



CONNECT

COLLABORATE



Center for Innovation & Technology

Where agriculture meets technology

[CIT Overview](#)

EDUCATE

INNOVATE



A modern office interior with cubicles, large windows, and a dark wood conference table in the foreground. The office is bright and spacious, with orange and white cubicle walls and white office chairs.

16

START UPS

12

SPONSORS

Startups

- California Safe Soil** Turns organic waste into high quality fertilizer
- Concentric Power** develops prefabricated, modular power plants
- GeoVisual Analytics** analyzes aerial/satellite imagery to predict crop yield, health
- iFood Decision Sciences** – Streamlines food safety data collection and reporting
- Inteligistics** provides real time pulp temp reports and alerts
- Specright** provides end to end management of packaging specifications
- Conservis** provides an enterprise level view of the entire farming operation
- Harvestport** provides a platform for the sharing of seasonal assets
- Russell Pacific** increases capture of solar energy with racks that track the sun
- Plant Nutrition Technologies** custom fertilizers to conserve water/increase yield
- Biosensing Systems** combines technologies to better use hyperspectral imaging in ag
- Lotpath** builds web and mobile apps to serve food and ag operations
- Trace Genomics** combines genomics and machine learning to analyze for soil pathogens
- Wexus Technologies** translates energy data to actual field equipment
- TerrAvion** – Heavy Connect and Food Origins (coming soon)

WGCIT PROMISE

- **HUB of Activity**
- **GO-TO for AgTech**
- **CHANGE (Incremental)**
- **SILVER BULLET (Potentially)**

WESTERN GROWERS

CENTER for INNOVATION & TECHNOLOGY

Where agriculture
meets technology



ACCELERATE
Availability of New Technology



Real-time "Google Earth" for Agriculture

Brandon Udelhofen, Regional Vice President
brandon@terravion.com



Our unique insight:
visual control of
operations

You can't effectively fight
problems you can't see

Main competitor to imagery is
driving around in a truck

Genesis:
2007 – Ghazni, Afghanistan



Reality:
2015 – Salinas, California

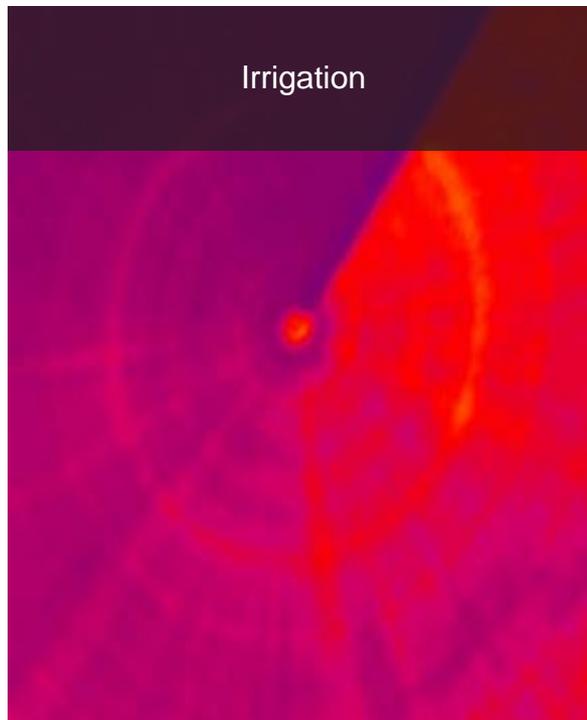




TerrAvion OverView is a subscription to current farm imagery

Imagery is used to manage:

- Labor
- Irrigation
- Fertility
- Pests and Disease
- Forecasting
- Crop Unique Issues





