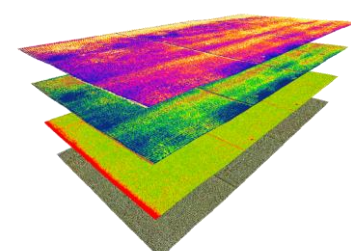# Development of a sUAS Crop Sensing and Computational Suite for Precision Irrigation

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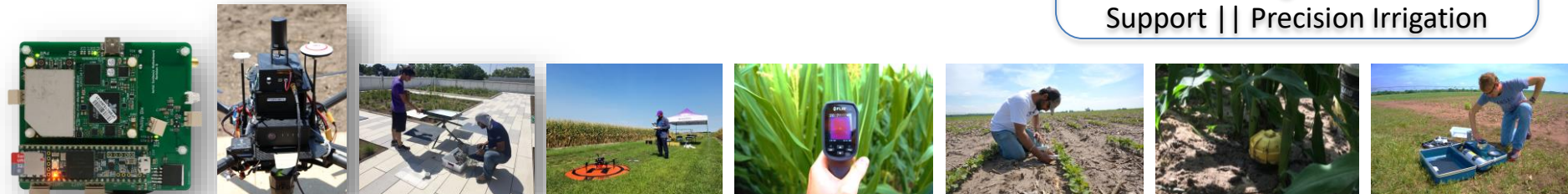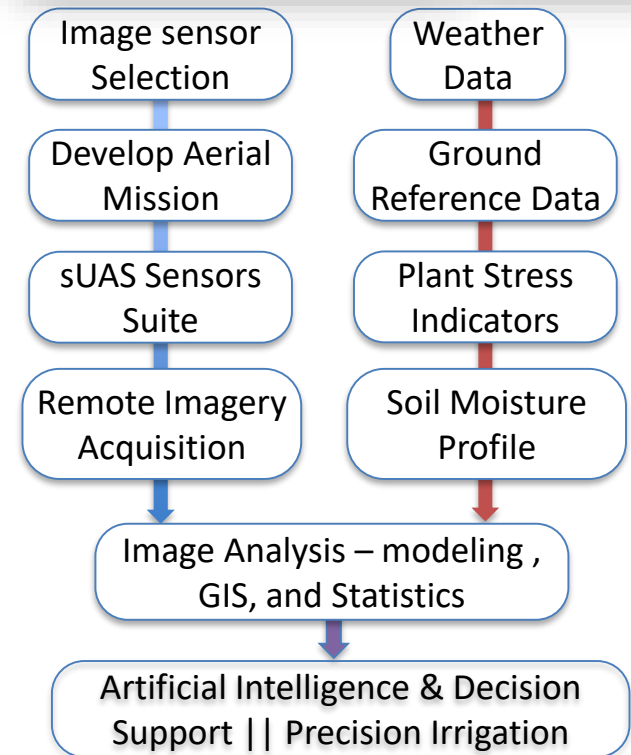- [2]Guanghui Wang, University of Kansas, ghwang@ksu.edu

Description

Robust imaging and ground sensor must accurately provide canopy temperatures to assess soil moisture and implement precision irrigation decision.

Goals of This Project:

- Develop an integrated sensor suite for real-time image orientation, localization and data acquisition.
- Develop spatial canopy temperature and crop water stress index maps and compare with plant stress indicators captured using ground-based measurements
- Develop and evaluate protocols for safe and effective use of sUAS at low altitudes

Image sensor Selection → Develop Aerial Mission → sUAS Sensors Suite → Remote Imagery Acquisition

Weather Data → Ground Reference Data → Plant Stress Indicators → Soil Moisture Profile

Image Analysis – modeling , GIS, and Statistics

Artificial Intelligence & Decision Support || Precision Irrigation

Findings

- Designed and implemented sUAS sensor suite for low altitude high quality field scale image acquisition
- Comparable geometric accuracy can be achieved using developed sensor package to accurately conduct image analysis
- A 13 mm thermal sensor at 50 m altitude can provide canopy temperature within ± 1°C
- Strong correlation between canopy temperature and available soil moisture

Industry Partner: **TOPCON** Precision Agriculture