

Biophi



High Tech Drones in High Tech CEA IPM
(and other fun gadgets)



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Biophi

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Canada's Greenhouse Influence

- 2nd highest concentration of high-tech greenhouses globally (Southern Ontario)
- 5800 acres in Canada (65%-ON, 20%-BC, 10%-QC)
 - Ontario 4-6% annual growth (200-250ac)
 - 3000-4000ac projected growth by 2035
- \$2.5 billion in farm-gate value (Ontario)
- 200 million people within 1-day drive
- 200 truck loads/day from Southern Ontario to US
- 35,000 employed

- Greenhouse Benefits
 - Stable supply
 - Water use efficiency
 - Fewer chemicals
 - Traceability
 - Increased product quality
 - Increased food safety



Introduction to Biophi

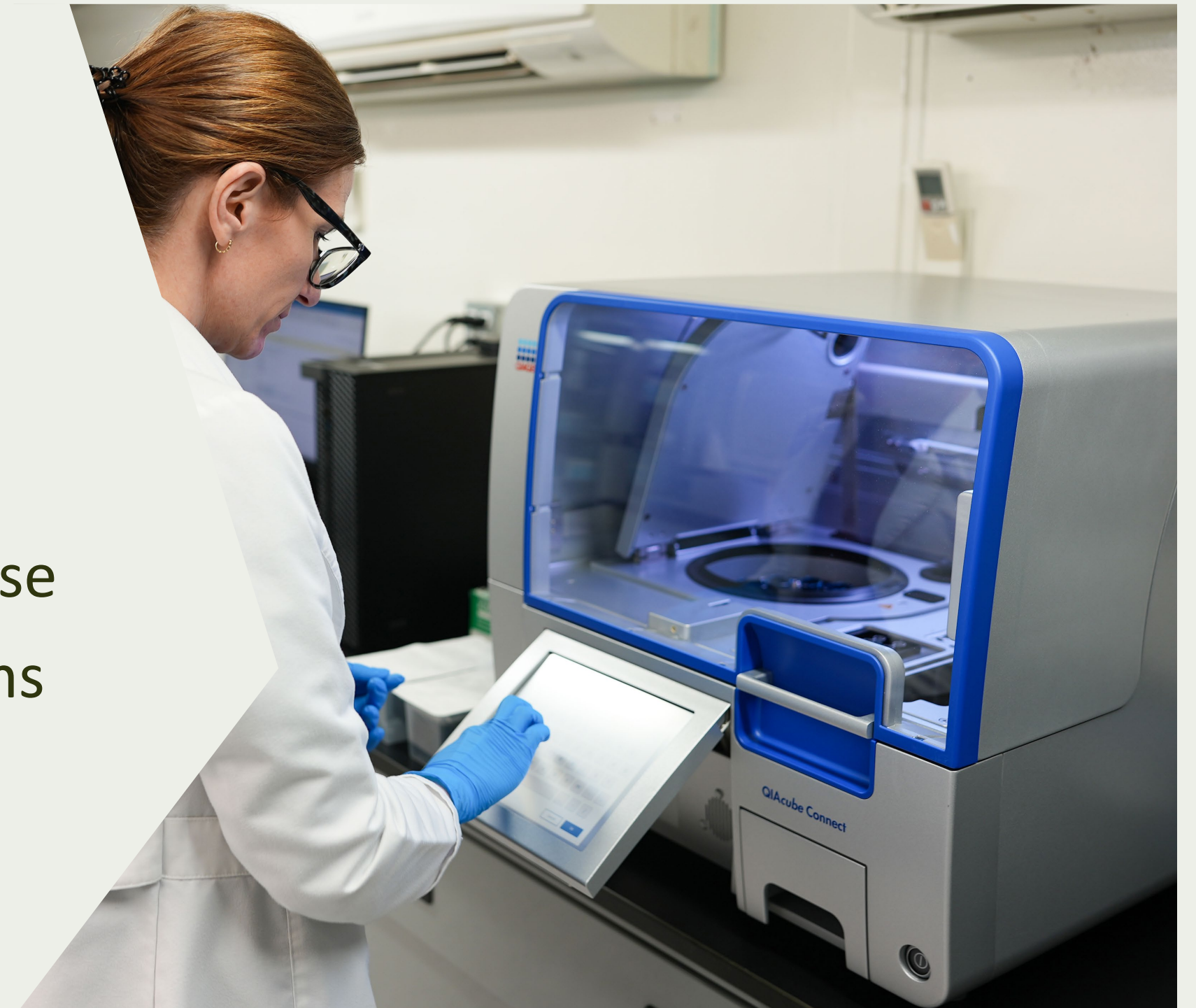
- Industry-led Horticultural Innovation Hub in Leamington, ON
- Supporting growers on current challenges and new opportunities.
- Providing a pathway for knowledge and innovations into the commercial growing environment. (*Grower access*)
- Partner with the current R&D ecosystem to drive effective change.
 - Bringing academic and government research into the hands of the growers.





