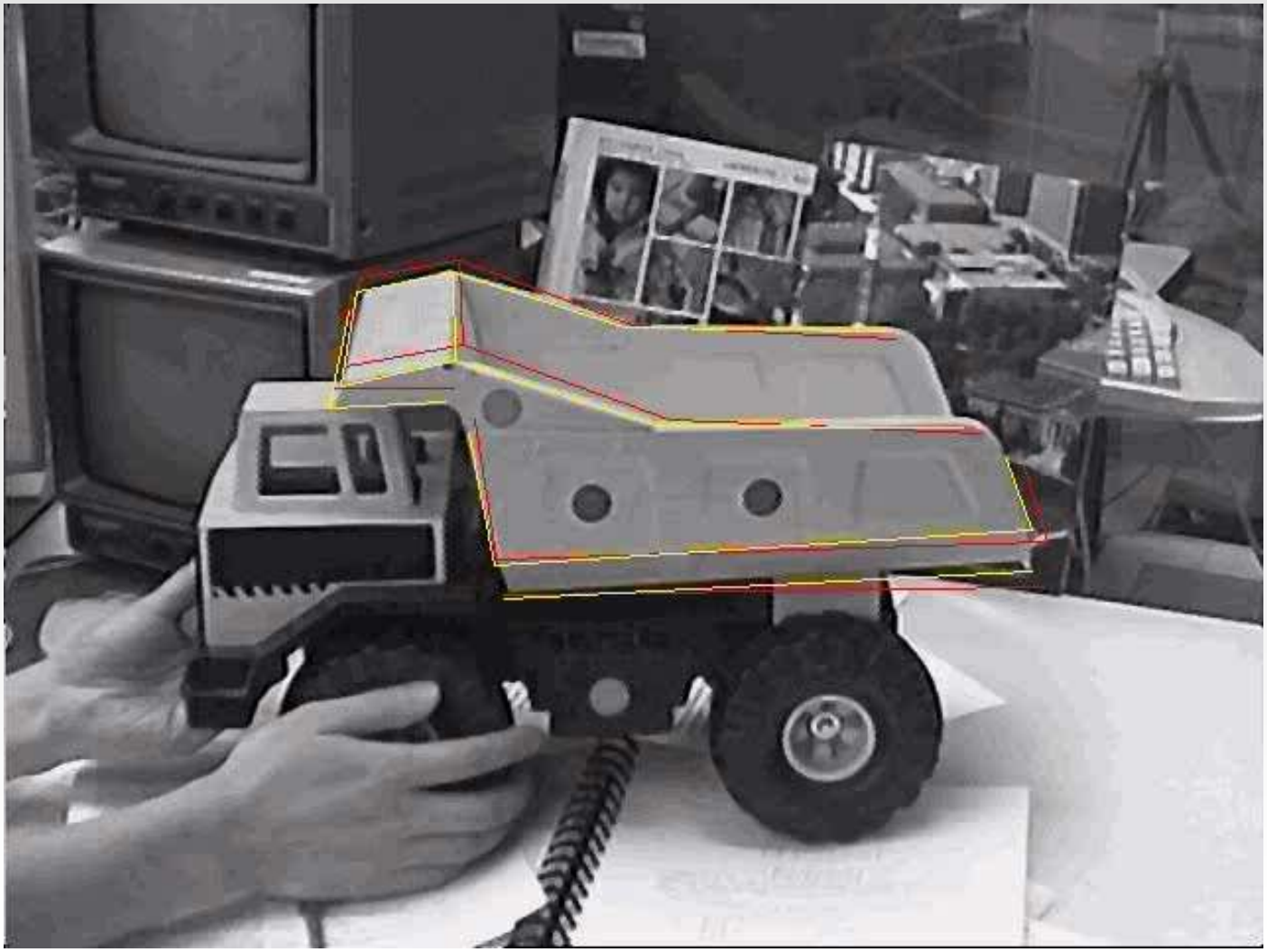
Precision Ag Insights

Johnny Park, CEO
johnny@spensatech.com

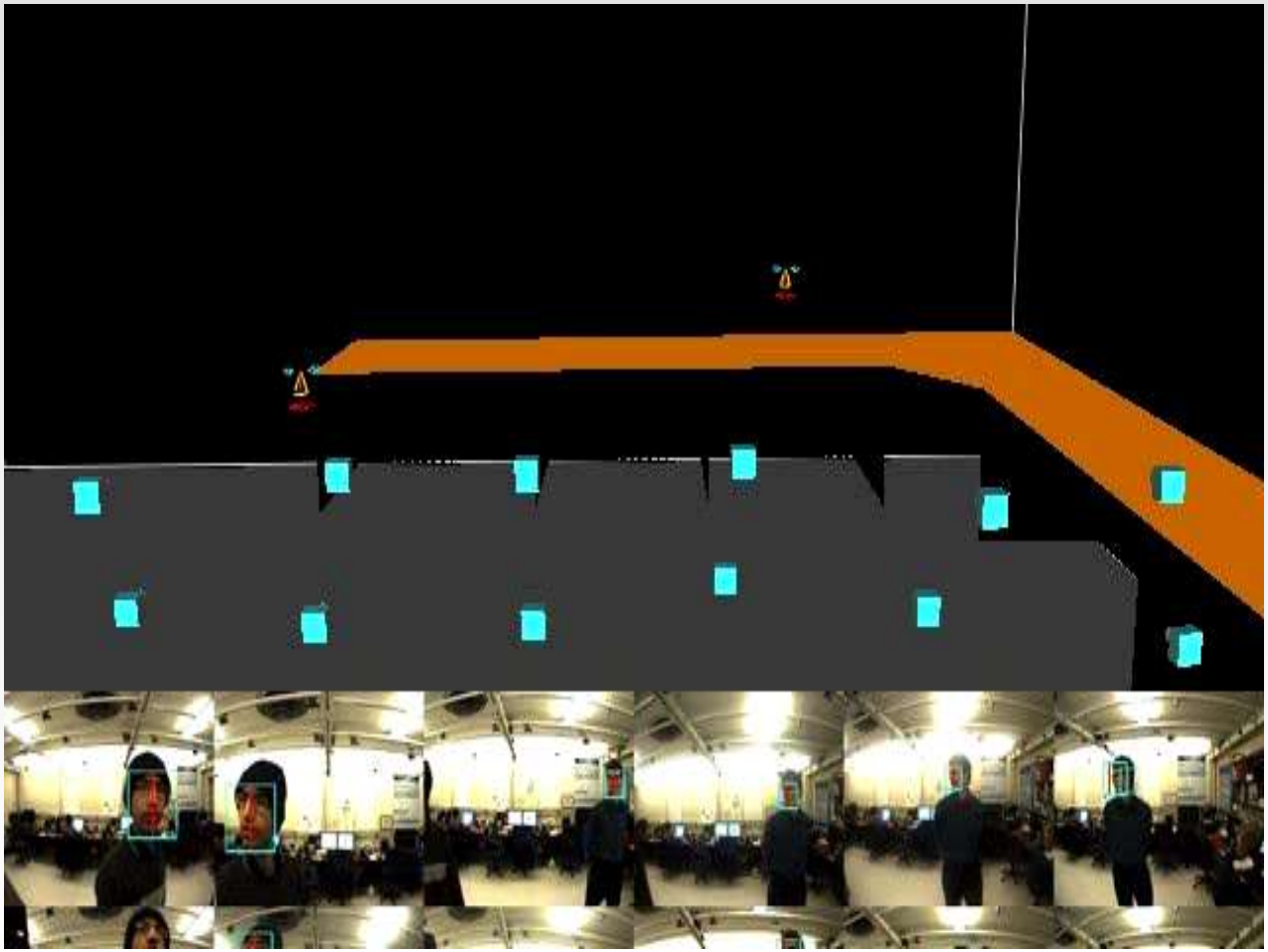
Line Tracking for Robotic Assembly On-the-fly

Mobile Robotics