Yield Forecasting and Observations

The screenshot displays the GeoVisual analytics web application interface. The main map shows a satellite view of a rural area with a central field overlaid with a color-coded yield forecast (ranging from blue to orange) and numerous green and yellow observation points. The interface includes a top-left navigation panel with user controls (jeffo, Logoff) and filters (Layers, Filters, Edit, Export). Below this is a metadata section with dropdown menus for Organization (GeoVisual), Group (Testers), Campaign (Driscolls Demo1), User (All Users), Property (All Properties), and Choice (All Choices). A central panel contains a 'Required' section with a 'Reset' button, a 'Comment' field with the text 'yield', and an 'Apply' button. Below the comment field are several dropdown menus for data types: 'flower count' (yield measurement), 'green berry co' (yield measurement), 'yield measurement' (Any Choice), 'vigor stage' (Any Choice), 'runners' (Any Choice), 'plant die out' (Any Choice), 'pests' (Any Choice), 'weeds' (Any Choice), 'diseases' (Any Choice), 'fixed asset' (Any Choice), 'mobile asset' (Any Choice), and '*use as yield observation' (Any Choice). The bottom of the interface features a layer control panel with checkboxes for Observations, Waypoints, and TerraVion, and a 'Yield Model' checkbox. It also includes a 'Layer Type' dropdown (NDVI), a 'Colormap' dropdown (Default), and a date range selector (Jul 2015 to Aug 2015). The bottom right corner contains a 'Map Satellite' toggle and a 'GeoVisual analytics' logo. The bottom of the map shows 'Google' and 'ML, CA OPC, DigitalGlobe, USDA Farm Service Agency | Terms of Use | Report a map error'.



What we do: Hardware + data + software + operations as a service



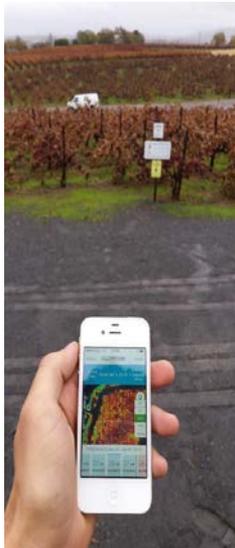
08:00 Takeoff



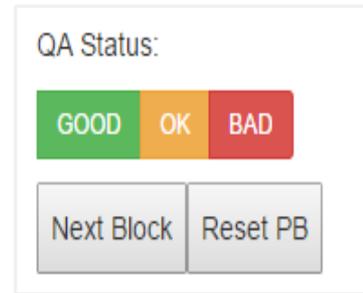
16:00 Landing



17:00 Upload & processing



05:00 User login



23:00 QA & delivery



- We fly rented planes over our customers' farms.
- We build our own sensors that detect: imagery, plus chlorophyll density and water transpiration.
- NASA Landsat (#1 scientific remote sensing platform) cost \$100M+. Our equipment: 100x better resolution, but customized off-the-shelf sensors we build for \$50K each
- We process the data (1TB per plane per day) in the cloud overnight, and farmers get it over the web, mobile, and iPad.



TerrAvion OverView + grower implementation
= 10%+ productivity, 100%+ average farm profit

Managers in agriculture have
been managing blind and
they know it





Satellite Does Not Work for Visual Control, Stand Counting, or Open Canopy Crop Forecasting & is not reliable



LANDSAT



TerrAvion is cheaper for farmers than flying their own drone





We are riding the cost/volume leadership wave

#1 California

#1 Pacific Northwest

#1 Chile

Just entered Corn Belt...

TerrAvion is ~100x larger by volume than the whole electric drone industry



Our API is already the de facto standard for ag imagery



Fruition Sciences — premium software platform for viticulture, already integrated



Ranch Systems — top west coast weather station hardware/software for ag, also already integrated



Propak — #1 citrus grove management software, also already integrated

CHS — \$3B ag cooperative, integration in beta with 70,000 acres, discussing 650,000 2017 acres



Wilbur Ellis — \$3B ag retailer, integration expected in Q3 2016



ESRI and QGIS — WMTS and Geotiff support





Over-serve and under-charge to build density

2016 OverView features:

Data acquired:

