Business Opportunity

We deliver agriculture data to growers, using computer vision technology which helps manage crop yield and reduce cost for farmers.

- Our cart periodically tours the orchard and takes images of the leaves and trees.
- Based on computer vision technology we help detect issues based on changing leaf coloration
- This data helps growers and pest control advisors identify the issues in the tree and take the right set of preventive measures.

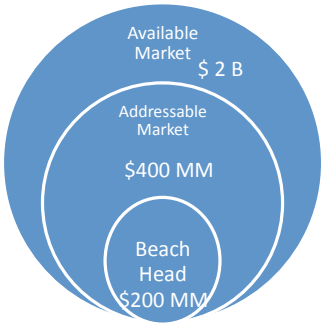
Target Market

Customer Profile

Our technology can be applied to most fruit and nut growers with some adaptation.

We plan to tackle the following in our initial outreach – almond, walnuts, citrus and grapes. (Primarily driven by geography, market value of crops, growing season and business need in the orchards)

Segmentation



Value Proposition

Burning Need

Almonds /Walnut
Average orchard size is 300 acres – 500 acres.

Current methods deployed by farmers to detect issues in trees are either based on sampling, aggregate information or driven by highly labor intensive process.

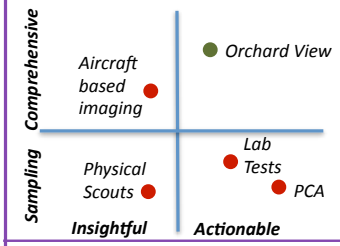
Periodic management of issues help improve yield of their orchard and also reduce potential future losses.

Digitized information allows farmers to collaborate with pest control advisors and consultants in a seamless manner to get immediate value

Differentiation

Competition

Where is your product in relation to market competitors now?



Trajectory (Sustainable differentiation)

We will build an "add on" to existing carts moving through the orchards which will help reduce the fixed cost investments for farmers and adopt our technology easily.

We will continue to combine the latest research in imaging technology to help identify yield estimate, and other issues in trees based on image captured.

Go-to-Market

Channels

- Directly to Grower community (Reach out to them individually or through Co Ops)
- In partnership with Pest Control Advisors and independent consultants
- Potential arrangements with Heavy Equipment manufacturers

Relationships

- Work in partnership with Almond / Walnut Board of California
- Partnership with Co-Op and other independent consultants in the market place
- Work with research divisions of large growers in the industry

Financials

Assumptions

- Service Fee : $25/acre trip
- Demand penetration of 20% of the total market in 5 years

Projections

	Y1	Y2	Y3	Y4	Y5
Rev.	$0.58	$3.05	$5.96	$9.81	$15.34
Net Inc.	($1.26)	($0.29)	$1.18	$2.19	$4.83
%	-219%	-10%	20%	22%	31%

Funding Requirements

- Seed Funding : $1 MM
- Series A : $3 MM

Business Opportunity

Our product will help orchard growers identify potential signs of stress and disease in their crops, alleviating a $1.2B pain associated with crop disease. We enable faster diagnoses by a Pest Control Advisor (PCA), allowing the grower to take corrective measures more quickly and accurately. In the long-term, our software will automatically diagnose the most common and visually apparent issues, reducing the cost of diagnosis and treatment.

Target Market

Customer Profile

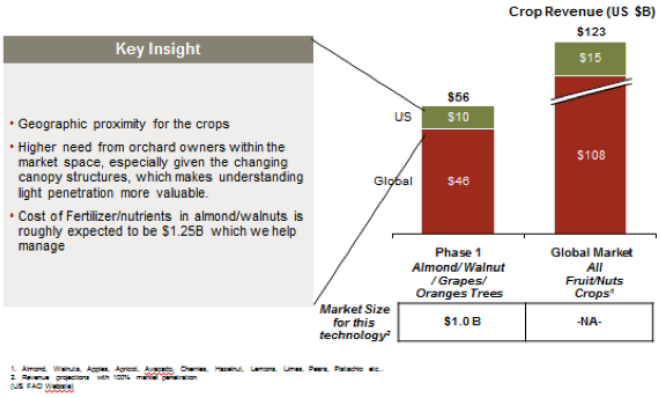
Our product-market fit is tightest for high-margin orchard crops such as almonds, walnuts, grapes, and oranges. The penetration of sensor technology into these crops is low compared to commodity row crops such as corn and soybean. Coodity row crops are watered and fertilized by tractors, which provide a natural physical platform on which to mount a sensor system that can also automatically adjust the amount of water and chemical applied to each small section of the crop. In contrast, high-margin orchard crops rely on built-in irrigation systems (e.g., micro-sprinkler, drip) that provide much coarser control over resource allocation and also do not provide a vehicle on which to mount a sensor.