Introduction to Biophi

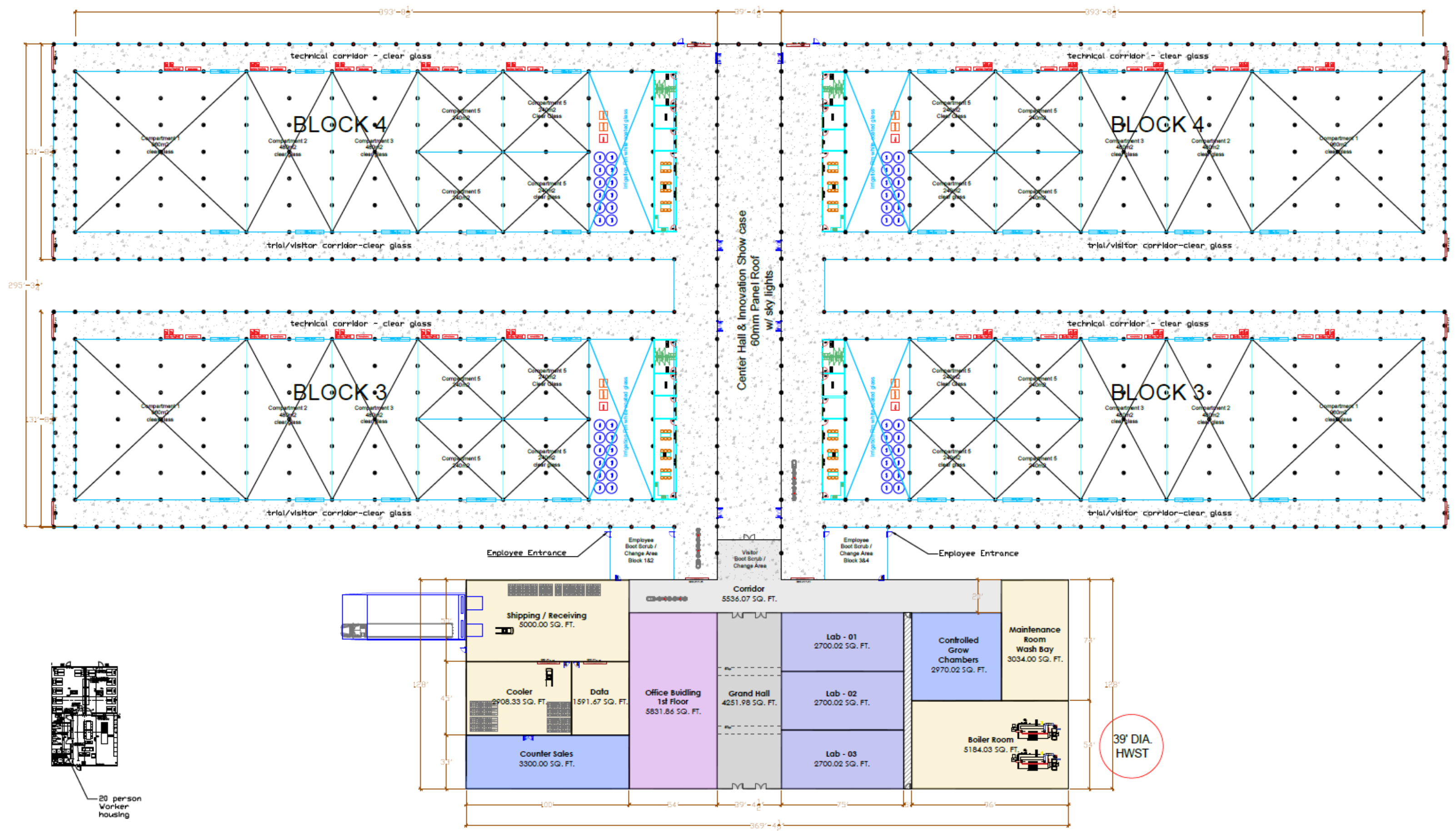
- Laboratories:
 - Genetics & rapid pathogen testing (PCR, qPCR, DNA/RNA sequencing)
 - Tissue Culture – Clean Plant Program
 - Food Safety and Nutrition
- Horticulture
 - Vine crops
 - Soft fruit
 - Leafy greens
 - Transition crops (field to greenhouse)
- Tech: AI, vision tech, biofeedback/plant response
- Labour – robotics, lower labour growing systems