- Bands: Red, Green, Blue, Near Infrared, Thermal Infrared
- 1 extra band for later development
- Resolution: 10 cm color resolution, 18 cm NIR, 1M Thermal
- (Capacity for custom higher resolution)
- Color forward oblique images

Access and processing:

- Products: Color, Color IR, NDVI, Zoned-NDVI
- Operations-grade reflectance-calibrated radiometry
- Overnight processing
- 2M week to week geometric accuracy
- Block/field-level image statistics
- API, web, iPad access

Schedule	Visits	Interval	Per Acre
Coastal	35	Weekly + Monthly	\$10 - \$30
Central Valley	35	Weekly + Monthly	\$10
One Shot	1	Once	\$1 + dispatch
Center Pivot	20	Weekly	\$6
Corn & Soy	12	10 days	\$4



Roadmap in 2016

- Bolstering GeoVisual integration, bringing forecasting features to our platform in the 2nd half of the year
- Higher resolution pod, as fine as 5 cm per pixel



Brandon Udelhofen | Regional Vice President| brandon@terraavion.com



HEAVYCONNECT

Operations Management....Redefined!



Team

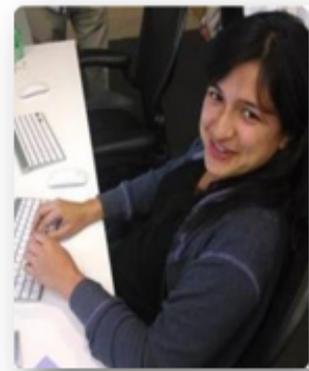
Patrick Zelaya, MBA

Global sales & marketing exec, **CEO**



Jessica Gonzalez

Coding ninja & project manager, **CTO**



Joe Welch
Innovation strategy



Norm Groot
Agriculture strategy



Dr. Eric Tao
Development strategy



Roger Royse
Legal strategy



Team



Problem



Juan Gonzalez
Operations Manager



“I make 240 calls daily **synchronizing** people & equipment.”



Nathan Dorn
Director of Knowledge & Innovation



“**Paperwork** costs farm managers over 1 day a week.”



Jaime Strachan
CEO



“**Managing** schedules is the biggest risk in Ag.”

Solution

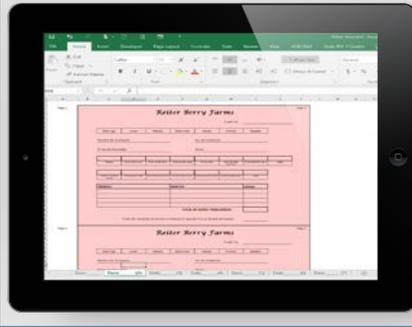
TIMEKEEPER



Input



Output



TRACKER



Input



Output



SCHEDULER



Input



Output



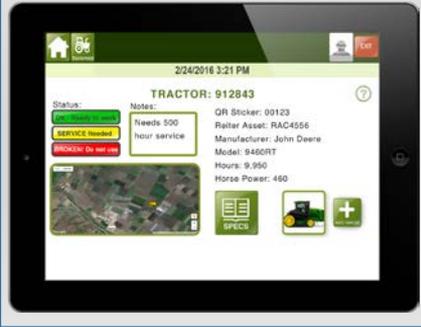
RECORDER



Input



Output



Opportunity

**Monterey
County**

California

**Western
US**

**United
States**

World

**\$ 7.1
Million**

**\$ 165
Million**

**\$ 691
Million**

**\$ 7.8
Billion**

**\$ 22.8
Billion**



<http://rlb.com/articles/global-construction-2020/>
<http://www.statista.com/statistics/208715/total-revenue-of-the-top-mining-companies/>
<http://www.sipri.org/yearbook/2013/03>
<http://www.statista.com/statistics/254875/third-party-logistics-revenue-size-by-region/>

Business Model (GTM)

