When is a drone not a drone? Performing Meaningful Scientific Work with the AggieAir Unmanned Aerial System

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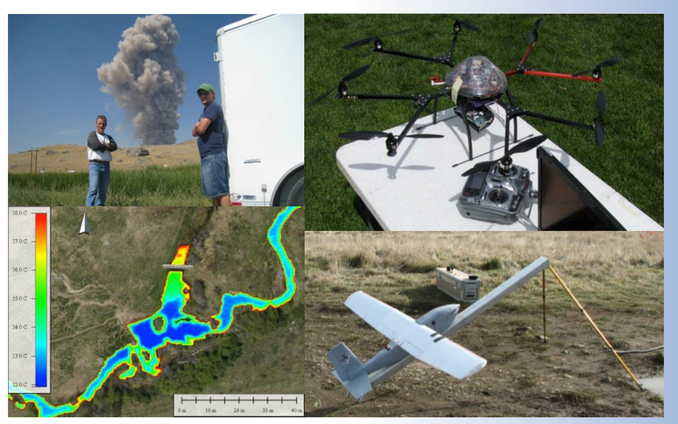
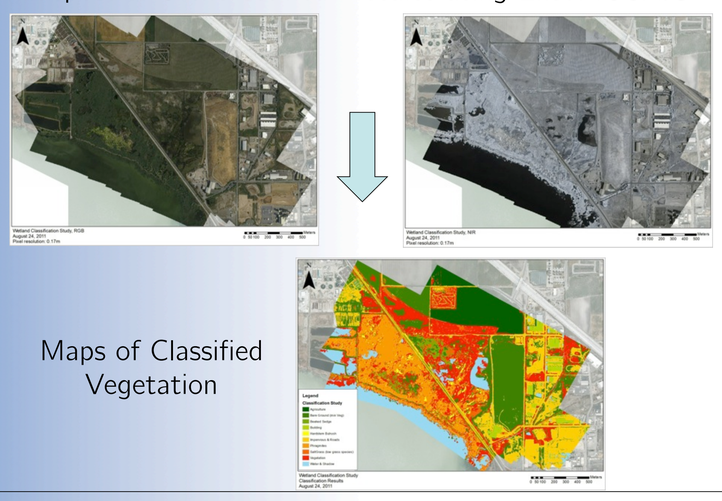
Summary

Current aerial drones are platforms for weapons or surveillance, providing actionable intelligence or targeted strikes. Although similar in many respects, the AggieAir UAS is not a drone. AggieAir is designed to target scientific remote sensing applications, and has been used to provide meaningful scientific data for many ecological applications, including precision agriculture, wetland vegetation mapping, and river monitoring for fish habitat. This poster introduces AggieAir from a scientific perspective and shows how key differences from other UASs allow collection of significant scientific data, used in meaningful ways.



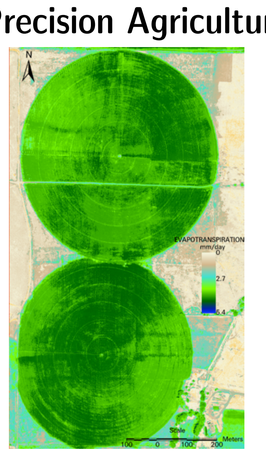
Wetland Monitoring

Multispectral Orthorectified Mosaics using EnsoMOSAIC

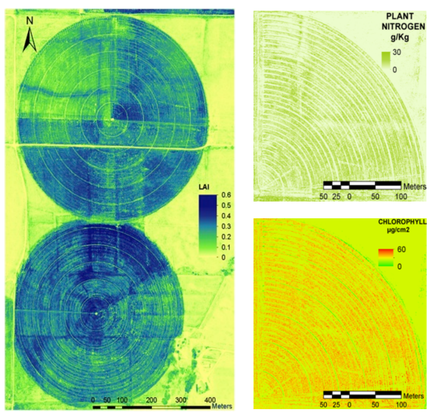


Maps of Classified Vegetation

Precision Agriculture

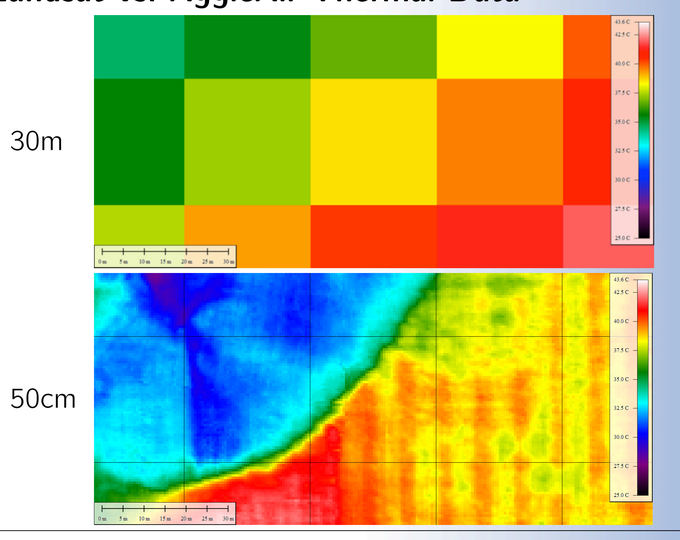


Thermal: Evapotranspiration, Soil Moisture



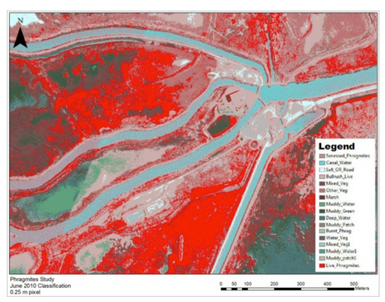
Multispectral Visual+NIR: Leaf Area Index, Plant Nitrogen, Chlorophyll