Almonds are the number one cash crop in California and the almond industry has experienced 10% growth over the past decade. Almond production is geographically concentrated in California's Central Valley, the region accounting for roughly 95% of almond production in the United States, which in turn produces over half of the almonds in the world. Geographic density favors solution, which involves transporting carts to each customer farm. Almond crop disease represents a $5M expense to these growers.

Grapes are California's second largest crop and also share the geographic density and proximity of almonds. Wine vineyards spend $7M to manage the stress levels in grapevines at a minute level, oftentimes purposefully stressing the plant to some degree to achieve desired flavor properties.

Oranges are a high-risk crop. In recent years, the bacterial disease known as citrus greening or Huanglongbing has devastated orange crops in Florida and Texas, and is now spreading across the country to the West Coast. Once infected, a tree ceases useful fruit production and dies within a few years, representing a $20M loss to a grower. The key symptom of the disease is that it changes the fruit color from orange to green and limits the size of the fruit. Early detection of the disease is crucial in order to quarantine and prevent its further spread.

The figure below highlights issues in orchards that can be recognized using imaging technology.



Segmentation

Our initial target market is almond, walnut, citrus, and grape orchards throughout the U.S. We have selected these crops because of their high volume and revenue ($10.2B), intensity of need, and geographic coverage. This technology can be adapted to most fruit and nut plants and other crops in agriculture, representing a $123B total available market.

An indicator of total potential market size is the total cost of fertilizer, disease control, irrigation, insects, and PCA advisement for these crops. Using a cost-and-return analysis for almonds from UC Davis[1], the cost per acre is $785. Assuming that the other crops have similar costs for these items, the cost of materials that would be impacted by use of our product would be $2B for almonds, walnuts, grapes, and oranges.

We estimate the approximate size of our target addressable market as the total acreage of the crop multiplied by the price of our service for a year (3 trips at $25/acre). This approximation was constructed from extensive almond farmer outreach as a proxy for other crops. The initial addressable market is $1.1B.

Value Proposition

The Burning Need

Orchard growers rely on manual techniques - physically touring a small area of the farm or taking a few leaf samples from various locations and sending them off to be tested in a lab - to monitor the status disease, pest infestation, malnutrition and water stress in their orchards. The price of a single missed detection compounds geometrically, as malnutrition, disease, and pests spread geometrically over time.

Growers use Pest Control Advisors (PCAs) who use the naked eye to detect some of these issues by periodically sampling the orchard. Some also use aerial photography, captured at a few thousand feet, to understand the status of their orchard at an aggregate level. Many of the PCAs who work with growers are actually representatives of chemical/fertilizer companies trying to sell their products. Though these experts may have great expertise, there is an inherent conflict of interest between helping the farmer and making a sale. Growers spend an estimated 15% more in pesticides than needed to

manage their orchards, at the advice of PCAs. Simultaneously, PCAs miss 40% of cases of infestation and disease, resulting in a $70M loss to the orchard growers industry.

There are currently no devices in the marketplace that do complete analysis of orchard status on a tree-by-tree basis. Manual effort, time, and cost have prohibited farmers from conducting such thorough periodic analysis. Our technology, however, can provide such a service at a marginal cost, allowing farmers to catch more issues earlier on.

By collecting this data and providing a platform for collaborating with multiple PCAs, we plan to disrupt the $125B chemical and fertilizer industry.

Pest Control Advisors (PCAs)

A PCA specializes in a particular set of crops and within that crop serves as a generalist advisor who has broad knowledge about all the issues that can affect that particular plant, including nutrient status, water status, insects, animals, fungi, bacteria, and viruses. During the growing season, the PCA will physically walk the field checking insect traps and selecting regions at random to check for visual signs of plant stress. The PCA will also collect a limited set of plant or soil samples that can be sent to a lab for testing for chemical composition. Some farmers we spoke with hire additional expensive field scouts to look for problems. Others incentivize existing field hands to highlight potential issues, but these workers are unskilled and untrained to detect the signs of plant stress.

Sensor Technology

More recently, growers have turned to sensor technology to acquire automated large-scale visibility into the status of their crops. Among these sensor technologies is multispectral aerial imagery, which employs cameras in the visible and infrared light spectra to capture aerial photographs of crop fields. The intensity of the image across the different spectra is correlated with soil moisture, vegetation density, and to a lesser extent plant nutrient status. At a few dollars per acre, aerial imagery is fairly cheap, but it is also coarse and misses many details. The correlation between pixel intensity in an image and actual plant stress is susceptible to environmental conditions such as cloud coverage, ambient temperature, and ambient wind speed.

