



Field checks with UAVs



There are benefits to flying Unmanned Aerial Vehicles (UAVs), also known as drones, over crop fields when combined with traditional field checking techniques. UAV flights provide a flexible option for collecting data from fields. In a short amount of time it is possible to have your UAV in the air collecting images quickly. They are much more flexible to use than waiting on satellite imagery from different services which can sometimes take days.

Benefits

- **Quick collection of high-resolution imagery.**
With most common UAVs used for field checking today, it is possible to fly and collect images from a 60-80 acre field in 30 minutes or less. This helps to identify problem areas in the field quickly.
- **Identify problem areas.**
There are software options that have made it possible to view your imagery at the field edge within 5-10 minutes of the flight. It is then possible to go to scout areas that are showing issues or problems.
- **UAVs can help to eliminate wasted efforts.**
Compare the traditional field checking pattern of z or w across a field. This is a good method to randomly field check and get a broad idea of what is happening in the field. However, field checking this way becomes more difficult once crops are further in their growth stages. With UAV imagery, you will be able to see potential issues in the field that might not be as easily viewable from the ground. While UAVs will not eliminate the need for ground truthing they can help to highlight areas of issue that might otherwise be missed.
- **Understanding your field.**
Once imagery is collected it is possible to use it in other precision agriculture applications. It can then be compared to yield data, as-applied maps, or soil maps to further dive into what is happening in your field.

Considerations

Camera

When considering your UAV purchase one of the most important questions to ask yourself is what camera will you need? This has a large impact on the overall cost of the UAV. Most UAVs will come equipped with a standard camera that has an RGB lens. RGB stands for red, green, and blue bands of light that it collects.

Higher end UAV models can come equipped with NIR or near infrared light band collection. For mapping NDVI indexes this type of camera is necessary. There are also multispectral cameras available for UAVs that combine RGB, NIR, rededge, and thermal. These are very expensive options for more advanced UAV users.



UAVs can be used to perform field checks many times throughout the year. The imagery they produce is not just beneficial during the growing season.



Considerations (cont.)

Flight Conditions

There are many variables to consider before flying your UAV across the field, including:

- Time of day
- Weather conditions
- Crop type
- Growth stage of crop

The ideal time to fly is mid to late morning when skies are still clear and wind speeds are low. It becomes quite risky to fly in wind speeds above 10 mph and it can produce lower quality imagery due to the UAV tilting or shaking. Partly cloudy skies make orthomosaic generation difficult due to the image variability of clouds passing over.

Flight Height

For flight height, fly corn and soybean crops at 250' early in the season when plants are small and up to 400' later in the season once canopy is reached. A very important adjustment to make in UAV deploy is image overlap. To successfully stitch together images for the orthomosaic, each image must overlap the other images next to it. Usually, overlap is around 70% but it is adjustable.

Timing

UAVs can be used to perform field checks many times throughout the year. The imagery they produce is not just beneficial during the growing season.

Early in the spring when the ground is bare, it gives a birds eye view of areas of the field that might have water or erosion issues. It is possible to measure these areas and make plans to correct them.

After emergence, fly over to get an idea of crop stand and early season vigor. This timeframe can also help to show early issues like weed infestations or drowned out spots.

During the middle of the growing season, flights for field checking and plant health are useful to highlight areas with issues.

Late in the season, fly during dry-down to see if certain areas of the field are staying very wet and green or if other areas are drying down very fast.

It is important to compare what you are seeing on the ground versus what you are seeing from the air. UAVs are not a substitute for ground truthing and field checking on foot.

Visit soilhealthpartnership.org to learn more about how field check with UAVs.



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