3D Object Tracking

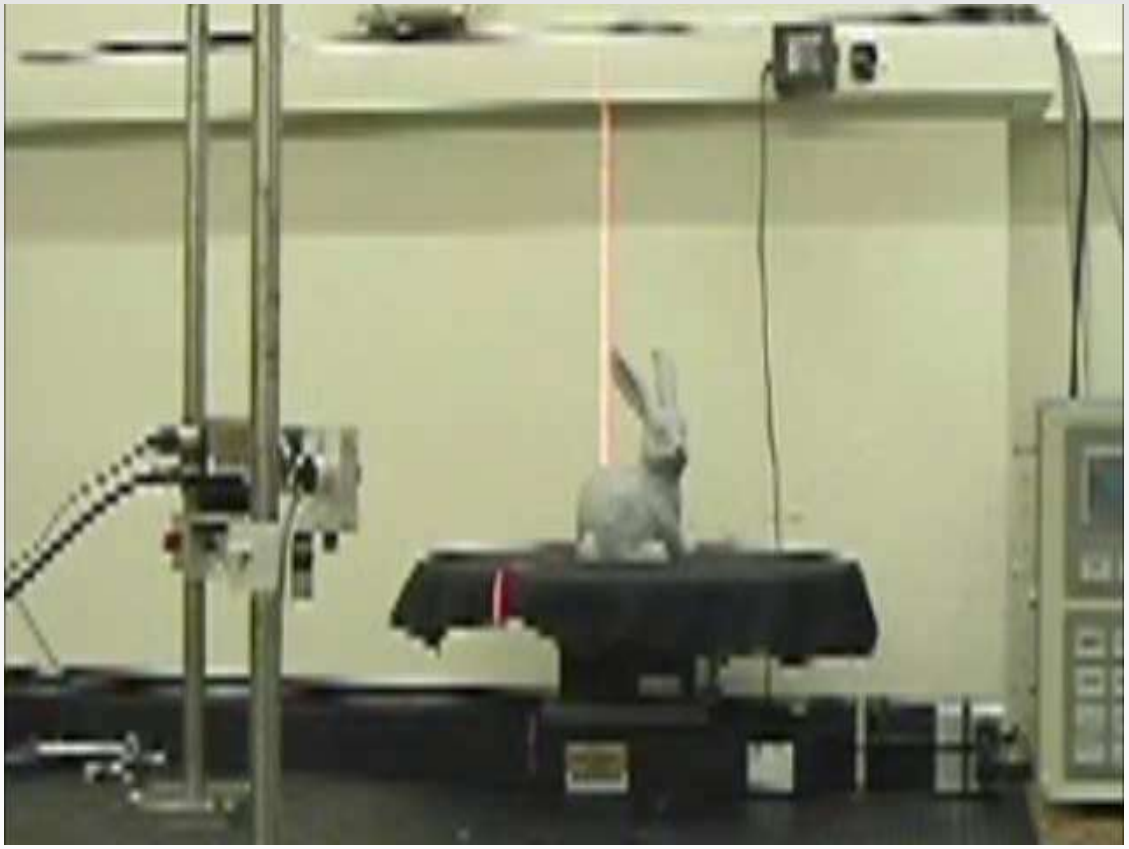


Wireless Camera Networks



UAV Vision

3D Modeling of Real-World Objects



3D Modeling of Real-World Objects

2005: Amy contacts Johnny to become her advisor.