To overcome the limitations of aerial remote sensing, some companies have begun to offer ground-based imaging hardware, such as the GreenSeeker and WeedSeeker products from Trimble. Such offerings, however, can only measure vegetation density or weed presence and are not sophisticated enough to detect general problems.

Finally, many farmers have started to employ soil moisture sensors from companies such as PureSense and Trimble. These sensors are implanted in the soil at various locations and broadcast soil moisture levels over time at various depths to a software system that is accessible to the grower on a desktop or mobile device. However, such sensors are expensive to purchase and install, so many growers buy fewer than one sensor per geographic farm management block (the size of a block varies from crop to crop and farm to farm but is typically quite large – on average 100 acres for almonds, for example). Furthermore, the sensors only provide data about soil moisture and ambient temperature,

and cannot detect signs of plant stress.

All in all, there currently exist no effective means of detecting signs of issues in plants in a scalable and cost-effective manner.

Our Solution

To collect the data, we employ a multispectral camera suite mounted on an all-terrain cart that is linked to an onboard data-logging machine. The camera suite is composed of cameras in the visible and near infrared spectral range, and an active visible and infrared light source. A GPS unit is attached to the cart and connected to the data logger. The cart is driven at a speed of 15 mph through the crop rows and the onboard DAQ captures data from the GPS unit and cameras every five seconds saving this to a USB- mounted flash storage device. The driving is done at night with the active light source providing sufficient and consistent illumination of the leaves in the camera frame.

After data-collection, the USB storage device is transferred to a server that runs the image processing software. The quantity of data captured by the camera suite (5 terabytes/hour) precludes the use of a cloud-based processing system. Our computer vision segmentation and stress-detection algorithm is applied to the images, pinpointing images and geographic coordinates of possible plant stress. This data is then presented to the end-user, either a farmer or a PCA, who can view the findings on a map on a desktop computer or mobile device. The user can zoom in on individual issues displayed on the map and look at the original picture with stressed region highlighted. This allows an expert to make a visual-based diagnosis without having to venture out into the field, allowing for quicker diagnosis.

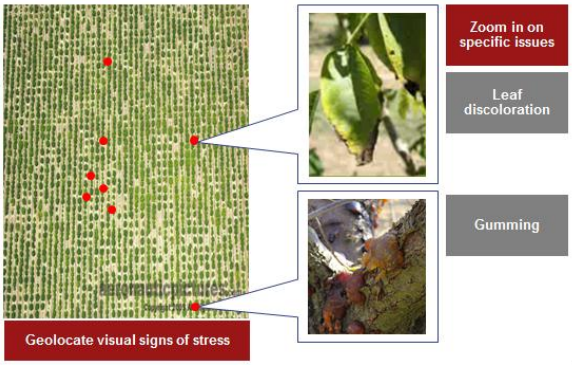


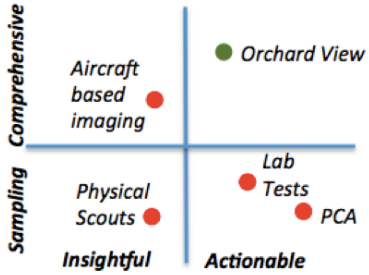
Figure: Detection of potential leaf problems in the orchard

As we collect more data through customer user, we will devote R&D resources to discovering visual features that can be used to automate the diagnoses of some diseases using machine-learning algorithms. PCA experts in the industry have stated that over 50% of the issues can be diagnosed visually from images.

In our initial product offering, we provide the cart at a $1000 loss as the means to deliver the sensor technology to the field. In the future, we will design a sensor apparatus that growers can mount on their own vehicles. This will eliminate the cost of maintaining the carts, transporting them to the fields, and hiring drivers. However, in the near term, we have chosen to focus on a cart-included product to keep the product line small and to give us more control over the sensor delivery mechanism as we collect the initial data.

Differentiation

Competition



Actionable, comprehensive data are the defining metrics of our competitive landscape. Growers want data that will help them carry out actions to increase yield and reduce cost. Further, PCAs and physical scouts can only look at a very small percentage of an orchard—they will inevitably miss some problem areas and infestations.

