

## Using software to capture and analyze drone images

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The images you get from drones can be greatly useful in agricultural production systems. A simple image can help identify issues in the field while systematically collecting hundreds or thousands of images and stitching them together to create a map of the farm can also be done using specific software. These maps can provide additional information such as plant health, plant populations, weed/disease presence, and field elevation maps. These software are user-friendly but do require a paid subscription. In some cases, a software subscription may come with a purchased sensor or drone. This factsheet will identify some software examples (DroneDeploy, FieldAgent, PrecisionAnalytics, Pix4DFields), their costs and how they can be used with the stock camera that comes with a drone.

Additional information related to this topic can be found in a video at:

[https://www.youtube.com/watch?v=EbYPsq\\_BcvI](https://www.youtube.com/watch?v=EbYPsq_BcvI)

### Capturing images for analysis

There are a number of types of software available that allow you to set up a flight plan and capture images for free. DroneDeploy, FieldAgent and Pix4DFields can all do this, however, PrecisionAnalytics cannot. Also, you can capture images in one software and use a different software to analyze the images. When images are collected, they need to have 75% overlap between images so that software can put them together by identifying similar features in each image. The software you use to set up the flight plan can automatically calculate the number of images to be collected and the route to fly based on the area you plan to capture and the height you will be flying (Fig. 1). Once you have created a flight plan, you can “hit go” and the drone will fly the route on its own and capture the images needed.

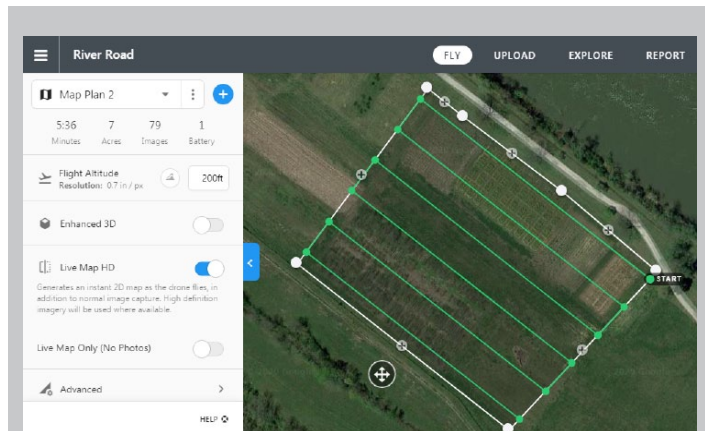


Fig. 1. Creating a flight plan in DroneDeploy. Green lines inside outer box indicate flight path based on the area highlighted.

### Analyzing images

Depending on the number of images, image resolution and your internet speed, uploading images to your software and having the software analyze them may take some time. For example, a recent upload and analysis in DroneDeploy of a 120 acre area with 460 images took about 4 hours. Some software applications (like LiveMap in DroneDeploy), however, can create a live map in the field and, therefore, do not require an internet connection. An example of the output from the 120 acre area mentioned above can be found in Fig. 2.

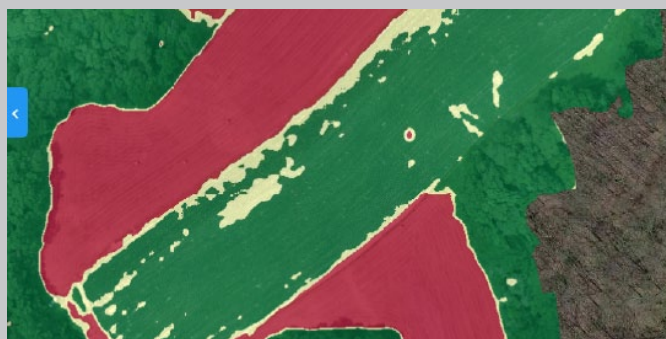


Fig. 2. Plant health map created in DroneDeploy for a tobacco field (green/yellow area). The red areas are a recently cut hay field so little plant material is observed. The green areas are considered to have the best plant health, yellow is in between.