2007: Mike, Johnny and 10 others write a proposal to USDA

2008: The proposal gets fully funded for $6.4M.

2008: Johnny becomes the first faculty at Purdue ECE to serv
the PI of a USDA sponsored project.

2008: Larry, Vince and Johnny start working together to develo
new technologies for automated insect monitoring

2009: Spensa Technologies is founded by Johnny

Pest Management Today

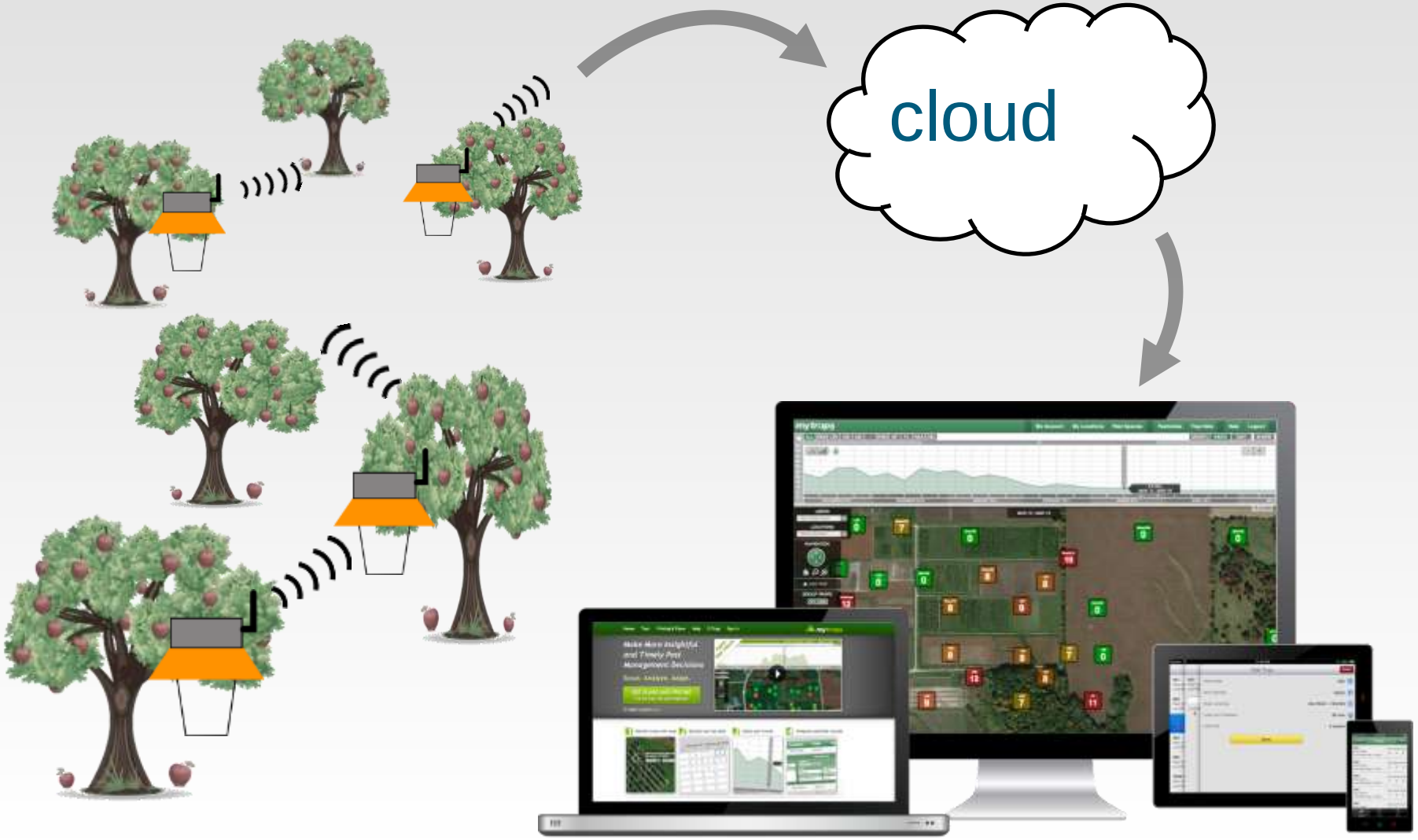
1. Deploy sticky traps every 2.5 acres

2. Visit each trap once per week, count pests, record on paper, clean bugs off trap

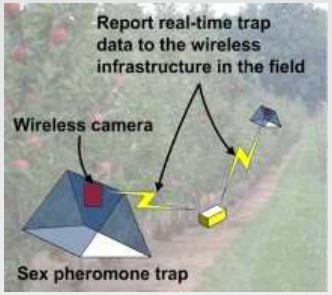
3. Spray insecticide if insect population reaches threshold

Z-Trap®

With Z-Trap, growers catch problems earlier and use less pesticide while saving more crops