Landsat vs. AggieAir Thermal Data

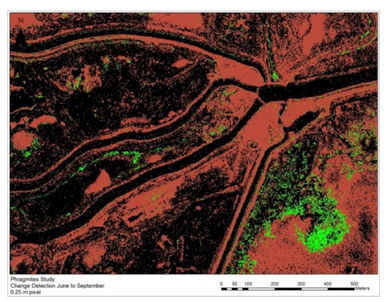


Airborne DNA detection

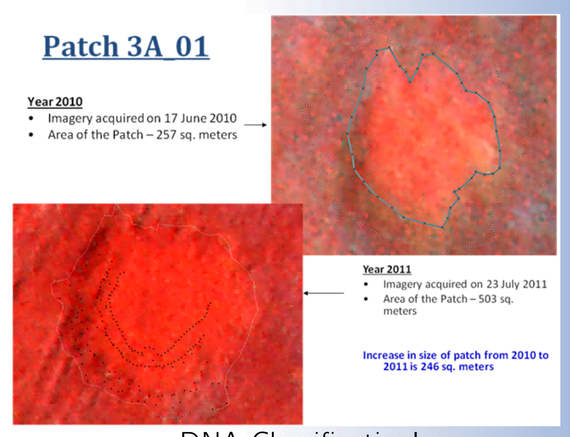
Multispectral Orthorectified Mosaics at different times



Maps of Classified Vegetation for each sampling period



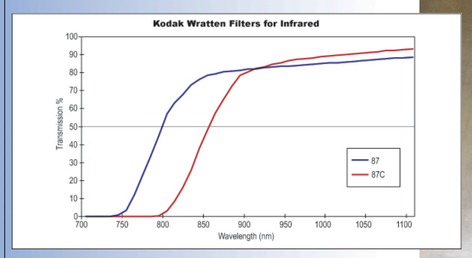
Change Detection of Vegetation Growth

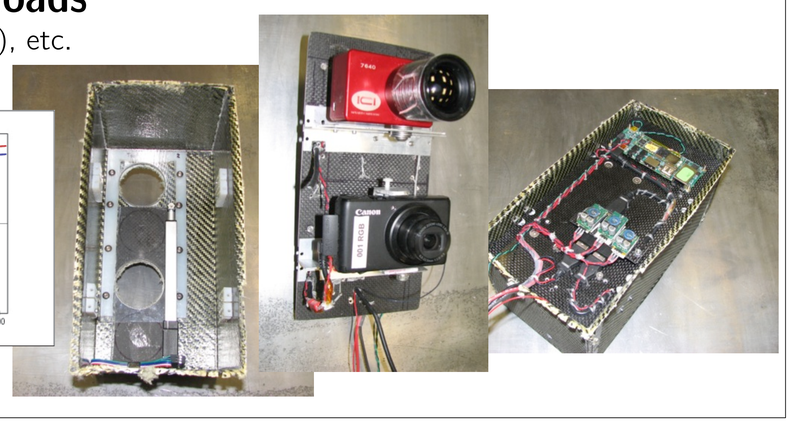


DNA Classification!

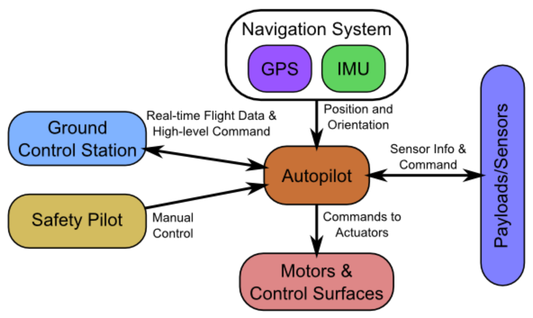
AggieAir Sensor Payloads

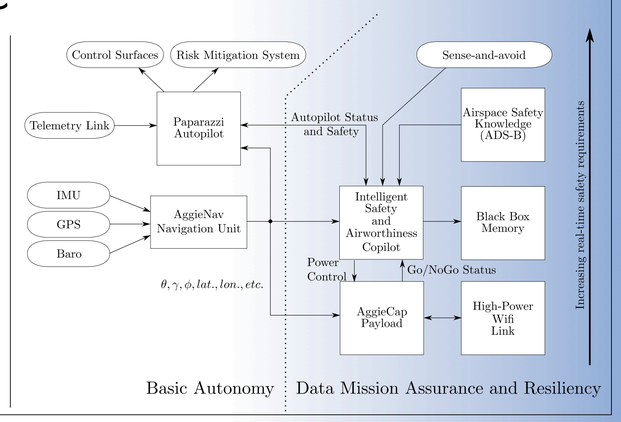
Visible, NIR, Thermal (7-14 um), etc.





AggieAir System Architecture





Minion Platform

Wingspan (feet)	Weight (pounds)	Power Source	Nominal Ground Speed (miles/hour)	Maximum Flight Duration (hours)	Maximum Flight Distance (miles)	Payload Capacity (pounds)
8	12	electric	35	1	35	3

Titan Platform

	Wingspan (feet)	Weight (pounds)	Power Source	Nominal Ground Speed (miles/hour)	Maximum Flight Duration (hours)	Maximum Flight Distance (miles)	Payload Capacity (pounds)
"Enterprise"	11	20-25	electric	40	1.3	50	5
"Titan"	12?	30+?	gas	80+?	12?	1,000?	8+?

Multirotor VTOL Platform

Diameter (feet)	Weight (pounds)	Power Source	Nominal Ground Speed (miles/hour)	Maximum Flight Duration (hours)	Maximum Flight Distance (miles)	Payload Capacity (pounds)
2.5	4	electric	25	>0.5	12	1

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