminary Monitoring Guidelines, Dr Mofakhar Hossain, DEDJTR, Australian Almonds

Mummy nut mapping: focus on the main problem areas!

Compare before/after sanitation

Mapping hull rot strike

- Challenge for production, reduces yield!
- Assessment is labour intensive, limiting scale
- Experiments to assess mapping with Cartographer

- Evaluated in January 2024
  - By Agriculture Victoria Mildura SmartFarm
  - In collaboration with AL22002 IDM team
- Across 2 trial blocks
  - H1 standard planting with NP, Carmel and Monterey
  - H3 high density planting with Carina, Vela and A12

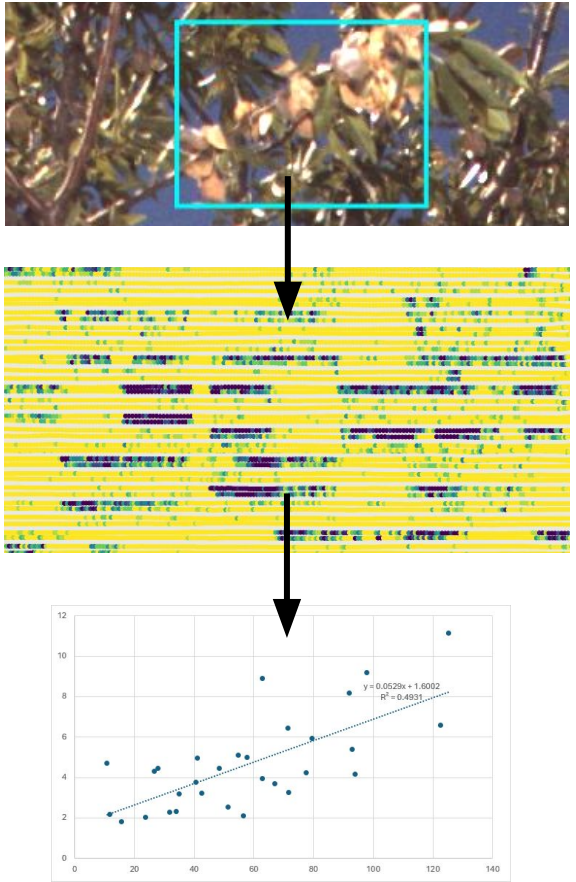
Mapping hull rot strike

→ Cartographer can map hull rot strike!

→ Potential localised interventions with less chem/labour!

→ Good example of R→D→E via gov/commercial collab.

Come to our poster to discuss!



Paper:
Investigating High-Resolution Proximal Imaging and Artificial Intelligence for Hull Rot Detection in Almonds
Peta Faulkner, Simone Kreidl, James Underwood and Tonya Wiechel

Get in touch: james@greenatlas.com