THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

7th Wernher von Braun Memorial Symposium
October 27 – 29, 2014

1954 2014 American Astronautical Society 60TH Anniversary

OPTIMIZATION OF AN INTEGRATED UAV IMAGING SYSTEM FOR AGRICULTURAL APPLICATIONS

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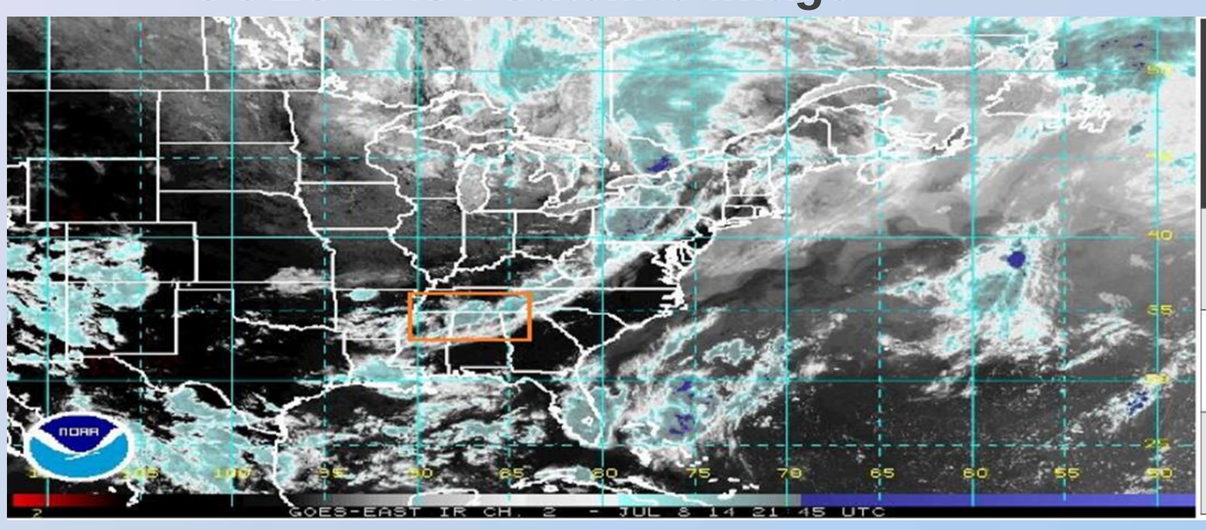
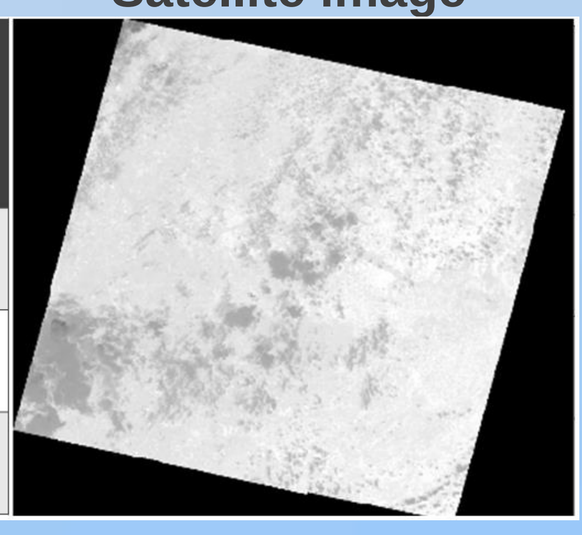
GOES EAST Satellite image



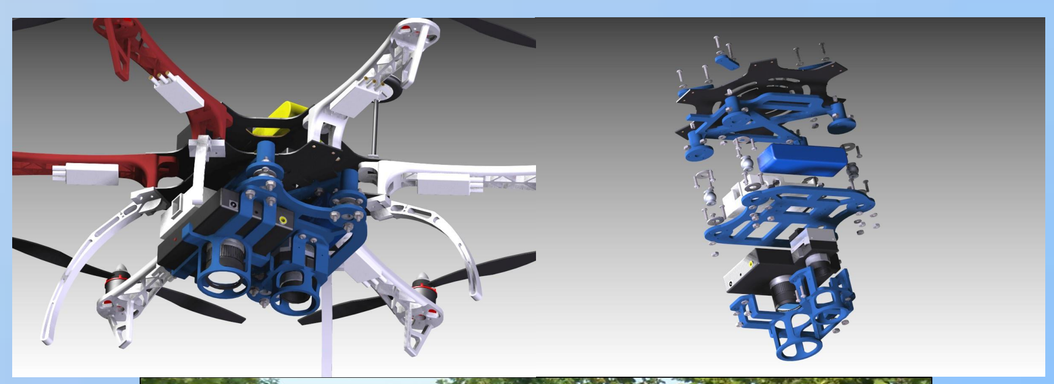
Source	Spatial Resolution
GOES	10 km
LANDSAT	30m/100m
UAV	0.02 – 0.1 m