Introduction to Biophi

- Types of work
 - Lab
 - Pathogen detection services / Sanitation validation programs
 - Plant vaccine developments – mRNA & attenuated virus vaccines
 - Breeder demo and variety screening.
 - Growing systems
 - (DWC, NFT/MGS, aeroponics, tech, lighting, etc).
 - Private research and innovation development.
 - Project support for academic & government research centers
 - Canada, US, Europe





Drone Use in High Tech CEA

- Still **VERY** new.
- Earlier detection of pests.
- Fewer chemicals.
- Healthier crops.
- Decrease(ing) cost of adoption.



CORVUS
DRONES

Drone Use in High Tech CEA

- Many use cases
 - IPM – monitoring + active “treatments”
 - Plant health evaluations
 - growth rate, nutrient deficiencies, plant stress
 - Germination counts
 - Maintenance (water leaks, broken glass, inoperable lights)





Drawbacks to Drone Use in CEA

- Greenhouses are full of obstacles.
 - Vine crops require support from string
 - Greenhouse structure – steel and glass
 - People!
- Plants interfere with wireless signals.



IPM Tech @ Biophi

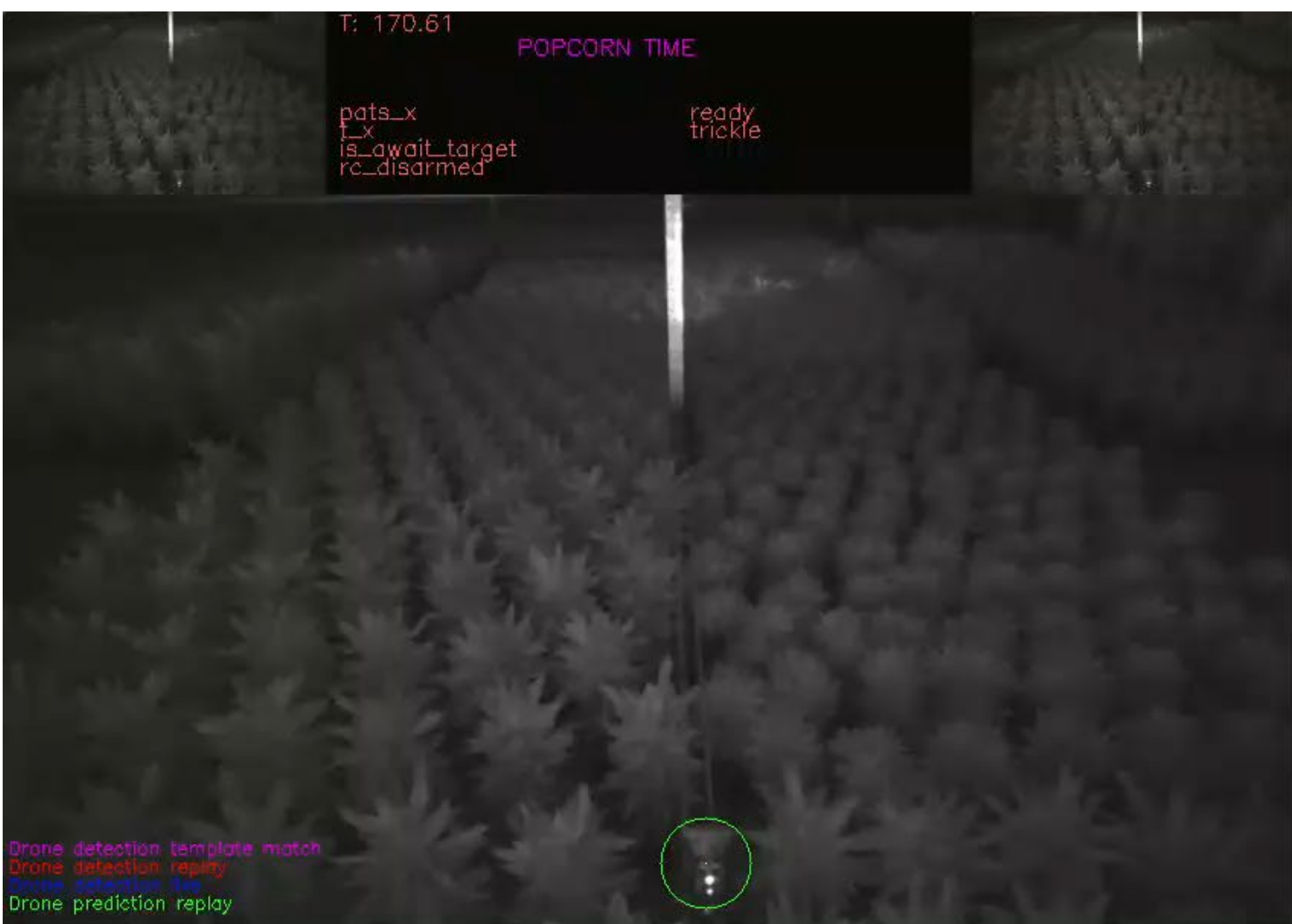
- Developed in Netherlands
- Tracks and kills pests >5mm
- No harm to “good” bugs (bees)