cloud

Evolution of Z-Trap



Aug-08

Jan-09

Feb-09

Jun-09

Feb-10

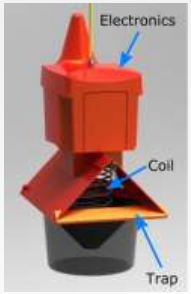
Apr-10

May-10

Jun-10

Jul-10

Aug-10



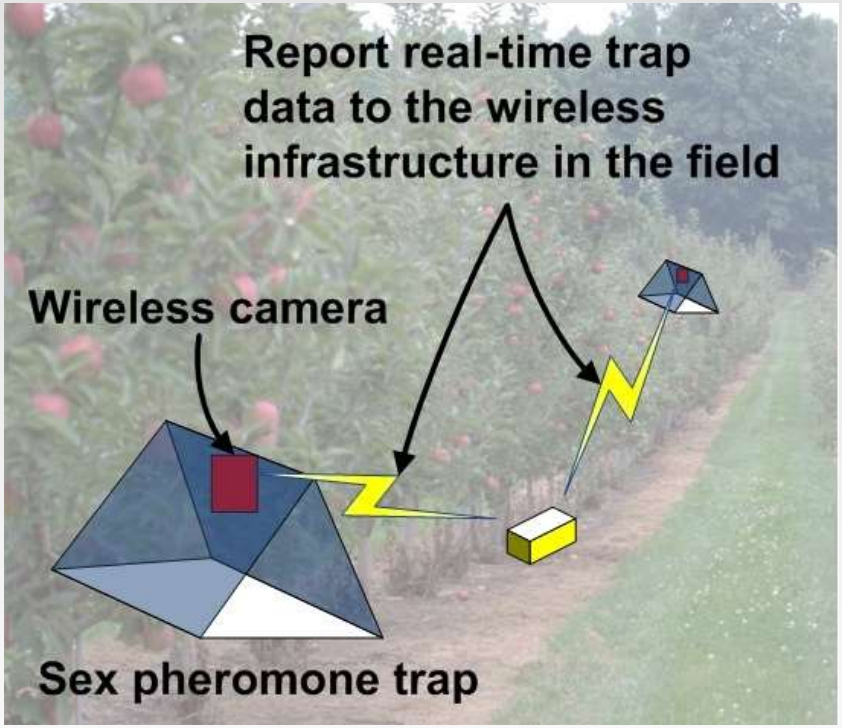
Feb-11

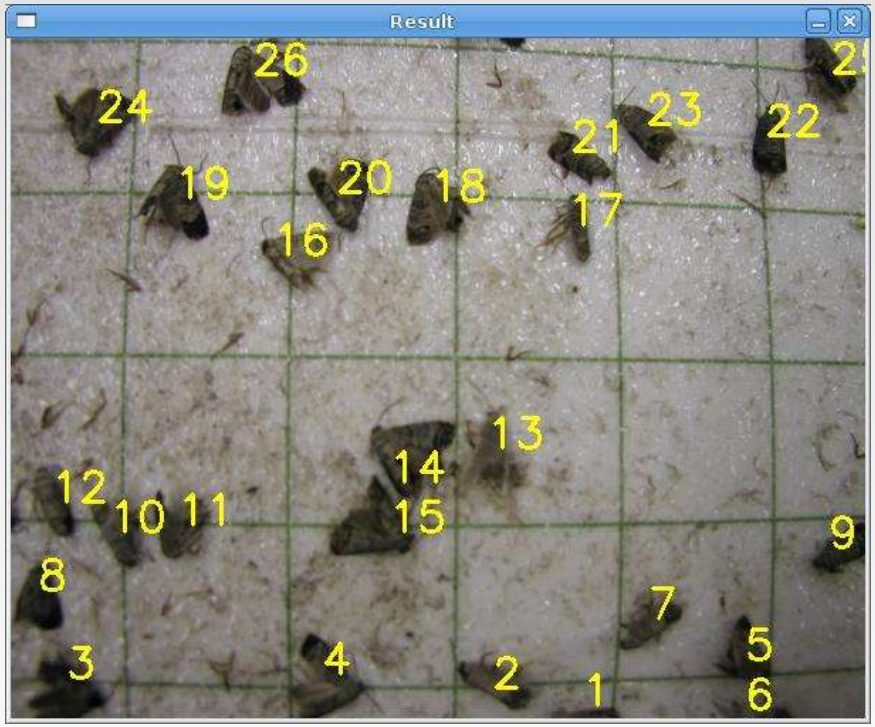
Apr-11

May-11

Apr-12

August 2008

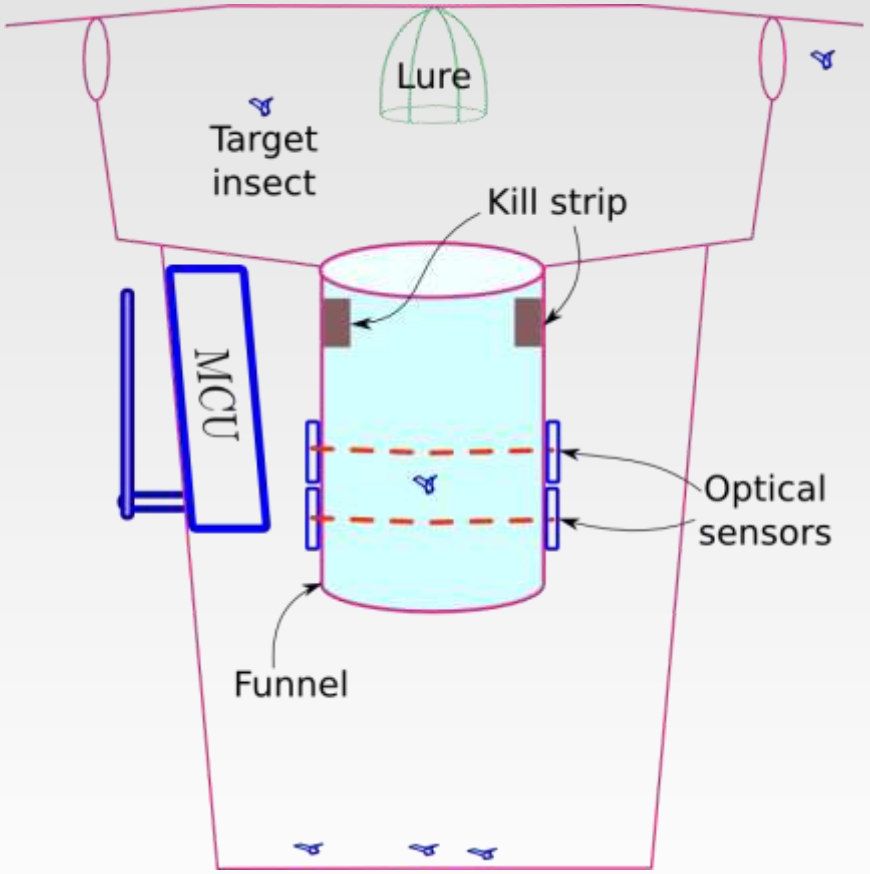




Initial concept in the USDA-SCRI proposal

Modify Universal Bucket Trap into “Digital Trap”