Aircraft imaging can take images of the entire orchard on a macro scale to measure chlorophyll content. Some farmers interviewed used aerial imaging as a way to find macro problem areas due to lower chlorophyll content (NDVI) in certain areas. Aerial images, however, are coarse and do not provide the resolution for growers to take

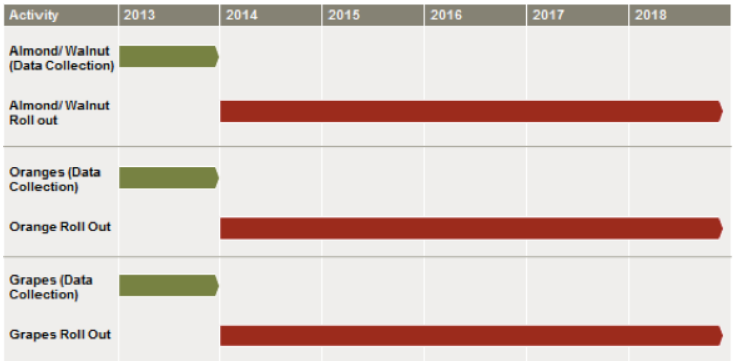
immediate and targeted action. Without fine-grain images of individual leaves, aerial imaging lacks a rich source of information relevant to plant health.

There are several other technology companies in the agriculture space. Companies like Pure Sense, Solum, and mOasis are also attacking this exciting space but are not competitors. In the future, these companies could in some way combine their offering to become our competitors or partners.

Sustainable Differentiation

In year 1, our primary focus will be to collect data across the primary target crops of almonds, walnuts, oranges, and grapes and refine the algorithm to detect issues in each crop. We will construct the on-cart sensor system and develop the first version of the end-user data reporting software GUI for mobile and desktop.

From year 2 onwards, we will deploy the system to grape, almond, walnut, and orange orchards. Using additional data gathered over time, we will continue making refinements to the image processing and stress detection algorithm. With the added data, we will also experiment with automated diagnosis algorithms for issues that exhibit clear visual symptoms. In addition, we will make refinements to the reporting software based on usability feedback from growers and PCAs. Finally, we will expand our services to additional crops. Strawberries and peaches are two candidate high value crops in the next phase of execution.



Go To Market

Channels

Our primary channel is to sell directly to growers. However, we will partner with PCA and chemical companies to obtain faster market penetration. PCAs from chemical companies would value this technology because it would help them perform their job better, as a PCA from Crop Protection Services has said. Despite the conflict of interest and desire to bias crop recommendations toward chemical sales, chemical companies ultimately need to demonstrate value to farmers to keep their business. Our service could

be used to better validate the efficacy of a particular nutrient or pesticide in the field, strengthening the chemical companies' customer feedback loop. In addition, maximal visibility into crop status ensures that more issues will be found, which translates to more opportunities to sell remedies to address these issues.

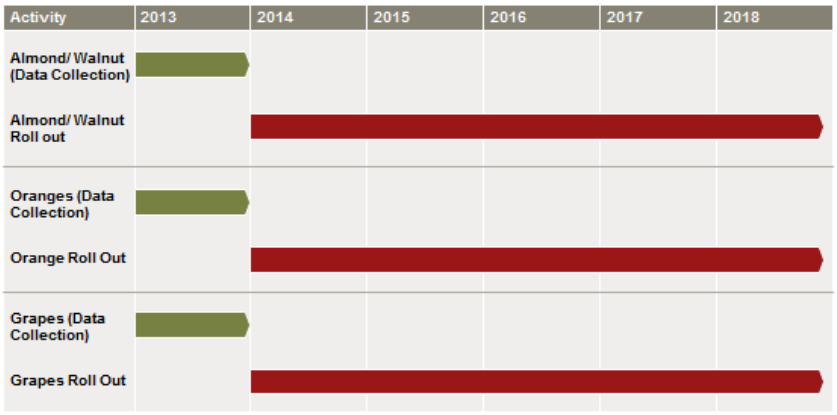
Relationships

The Almond/Walnut Board of California is a potential partner as they strongly encourage innovation in the almond industry by spending millions on research grants. Organizations of actual farmers (including co-ops) are key groups that could drive product adoption. Research divisions inside large orchards like Paramount Farms are another valuable resource that could help define the future of agriculture sensing. Frequent meetings of growers within these associations would be a great channel for us to explore to showcase the value of our technology.

Financials

Assumptions

We generate revenue by charging our customers a service fee per acre trip. So the revenue depends on total acre trips and the service fee per acre trip. Based on customer interviews, $25/ acre trip is the right price point to be offered in this marketplace.