patsX



patsx

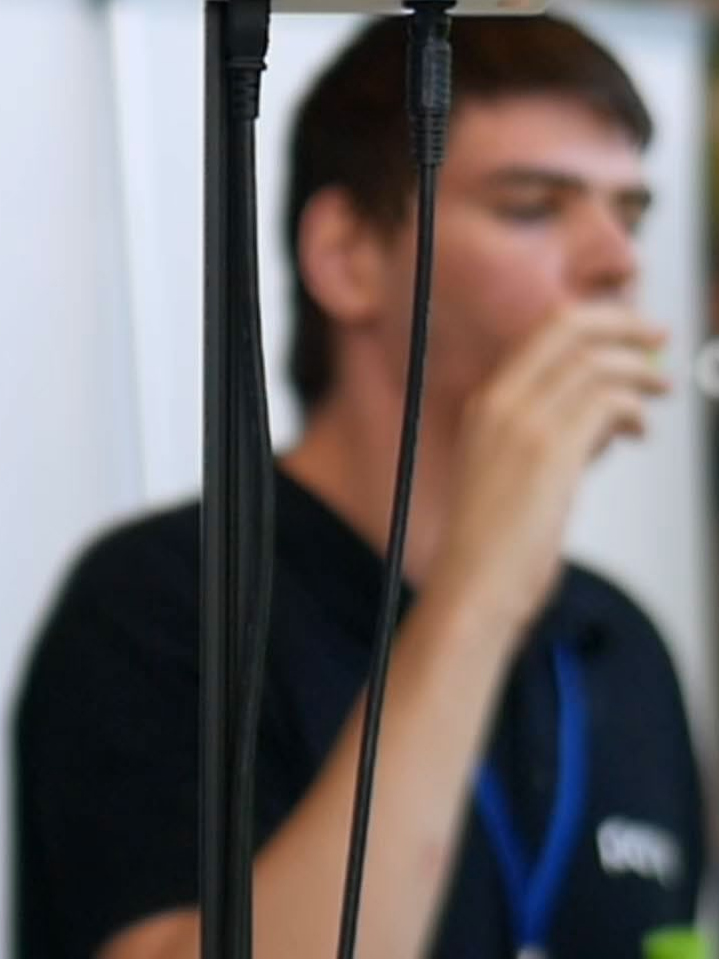


T: 170.61
POPCORN TIME
pats_x
t_x
is_await_target
rc_disarmed