Standard

Free

Up to 10 profiles

Pro

\$ 5/month

Per profile billed annually

Enterprise

\$ 500/month

Up to 200 profiles billed annually

All platform functionality

- Secure HTTPS domain
- Private AWS data hosting
- 6 month historical data retention
- Summary reports
- 48 hour response email support
- Encrypted multi-tenant data architecture
- Anonymous data privacy

Standard features **PLUS...**

- Unlimited historical data retention
- Analytic reports
- 24 hour response email support
- Webinar user training

Pro features **PLUS...**

- Immediate 24/7 phone support
- Encrypted private instance data architecture
- Client data ownership & retention
- Private on-site user training

Los Angeles Times

Monterey County The Herald

The Californian

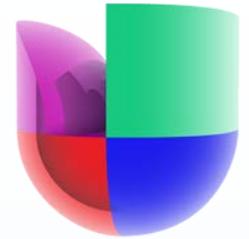


TELEMUNDO

TechCrunch

FARM PRESS

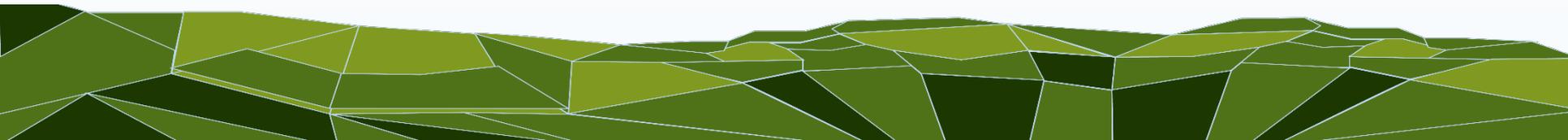
San Jose Mercury News



UNIVISION



MONTEREY COUNTY WEEKLY



Traction

Marketing & Support

Partners

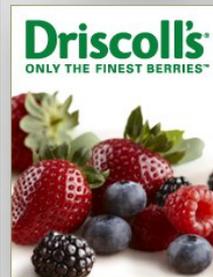


HARTNELL COLLEGE



Pipeline

Early adopters



IPPOLITO INTERNATIONAL



Competition

	Simple	Manage by Exception	Reduce Admin	Manage Remotely	Proactive
Analog tools notepad, post-it notes, 2-way radio					
OEM telematics John Deere's JDLink, Trimble's VisionLink					
Data aggregators Granular, FarmLogs, Conservis					
Specialized software Kronos, Fleetmatics, Smartsheet					

Food-Origins

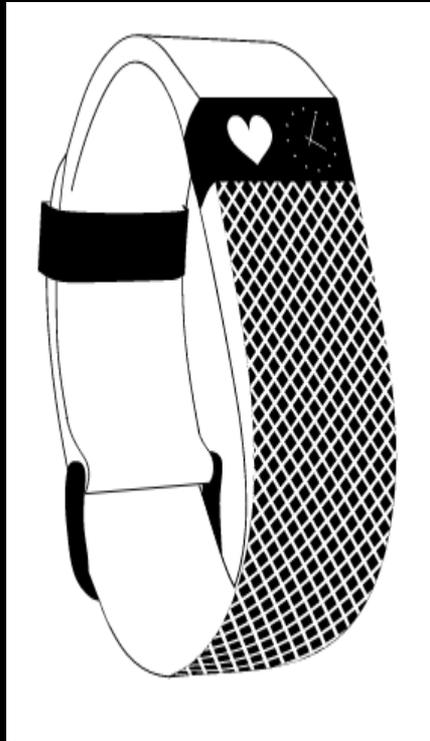
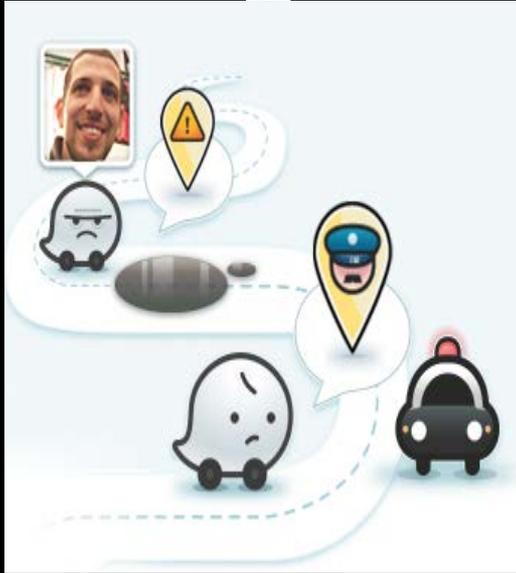
*“Provide actionable precision data
for harvesting of
handpicked crops.”*