Universal Bucket Trap



Digital Trap

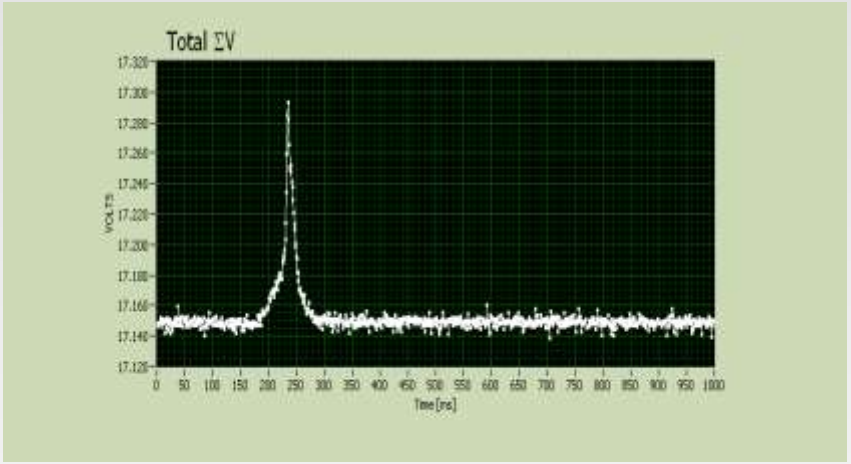
January 2009

LED (Light Emitting Diode)

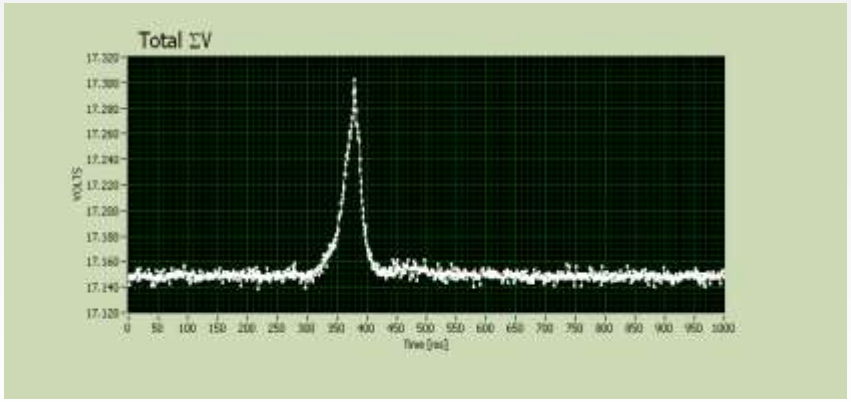
LDR (Light Dependent Resistor)

Signal Response of Free-Falling OFM and Black Plastic Bead

OFM (Oriental Fruit Moth)



Plastic black beads (4mm-diameter)