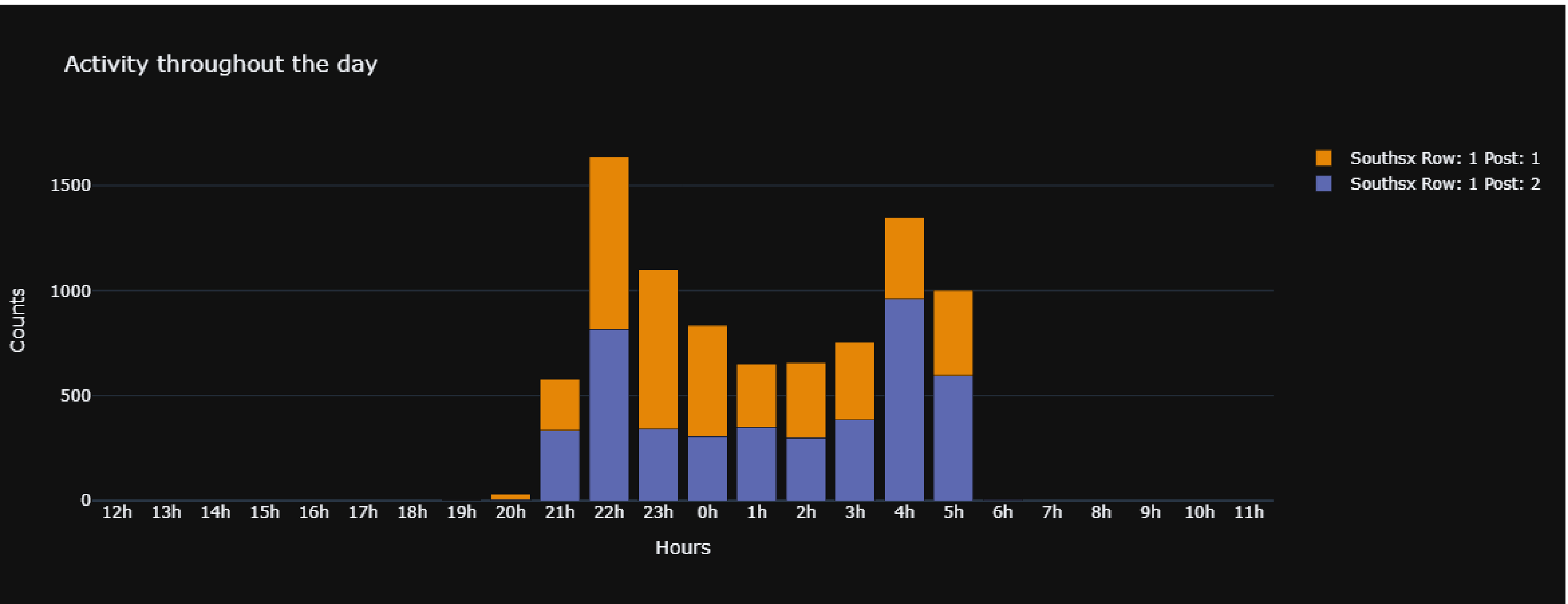
ready
trickle

Drone detection template match
Drone detection replay
Drone detection log
Drone prediction replay