Nathan Dorn, CEO
Richard Sowers CIO

@FOOD_ORIGINS



Data-driven, Collaborative & Agile World



Food-Origins



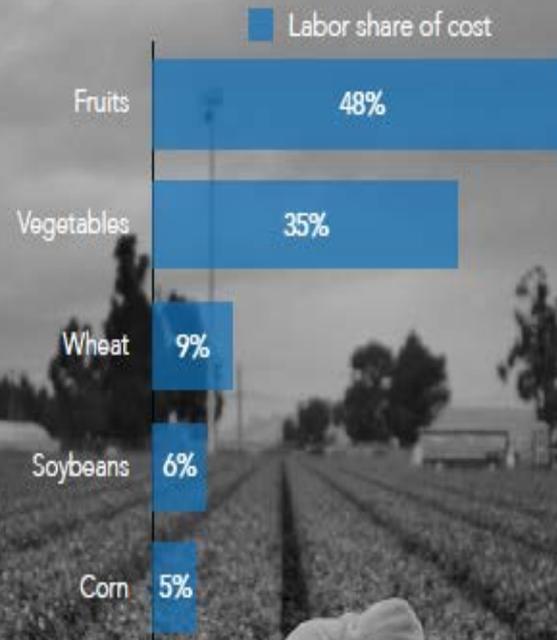
Hardware Enabled
Software Startup

Geo Registration of
Hand Harvested
Produce

- ✓ Spatial Yield Monitoring
- ✓ Real-Time Labor Management
- ✓ Traceability

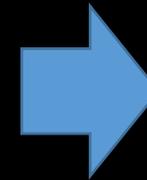


Labor is a huge component of farm cost; by some estimates, the US is seeing labor shortages of 10-30%

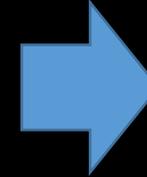


Source:
WSJ

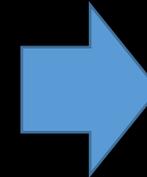
California's Berry Industry is in Crisis