We start our business from California and Florida before expanding to the rest of the US.

From our interviews with almond growers and other experts, 20% market penetration for almonds in year 5 is a reasonable assumption. We are estimating a 15% market penetration rate for walnut, grape, and orange crops.

Our cost of goods sold is the cost directly associated with the acre trip we offer to customers, including the diesel consumed by our trucks, wages of drivers, and other cost. For each acre trip we offer, we arrive at profits of $2.33 per trip. Two main components of operating expenses are truck cost and stuffing. Each truck costs about $20,044.

Other than the CTO, Orchard will hire four senior engineers and two data analysts at the

beginning. Most members of the team will remain in California, with one office manager and one data analyst in the Florida office for orange orchards. In year 2, our sales and data analysis teams will expand rapidly. We will also hire additional engineers to improve and maintain the technology. In year 3, OrchardView will hire a CMO and CFO.

Revenue Projections and Funding

Demand

% Market Share	Year 1	Year 2	Year 3	Year 4	Year 5
Almond	0%	2%	6%	12%	20%
Walnut	0%	1.5%	4.5%	9%	15%
Peaches	0%	1.5%	4.5%	9%	15%
Pistachio	0%	1.5%	4.5%	9%	15%

Pricing

- Service : $25/acre trip

Cost

- Truck cost broken down by each individual component
- Other misc. expense added (Travel, Advertising, Brochures, Recruiting, Website maint., legal, telephone, rent etc.)
- Total cost breakdown available

Table 1: Income Statement for first 5 years

	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue	$0	$3,255,288	$11,233,250	$24,474,000	$42,797,500
Cost of Goods Sold	$0	$303,393	$1,046,939	$2,280,977	$3,988,727
Gross Profit	$0	$2,951,895	$10,186,311	$22,193,023	$38,808,773
Gross Margin	0%	91%	91%	91%	91%
Operating Expenses	$2,040,650	$4,382,821	$7,360,647	$10,697,064	$13,528,163
Net Income (Pre-tax)	($2,040,650)	($1,430,927)	$2,825,664	$11,495,960	$25,280,610
Taxes	$0	$0	$0	$4,368,465	$9,606,632
Net Income	($2,040,650)	($1,430,927)	$2,825,664	$7,127,495	$15,673,979
Net Income %	n/a	-44%	25%	29%	37%
Ending Cash Balance	$475,186	$777,700	$1,992,101	$6,522,104	$18,620,583

OrchardView will need $5M in two years to generate positive cash flow, and break even in the third year. We are seeking two rounds of funding, for development and go to market expansion, respectively.

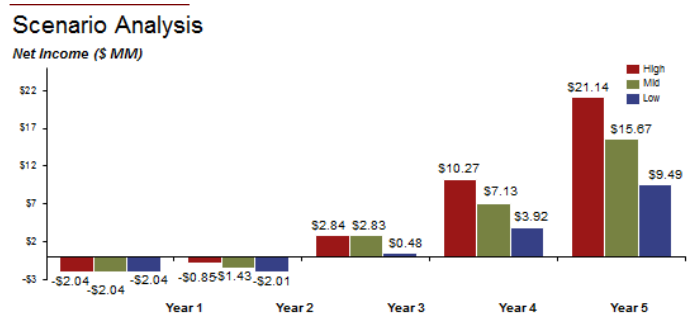
Seed Funding – Seed round of $2.5M in Q1 of 2013 will be used for product development and technology verification. It will fund the salaries and prototype development costs of the engineering team. By the end of this year, OrchardView will patent its product and technology, and the company is ready to go to market.

Series A – Series A round of $2.5M in Q1 of 2014 will be used to expand the staffing of the company. OrchardView will hire direct sales representatives to acquire customers, as well as more engineers, data analysts, and drivers. We also invest in additional infrastructure buying trucks and other components to build more equipment. By the end of the year, OrchardView will have 2% market penetration in the almond market and 1.5% penetration in the market of walnut, grape, and orange.

Our business turns cash flow positive in Year 3 and operates with a positive net income

by Year 5. With $40M revenue it becomes a very attractive investment for investors at the end of year 5.

Sensitivity analysis on our market penetration rate shows that the net income still turns positive in year 3 and our overall net income range will end up between $9M - $21M.



Almond and Walnut Combined Market Share %					
Scenario – High	0.00%	2.14%	6.42%	12.84%	21.40%
Scenario – Mid	0.00%	1.65%	4.94%	9.88%	16.46%
Scenario – Low	0.00%	1.15%	3.46%	6.92%	11.53%