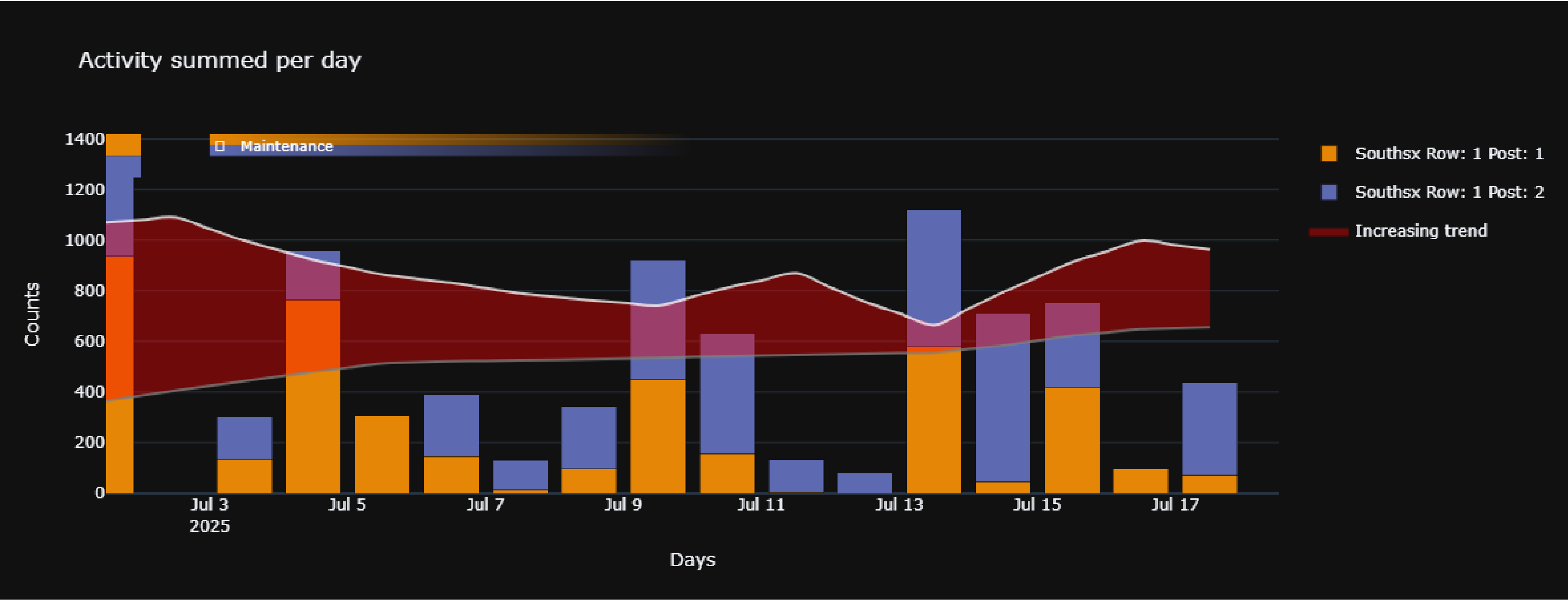
Overexposed noise
False positive
Multitracked
Untracked
Ignored
Blink
Replay/Virtual
Insect bbb->trk
Drone