February 2009

Funnel with sensors

Moths

Wind tunnel experiment setup at WSU

June 2009

February 2010

First zapper-based trap prototype

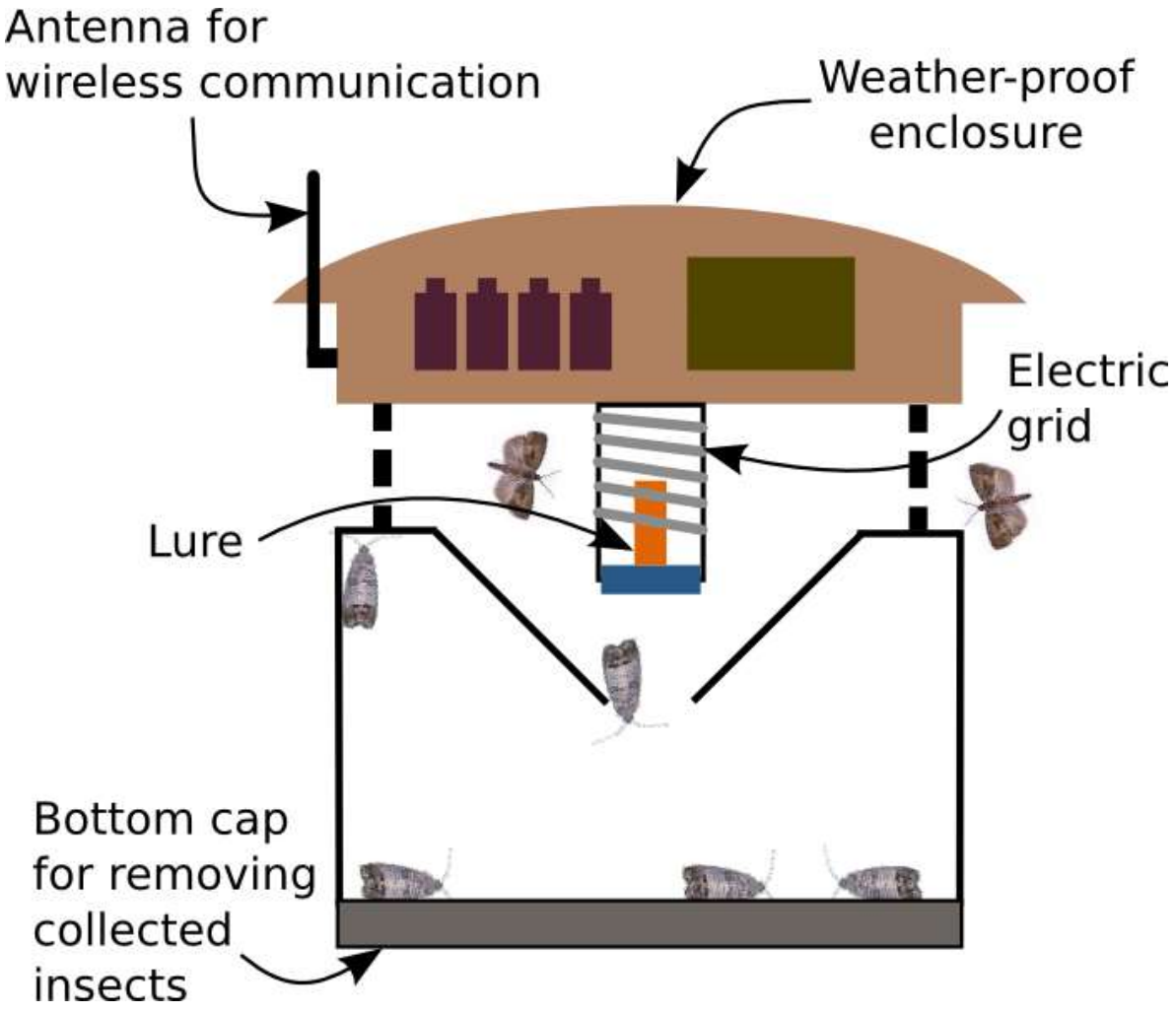
April 2010

Wind tunnel experiment at WSU

Lab Experiments (April 2010 at WSU)