PAYROLL



PRODUCTION
TRACKING

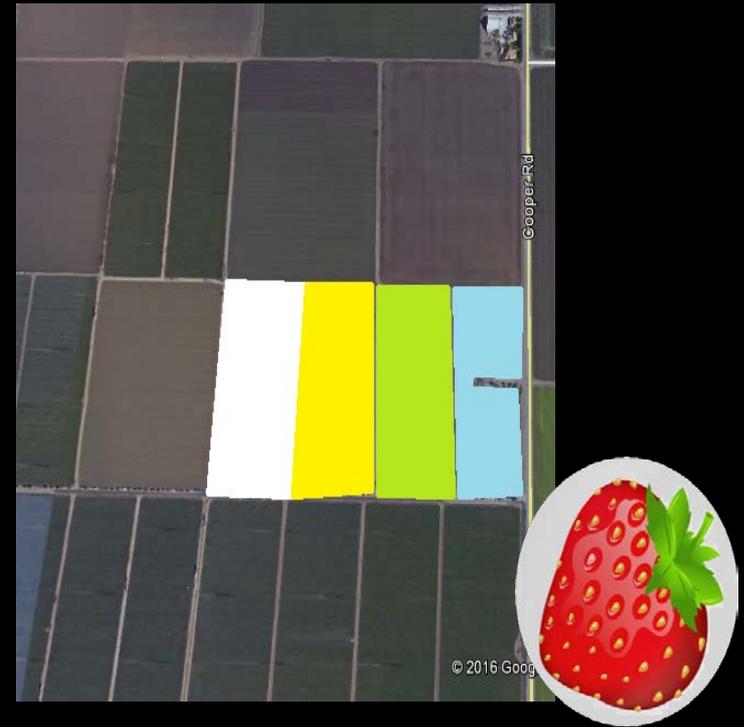


TRACEABILITY



**CURRENT DATA COLLECTION
METHODS DO NOT PROMOTE
CONTINUOUS IMPROVEMENT**

Precision Agriculture vs. Block Data



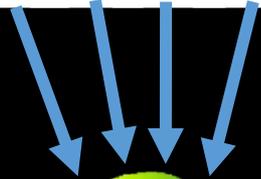
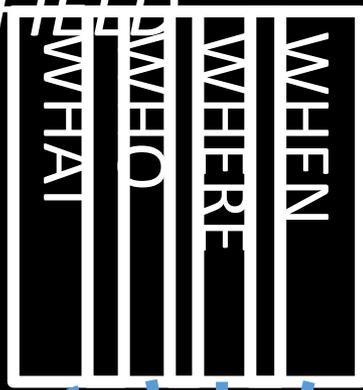
20 Acres – 200
B/ac – \$3.50 /B =
\$14,000
\$4.80 per data

20 Acres * 7000
Boxes/ac * \$10 /
box = **\$1,400,000**
\$250,000 per data

The Food Origins Solution

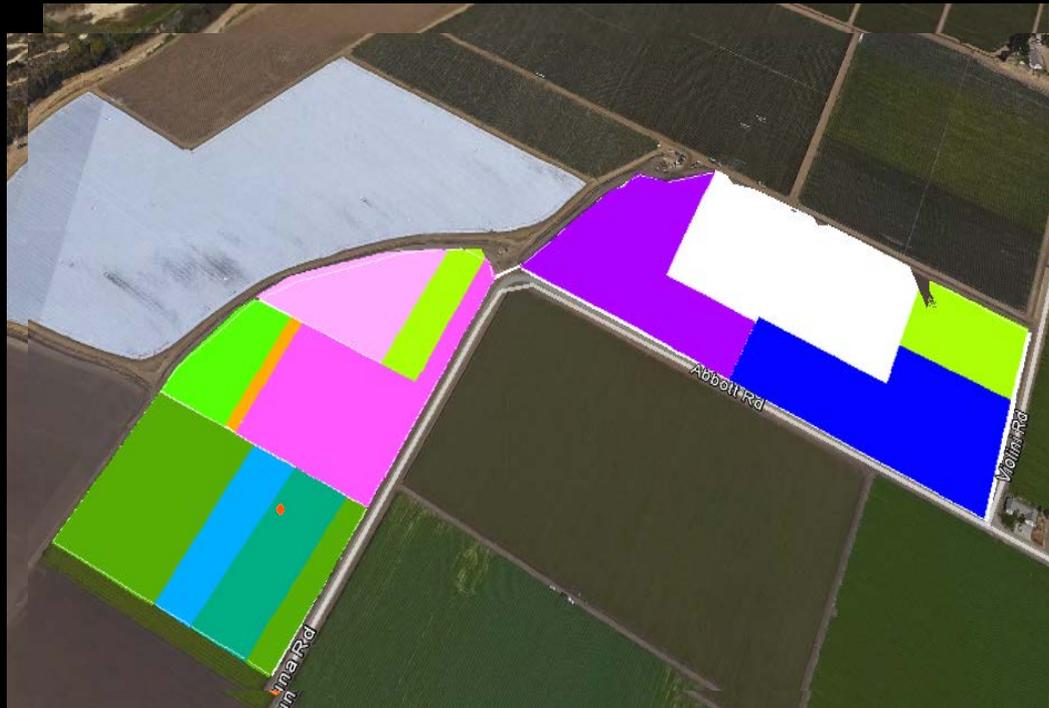
HARVESTERS collect and share data while
THE FIELD