As you can see this can be helpful in identifying trouble areas in the field that may need further attention or analysis.

Many software applications can also divide the field into different zones based on the analysis (Fig. 3).

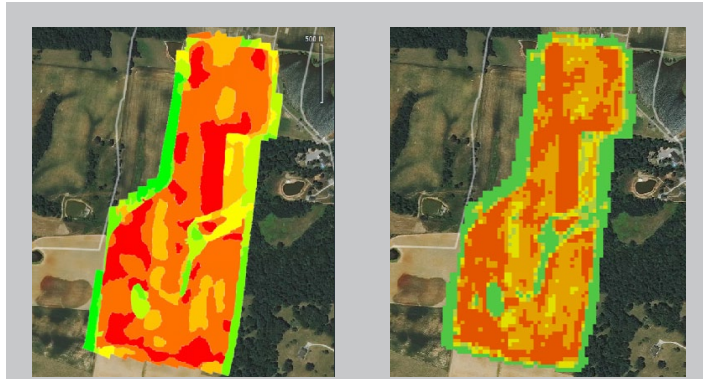


Fig. 3. Example of creating different zones across the field in Pix4DFields (left) and PrecisionAnalytics (right) software.

These zones can be used to better compare areas of the field that was mapped. If, after further scouting, these zones are confirmed and the issue is found to be related to nutrients or some type of pest, application of fertilizer or pesticides can be done using prescription tables that are associated with the zones (Fig. 4).

PRESCRIPTION			
Average Value	area [ac]	rate [units/ac]	amount [units]
-0.07	15.2	0.0	0.0
-0.01	31.4	0.0	0.0
0.06	10.5	0.0	0.0
0.18	3.3	0.0	0.0
0.31	5.5	0.0	0.0
0.42	4.0	0.0	0.0
0.61	3.8	0.0	0.0
<b>Total</b>	<b>73.7</b>		<b>0.0</b>

PRESCRIPTION			
Grid size - 10 x 10 meters			
8.52 HA	0	kg/ha	
10.09 HA	0	kg/ha	
2.76 HA	0	kg/ha	
1.30 HA	0	kg/ha	
5.73 HA	0	kg/ha	
TOTAL: 0.0		kg	
AVERAGE: 0.0		kg/ha	

Fig. 4. Prescription tables associated with zone maps in Pix4DFields (left) and PrecisionAnalytics (right) software applications.

These files can then be uploaded into any applicator equipment that uses GPS and has a controller to apply variable rates based on what you define within the prescription table.

## Software comparison

The four software examples (DroneDeploy, FieldAgent, Pix4DFields, PrecisionAnalytics) can be compared by cost, features and storage capabilities. These are valid as of May 2020 but are subject to change. Omission of similar products is not intentional and inclusion of these products is not an endorsement.

### DroneDeploy

**Cost:** \$149/month or \$1200/year

**Features:** Stitched (orthomosaic) map, plant health and elevation analysis are free, plant population and weed analyses are free up to 1000 acres

**Storage:** Unlimited

### FieldAgent

**Cost:** \$50/month or \$500/year

**Features:** Stitched (orthomosaic) map is \$30-\$50/map and elevation map is \$40-\$60/map depending upon size. Plant population and weed analysis are \$0.25/acre and plant health is free.

**Storage:** 200 GB, more space for \$15/month

### Pix4DFields

**Cost:** \$250/month or \$2000/year

**Features:** Stitched (orthomosaic) map, plant health and elevation analysis are free, no plant population or weed analysis available

**Storage:** Based on your computer storage capabilities

### PrecisionAnalytics

**Cost:** \$850/year or \$2750/year

**Features:** Stitched (orthomosaic) map, plant health and elevation analysis are free, plant population analysis is 5/year or 10/month (depending upon plan chosen from above), no weed analysis available

**Storage:** 300 GB or unlimited depending upon plan

Each software application has a free trial that can help you identify which one is right for you.

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This factsheet was funded through a USDA-NIFA Capacity Building Grant (#2018-38821-27763)