Finding the “Optimal” Voltage for Z-Trap

Z-Trap Components



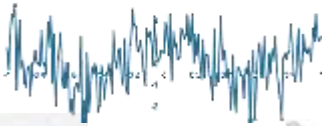
Core Technologies

Wireless Sensor Networks

Low Power Embedded Systems

FULL SEASON BATTERY LIF

Pattern Recognition



TARGET PEST VS NON-TARGET INSECTS

FILED PATENT
IN US, EU + 10 OTHER COUNTRIES









Team

Spensa's Core Expertise

Robotics

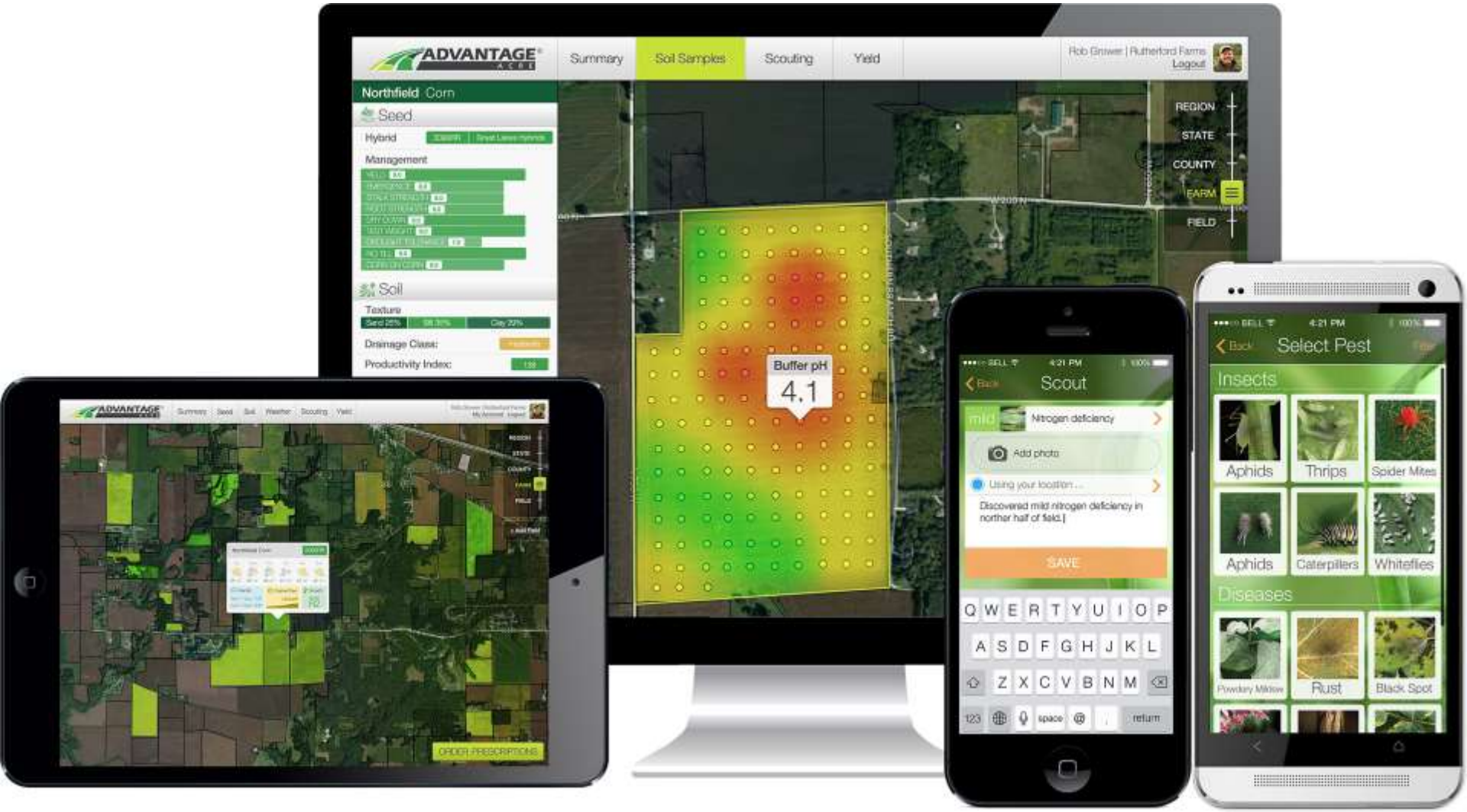
Sensors

Data Analytics

User Interface

Advantage Acre

Innovative Precision Planting Too




When the tractor moves, the front
cameras scan the vine

Launching in Q1 2015

Record Observations/Severity

OpenScout

OpenScout

Farm & Fields | Pick Lists | Account | Logout

SELECT FIELD

SELECT TRIP

8:45am 6/27

12 SPIDER MITES

Discovered isolated case of black rot. Examined neighboring trees.

8:37am 6/27

3 CATERPILLERS

Took soil moisture samples with probe in 4 locations. Looking good. Will measure again in 2 weeks.