INSIDE



Pins Through Data Layers

- Violini
 - 1497 Violini
 - Conventional
 - [Water Lab Report 23 Mar 2015](#)
Soil Control Lab, Dan Schmida
 - [Soil Report 22 Sep 2015](#)
Perry Lab
PH 7.5
 - [Soil Report 1 Sep 2015](#)
Perry Lab
PH 8.0
 - 48"Bed
 - Mulch Silver/Black
 - Monterey Co Fumigation ...
 - Monterey Co Fumigation ...
 - Block7
 - Block6
 - Block5
 - Block4
 - Block3
 - Block2
 - Block1
 - PlantDate 11/23/2015
 - PlantDate 11/21/2015
 - PlantDate 11/21/2015
 - PlantDate 11/20/2015
 - PlantDate 11/17/2015
 - PlantDate 11/12/2015



timestamp: 2016-Apr-18 08:24:11
position: (36.601368,-121.601429)
IMEI: 355136056588471
barcode: 1857811805
Object being scanned: Harvest
user: Marielena

history

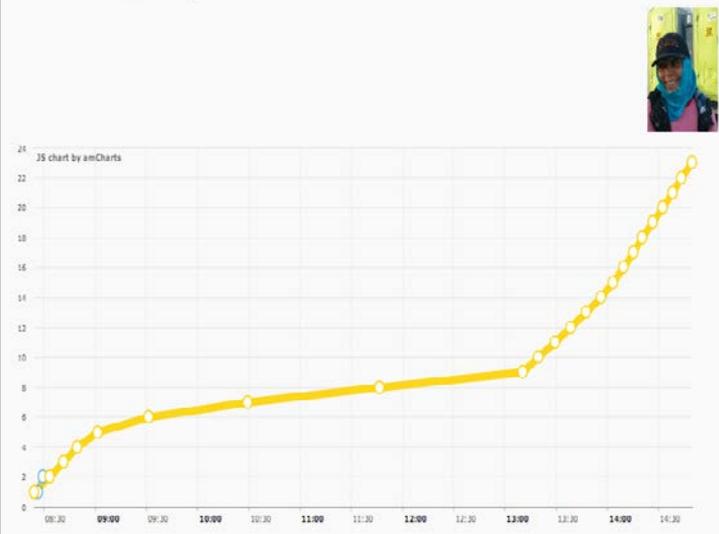
- 7660 Flewell Ranch: 2016-05-12
- Transitional: 2016-05-12
- Flewell Block 3: 2016-05-12
- Flewell Big Sur: 2016-05-12

badgescan: 2016-04-18 07:49:34



Real-time, Precise, Shared Data Enables Dynamic Responses from Ecosystem Players

Recent Productivity for elisa1



timestamp: 2016-Apr-07 14:16:45 X
position: (36.582026,-121.616825)
IMEI: 355136058615736
barcode: 2054420271
variety: organic
ranch: 414
Object being scanned: Harvest
user: Fortino1
badgescan: 2016-04-18 07:43:39

The Team

Nathan Dorn,



Dr. Richard Sowers, CIO



Tom Rolander, Business
Development



Food Origins

“Provide actionable precision data to significantly improve agile harvesting of handpicked crops.”

Nathan Dorn, CEO

@FOOD_ORIGINS



Benefits of Precision Agriculture



Past research has shown that much of the differences between high- and low-profit farm enterprises can be traced to machinery cost advantages (Dhuyvetter & Smith, 2010).

Machinery management is one of the areas where producers should focus their efforts to improve their relative profit positions.





EXIT

Taylor Farms
JVSmith
COMPANIES
Producers for a healthier tomorrow

Building the
Future of the U.S.
Agri-Tech System