LANDSAT Huntsville Satellite image



Problem

Ground and satellite-based instruments for measuring soil moisture offer low-to-medium spatial and temporal resolution data that is insufficient for running crop simulation models accurately (Mishra et al., 2013)



Solution

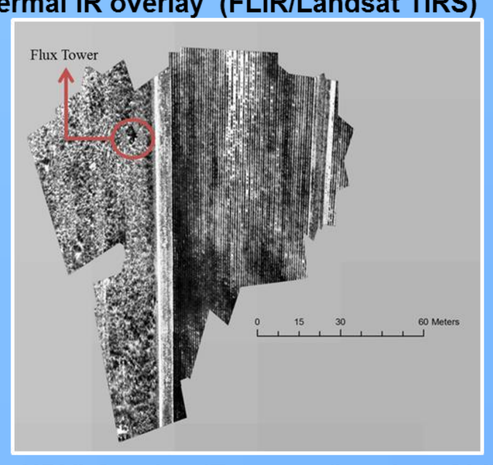
A UAV integrated with an imaging payload can collect data at greater spatial and temporal resolution that can complement the ground and satellite-based instruments, improving the accuracy of crop simulation models.

Procedure

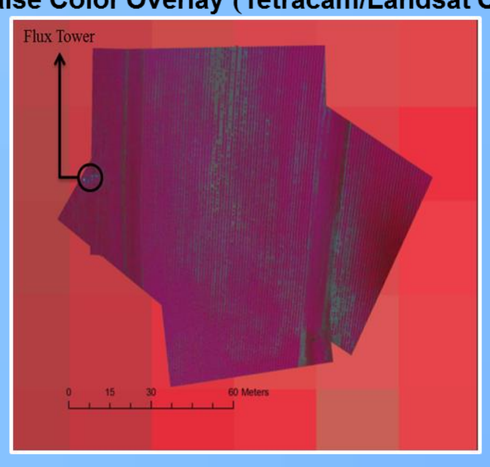
- Infrared and multispectral cameras, GPS sensor, microcomputer and battery were integrated onto the hex rotor UAV through a fixed mount, 3D printed in the MAE department.
- The microcomputer controls the infrared camera to capture geotagged images at user-defined intervals.

Belle Mina Farm

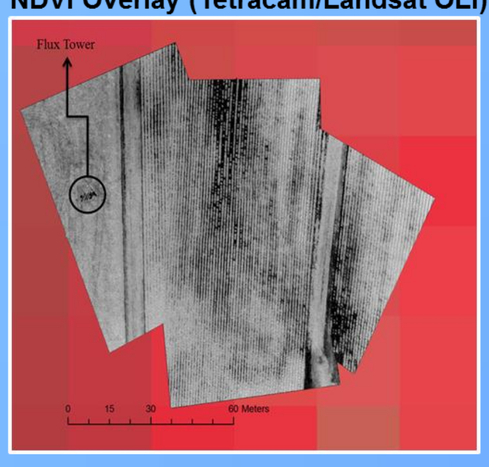
Thermal IR overlay (FLIR/Landsat TIRS)



False Color Overlay (Tetracam/Landsat OLI)



NDVI Overlay (Tetracam/Landsat OLI)



Results

- On July 16th, 2014 the UAV-based imaging system was operated over farms in Belle Mina, AL.
- Infrared and multispectral geotagged images were captured and provided to UAH Atmospheric Science department.
- These images were processed and compared to LANDSAT data taken at approximately the same time.

Acknowledgements

Dr. Brian Landrum (Advisor), Dr. Robert Griffin, Dr. John Mecikalski, Dr. Farbod Fahimi, Nathaniel Stepp, Jeremy Pohly, Casey Calamio, Vikalp Mishra, Hunter Phillips, MAE Department, UAH Vice-president of Research, UAH SMAP.