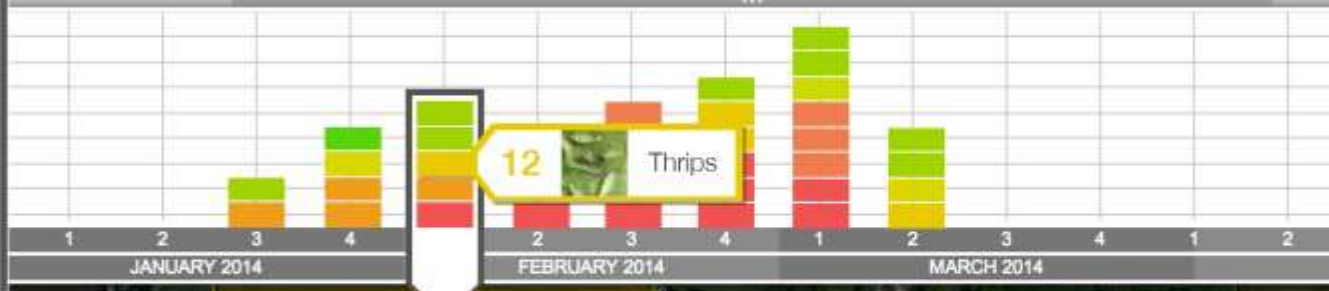
8:25am 6/27

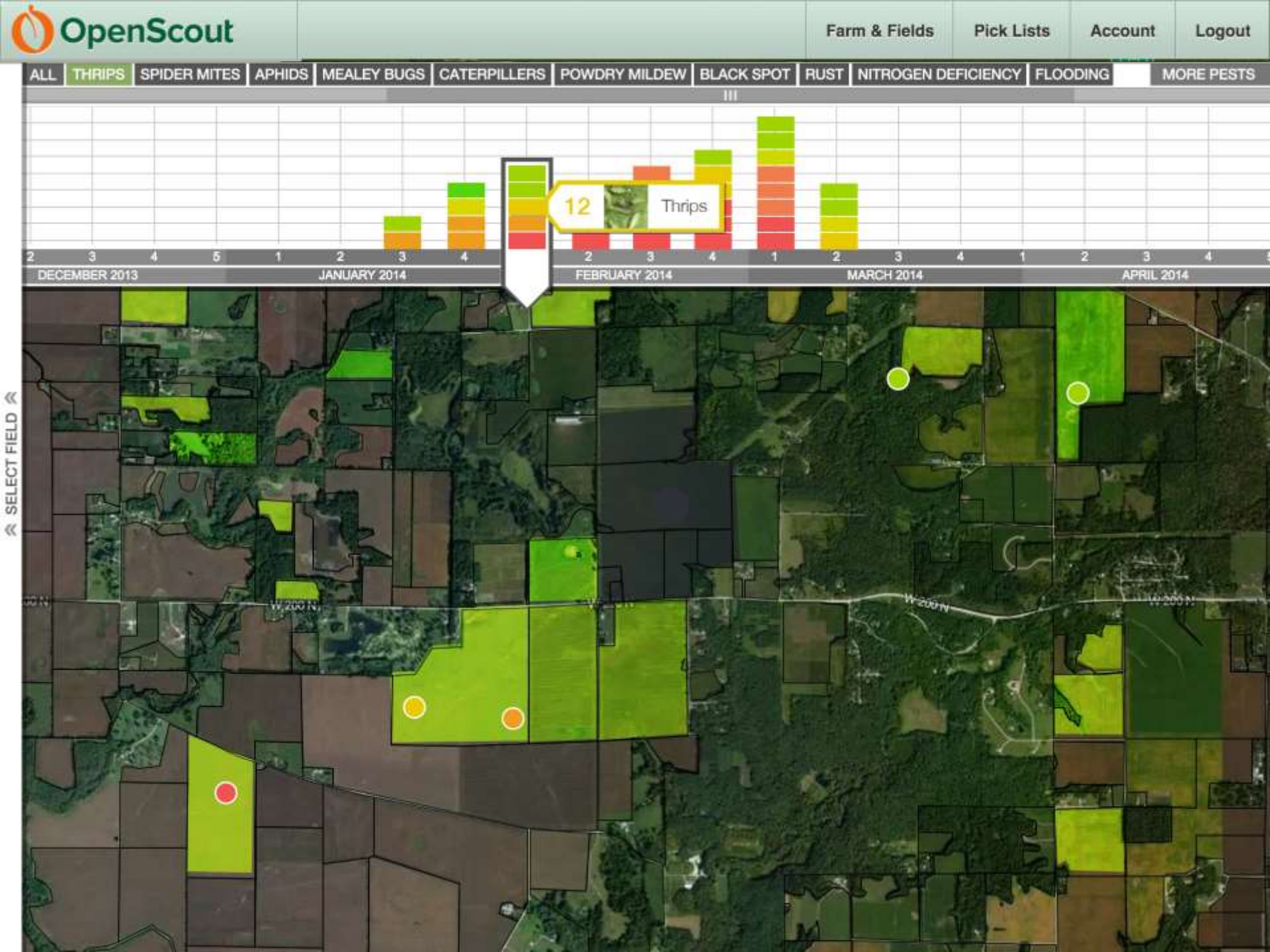
MILD NITROGEN DEFICIENCY

8:15am 6/27

MODERATE BLACK SPOT

APHIDS | MEALEY BUGS | CATERPILLERS | POWDRY MILDEW | BLACK SPOT | RUST | NITROGEN DEFICIENCY | FLOODING

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CATERPILLERS
POWDRY MILDEW
BLACK SPOT
RUST
NITROGEN DEFICIENCY
FLOODING
MORE PESTS
12
Thrips
DECEMBER 2013
JANUARY 2014
FEBRUARY 2014
MARCH 2014
APRIL 2014
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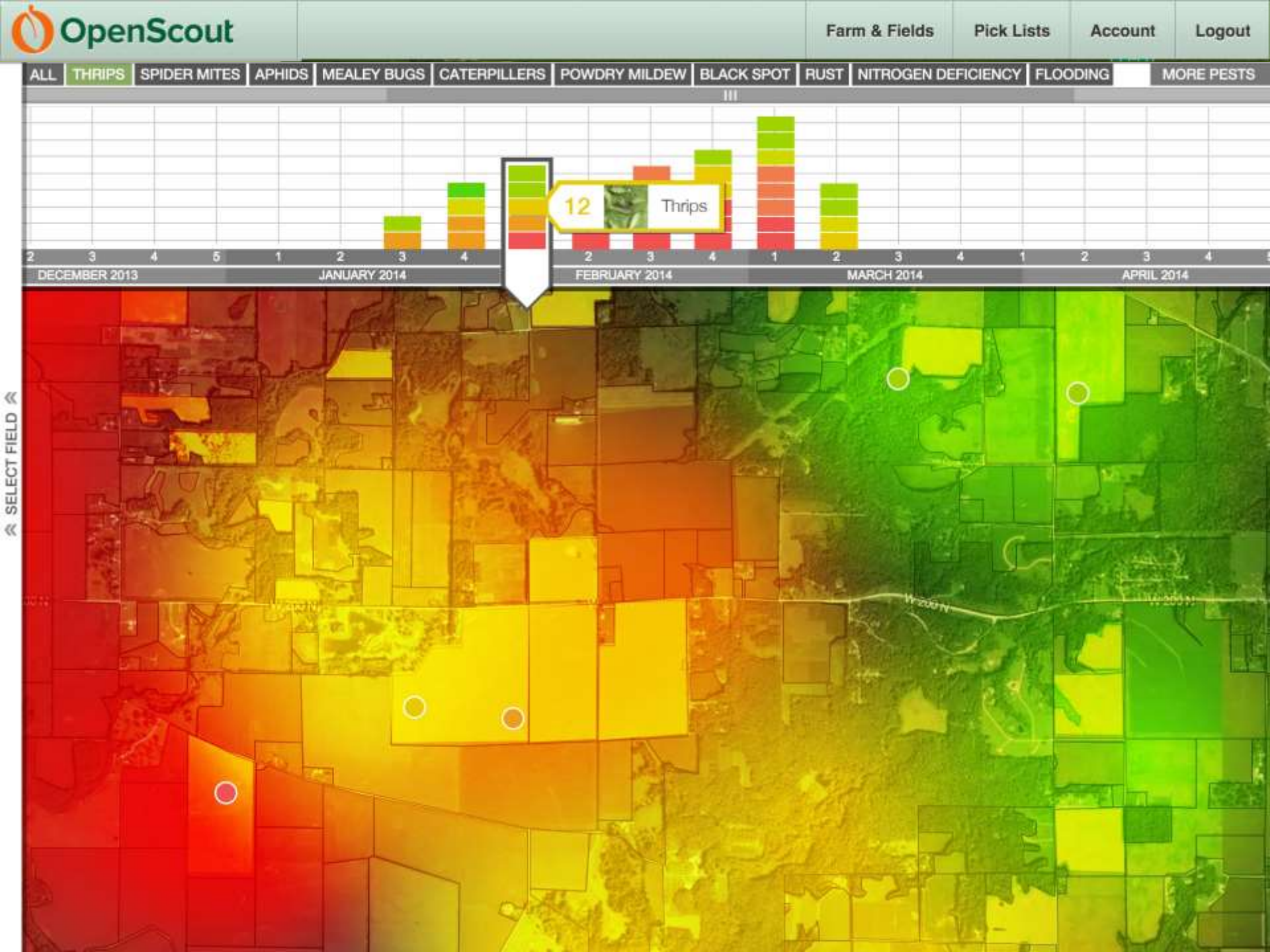
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12
Thrips
DECEMBER 2013
JANUARY 2014
FEBRUARY 2014
MARCH 2014
APRIL 2014
SELECT FIELD

Automatic Corn Kernel Counting App

Spensa's Vision:

Precision Ag Insights

for

Safe and Abundant Food

for Everyone in the World