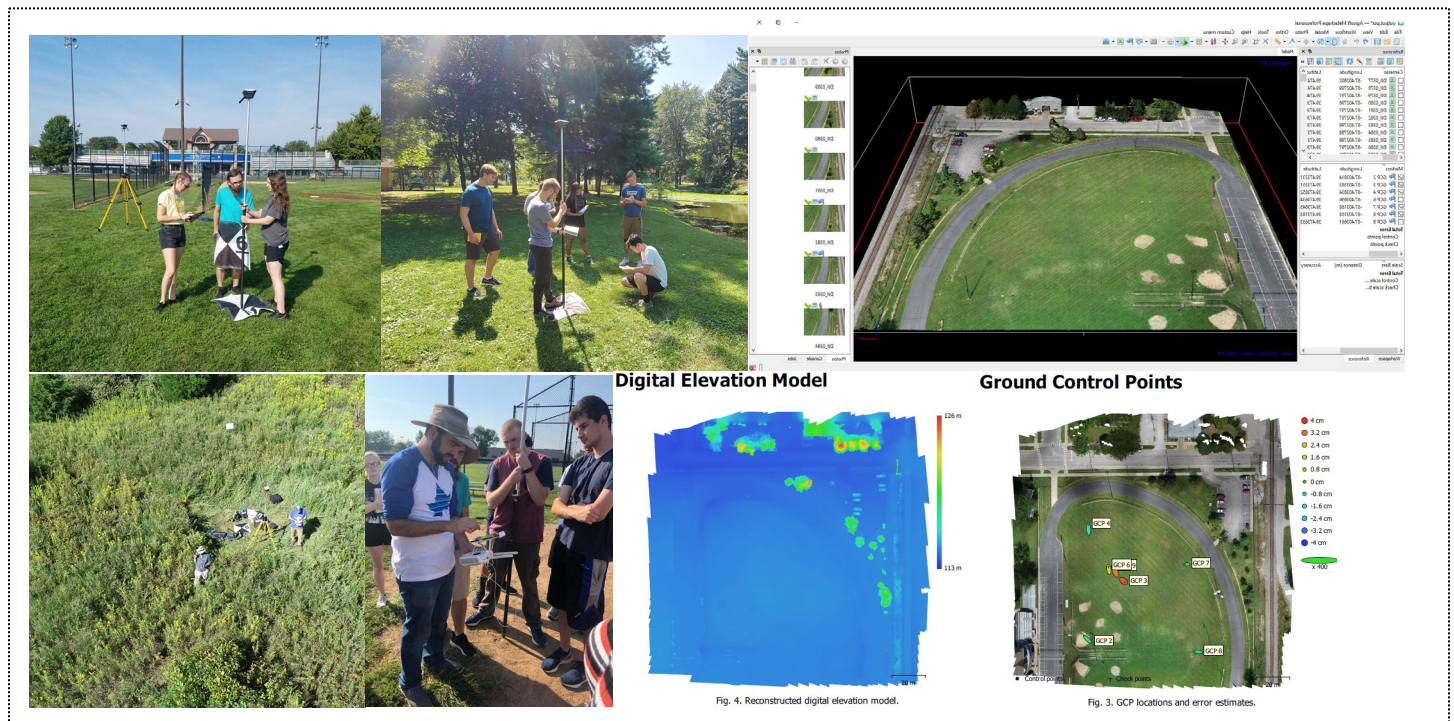# Capturing UAV(drone) imagery, collecting GPS data, and exploring augmented reality using multipurpose tablet devices

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Fig. 4. Reconstructed digital elevation model.

Fig. 3. GCP locations and error estimates.

Introduction: In the last decade, increasing accessibility to unmanned aerial vehicles (UAVs, a.k.a. drones) has sparked a boom in local and custom imagery data. Geospatial consultants and researchers can easily collect and produce datasets such as orthophotos and digital elevation models (DEMs). Today, there is a demand for up-and-coming geospatial scientists to understand how to map and create imagery datasets using UAV, and this demand will only increase in the coming years. In response to this demand, the department of Earth and Environmental Systems (EES) at Indiana State University (ISU) recently developed curriculum and taught a course on remote sensing and mapping techniques using UAVs and method called structure from motion (SfM) photogrammetry. Additionally, we are experimenting with advanced visualization techniques such as augmented reality (AR) in order to explore, share, and use digital models of terrain and other three-dimensional GIS data.

Objective: The primary goal of the project is to promote education and training in UAV mapping/remote sensing and augmented reality (AR) visualization techniques at ISU, the state of Indiana, and beyond.

What we did: With support from the IndianaView grant, we were able to purchase two Apple iPad mini tablets. These

tablets have served as an integral part in our equipment for UAV mapping and remote sensing. In addition, they facilitate AR visualization of 3D data. These tablets have already proven useful in the classroom and in the field, and we have already begun to generate helpful educational resources.

Preliminary Outcomes:

- We have collected diverse UAV mapping and remote sensing datasets that can be used for training/education and visualization.

- While using this equipment for hands-on experiences in ISU classes, we have begun to create a short series of tutorial videos about UAV mapping/remote sensing and appropriate georeferencing. These are currently under production.

For the future: We plan to make these resources and videos available online by mid-2019-2020 academic year to share with the wider Indiana and global community.