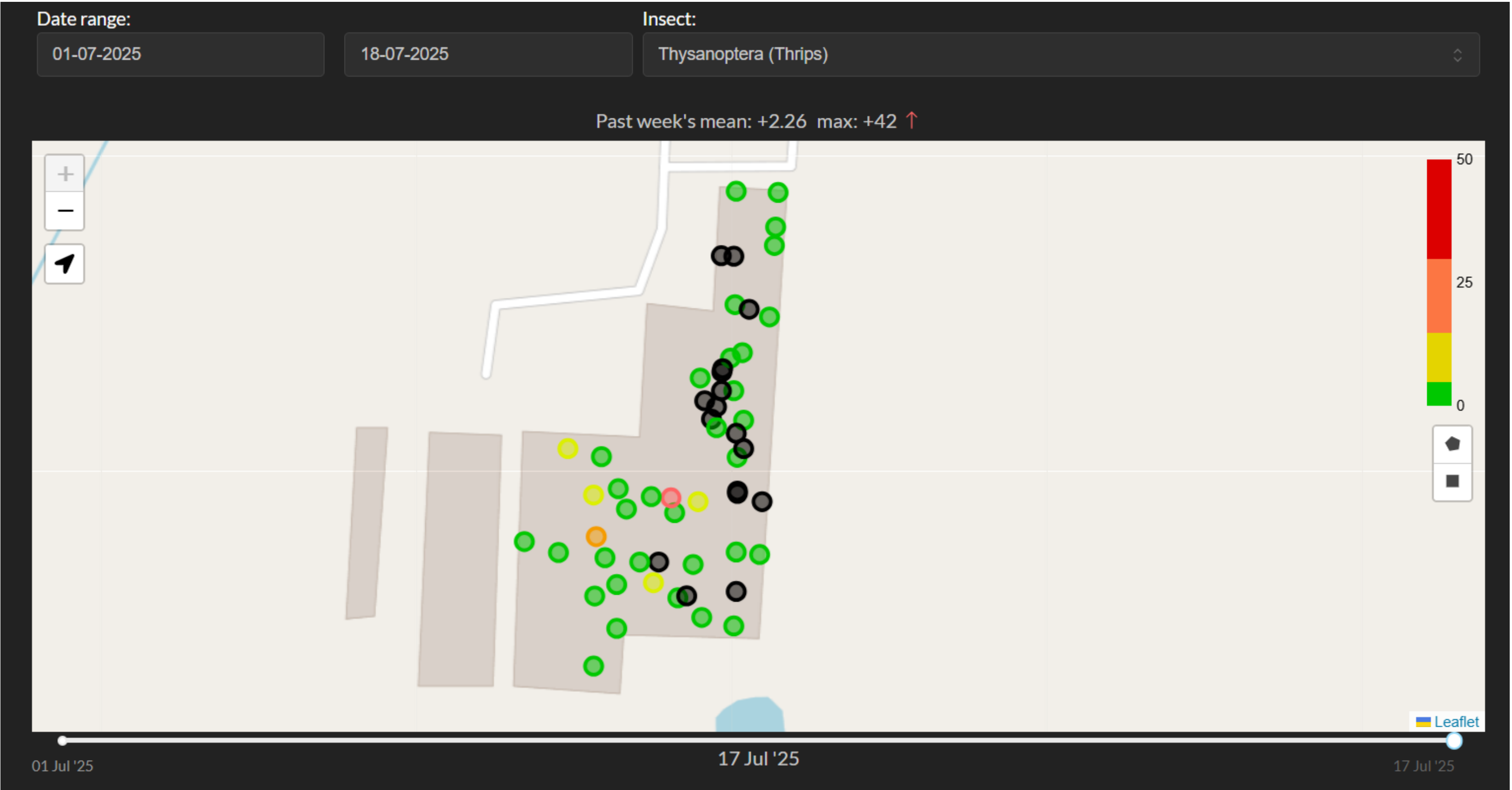
Hourly PATS-C Activity



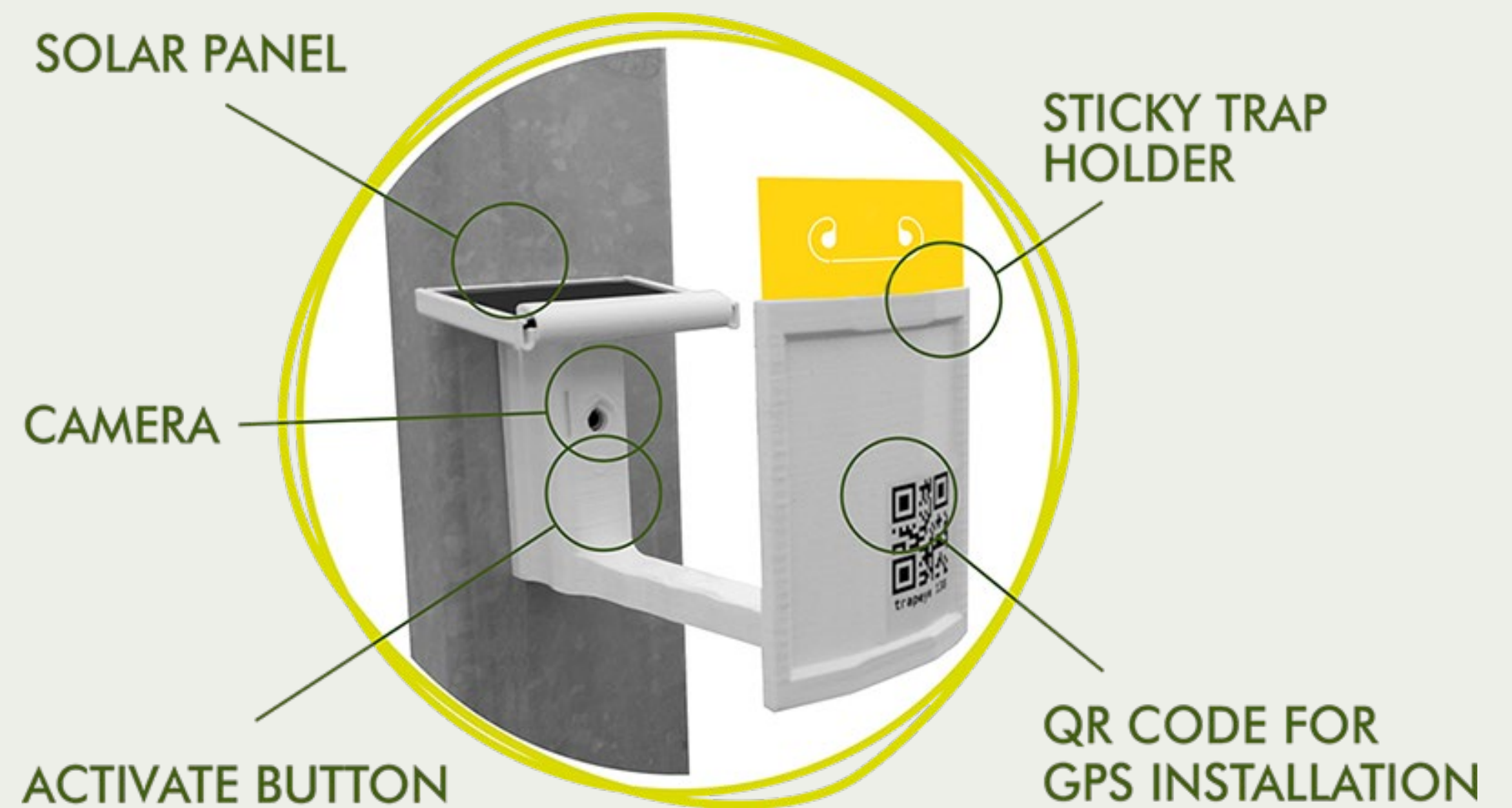
PATS-C Moth Activity



Trap Eye Activity



Other Tech in CEA IPM







What Next?

- Current innovations are still in development
- Systems need to be trained on new pests and crops
- No one technology will serve all purposes
- CEA offers excellent feedback for product development
- AI developments are critical to evaluating data

Biopphi

Thank you!

