Insight for Application Efficiency
How One Corn Grower Used Aerial Drone Imagery to Quantify Irrigation Issues Improving Operational Efficiency
Over the past thirty years, Corn and Soybean grower Matt Heidemann has been utilizing progressive farming techniques to reduce costs, manage inputs and optimize yields across his 2,800 acre Nebraska farm. But Matt had a problem. When surveying his field, he discovered a leak in one of the drop nozzles in his pivot irrigation system that was impacting the growth of his corn crops. What he didn’t know was how large the problem was, or what the complete downstream impact was. Fortunately, Matt was already partnering with AeroVironment to explore opportunities to use drone aerial imagery and data analysis to help identify operational inefficiencies.

“I'm a farmer who likes to try out a lot of new stuff. Especially with aerial analytics, there’s no way I could lose yield, so I was willing to give it a try.”

MATT HEIDEMANN
CORN GROWER
 METHODOLOGY
Matt and AeroVironment partnered for the 2017 growing season to collect aerial imagery using several drone platforms in addition to the Quantix™ Hybrid Drone, every 3 weeks from planting to harvest, with all the data processed using the AeroVironment Decision Support System™ (AV DSS). AV DSS was developed to seamlessly process aerial imagery and generate analytics to help growers detect anomalies in their fields that are not always visible from the ground or in the visible color spectrum. One of the key features of AV DSS is to provide historical and comparative analysis to help guide decision making and improve operational efficiency. Quantix, a purpose designed drone solution, was able to collect high quality image data even in the challenging weather conditions of central Nebraska.

 OBSERVATIONS
While the initial observation using the true color (visible) results from early July did not reveal a significant irrigation system impact across his field, Matt knew Quantix and AV DSS gave him more easy to use tools to look deeper. While analyzing the true color (visible) and NDVI values in AV DSS using the swipe tool, Matt uncovered a larger systemic issue with his irrigation. The sprinkler setup was causing an uneven application of water and nitrogen.

The AeroVironment team of data scientists and former farmers were eager to further help Matt quantify the impact of what the aerial data showed and manually scouted the field for Matt, sampling ears of corn throughout the growing season. Based on the sampling, the team estimated a yield reduction of 23 bushels per acre.

However, at harvest the actual yield decrease was 35 bushels per acre. At last year’s commodity prices, this equates to a loss of $122.50 per acre and in total $9,800 for this 80 acre field. While there were many factors impacting Matt’s yield, the AV DSS insight provided a complete view of his field objectively with data necessary to base next year’s planting and equipment decisions.

“\textit{At harvest the true difference was 35 b/a at $3.50 per bushel over 80 acres equals $122.50 reduction per acre or $9800.}”

Corn Sampling Demonstrates Variability
IMPLEMENTING CHANGE
The data insight Matt gained with the results AeroVironment provided gave Matt increased confidence to make the decision to plant soybeans for his next growing season. He is also budgeting to replace the poorly functioning irrigation system before planting corn again. Additionally, the data insight of AeroVironment’s products will allow Matt to make more effective and informed decisions with the zone applications of his variable rate irrigation systems.

GETTING TO RESULTS
Even though Matt regularly walked his fields and used the support of an agronomist, aerial imagery data allowed him to get a more complete and objective picture of anomalies on his operation and create a plan of action to correct them. The comparative analysis swipe tool in AV DSS showed Matt that what you can see with your own eyes is not always a complete and accurate picture of crop health. Overall, the insights gained from using drone-collected aerial imagery and analytics software to not only process images but store them for later reference allowed Matt to refine his farming practices and gain a better understanding of his farming operation. In the future, Matt can use the Historical Trend layer in AV DSS to refer back to images and continue to take action to boost yields while staying ahead of crop anomalies.

“I will run fertilizers through my pivot every year. Wet or dry weather, it comes through the pivot. It’s very important to get it right.”

ABOUT AEROVIRONMENT, INC. (AV)
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