TerrAvion Uses AWS to Help Farmers Improve Crop Yields Through High-Resolution Aerial Images

TerrAvion uses AWS to store and process aerial imagery, deliver images to agricultural customers overnight, and help farmers improve crop yields. The company is one of the largest providers of high-resolution aerial images by volume for farmers across the US and Brazil. TerrAvion runs its aerial-image data-processing application on Amazon EC2 and uses Amazon S3 and Amazon S3 Glacier to store multiple terabytes of images every day.

Providing High-Resolution Aerial Photos of Crops
Commodity-crop farmers across the United States often depend on satellite images of their fields to get an updated view of the health of their crops. The resolution of these images, though, is not high enough for farmers to get the most accurate picture of their fields. In fact, for many specialty-crop growers, satellite images are somewhere between useless and misleading.

TerrAvion is changing that. The company uses airplanes and drones to obtain full-frame and thermal images from high-resolution cameras. TerrAvion gives farmers, retailers, agronomists, and ag distributors the best possible pictures through OverView, the company’s core subscription service. “Our pictures offer resolutions of 9 or 18 centimeters per pixel, which satellite can’t do,” says Stephen Smith, CTO of TerrAvion. Using such high-resolution images, farmers can more accurately view the health of a plant.

TerrAvion started from day one as a cloud-native Amazon Web Services (AWS) customer. “We knew we were going to collect multiple terabytes per day, per aircraft, and needed to deliver fully processed images to our customers the day after the photos were taken,” Smith says. “Without the speed and economy of the public cloud, TerrAvion could not exist—everyone thinks drones are the big disruption in agriculture, but, in fact, it is 4G wireless and the public cloud.”

Processing Multiple Terabytes of Image Data Daily on AWS
TerrAvion was already using Amazon Elastic Compute Cloud (Amazon EC2) instances, powered by Intel® Xeon® processors, to support its online image-processing application. To accommodate its increasing image-storage needs, the company began using Amazon Simple Storage Service (Amazon S3) to ingest the aerial images each day. “Amazon S3 is highly scalable and reliable, which makes it the best solution for us. We use it to store aerial images as raw data,” says Smith.

TerrAvion also uses Amazon S3 Glacier for long-term image-data storage and AWS Lambda to automatically identify when image data has been uploaded to the processing application. The company partners with several analytics technology companies to integrate image analysis and machine learning for farmers, who can turn that analysis into business insights about crop yields. “Being on AWS is important to us, because almost all of our partners are on AWS, which allows us to serve them terabytes of data from our Amazon S3 buckets as though our infrastructure was theirs, for free,” Smith says.

Helps farmers avoid hundreds of thousands of dollars in unintended costs.

About TerrAvion
TerrAvion provides aerial images to farmers throughout the United States and Brazil. The company's core service—OverView—delivers subscription imagery overnight at each key agronomic event in the growing season. These farmers use imagery to make decisions that lead to more sustainable and profitable agriculture.

Benefits
• Supports high-resolution imagery that detects the health of a single plant
• Helps agricultural customers improve crop yields
• Helps farmers avoid hundreds of thousands of dollars in maintenance costs
• Gives small team of engineers more time to focus on building innovative applications
• Enables partners to build analytical and computer-vision applications on TerrAvion data

AWS Services Used
• Amazon Elastic Compute Cloud (Amazon EC2)
• Amazon S3 Glacier
• Amazon Simple Storage Service (Amazon S3)
• AWS Lambda
Helping Farmers Get Better Crop Yields
Relying on the AWS Cloud, TerrAvion can ingest, store, and process high-resolution aerial images. During the growing season, the company delivers the images to customers the next day through an online subscription service. “By taking advantage of the scalability of AWS compute and storage, we upload about three times as much data from the US corn belt as a satellite service does of the whole world, and we still get this data to farmers’ inboxes the next morning,” says Smith. “They can sit at their desk and see what’s actually going on with their field before even going out to the farm that day. As a result, they’re getting a real-time view of their crops, so they can make fast decisions on optimizing irrigation, improving overall yield, and even becoming efficient enough to not have to work on the weekend.”

Saving Customers Hundreds of Thousands of Dollars
Using AWS to support its thermal-imagery capabilities, TerrAvion can detect equipment issues before they cause serious problems for farmers. For example, emitters on irrigation systems often fail. “Using thermal imagery, we can detect emitter failures much earlier than satellite images can,” says Smith. “For a farmer, that could mean avoiding an impact of hundreds of thousands of dollars to their business.”

TerrAvion is also using thermal imagery to help vineyard owners more accurately determine the stress level of a grape vine. “Using our technology, which shows the difference between infrared and normal light, vineyard owners can see the health of their vines,” says Smith. “They can then better control and automate their irrigation systems, which can ultimately improve their end product.”

Creating New Applications
TerrAvion can focus more on developing new features, even with a small development team, because AWS handles the infrastructure of the company’s aerial-imagery application. “We have no one on our team focused on data hardware, but we don’t have to worry about that because AWS takes care of our storage and data-processing infrastructure,” Smith says. “I’ve looked into what it would take to move our data into our own storage systems, and it never comes close to what we can do on Amazon S3 and Amazon S3 Glacier in terms of functionality and cost. We plan to create more innovative features for our customers, and we can do that more easily and confidently because of AWS.”

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To learn more, visit aws.amazon.com/products/storage.