IFAS Extension **UNIVERSITY** of FLORIDA



The application of drone technology or a small unmanned aerial system (sUAS) has shown great potential in agricultural industry, especially in crop management for plant stress detection and distribution. However, most growers are concerned about the costs and benefits, the manipulation, government regulations, and advantages of its application. To help local growers understand better about such technology, the affordable cost, and the advantages of its application, data processing and governmental policies, onsite demonstrations associated with a workshop were carried out to showcase the application of the cutting-edge technology.





DJI phantom 4 Pro drone

sensor

OBJECTIVES

- Understand the fundamentals about the drone system
- Device selections and affordable costs
- Basic policies and requirements from Federal government and UF
- Operation and manipulation skills
- Autonomous flight setup parameter selection
- ✤ Data collection, processing, interpretation, understanding, and application
- The advantages of its implementation





Flight setup with selected parameters

White dots stand for pictures taken

DEMONSTRATION OF DRONE TECHNOLOGY TO IMPROVE VEGETABLE CROP MANAGEMENT

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Double 4k multispectral

ACTIVITIES

- * On-site demonstrations of the drone at two field day events and a workshop with
- Pre- and post tests
- Site and crop selection
- Setup for autonomous flight
- Flight parameter selections
- Operation and manipulation
- ✤ Government policies and guidelines (e.g., registration, certificate, authorization, and maximum height)
- Hardware and software for visible and invisible image collections
- Data processing and understanding
- Potential and usefulness of the data in crop management







The drone launched

EXAMPLE OF APPLICATION

OKRA FIELD

- Generating "Management Zones" with software–Sentera FieldAgent, green: healthy, yellow: unhealthy, and red: missing plants or bared ground
- Okra dead spot detection



Zoomed in a dead spot



Management zones of okra

RESULTS

- ✤ A total of 58 participants attended the events and 45 (78%) completed the pre- and post-tests.
- ◆ 91% (n=41) had knowledge gain with an increase of 35% in understanding the application of drone technology;
- ✤ 82% (n=37) believed that the application of drone technology would save their time and improve the crop management with an increase of 42%;
- ✤ 71% (n=32) would change their practice by implementing the drone technology with an increase of 30% from the post- vs. prepest;
- ✤ 100% (n=45) believed that the various Management Zones derived from NDVI (Normalized Difference Vegetation Index) based on crop health could provide timely information for their crop management to reduce the yield loss.



Field day display

Event evaluation

IMPACTS

- The program has provided a platform for local growers in implementing the drone technology.
- The drone system with an appropriate sensor can generate a number of images, which are helpful in detecting various crop stresses, such as missing plants, nutrient deficiency, and diseases.
- The application of drone technology can provide real-time data for farm planning and practice changes on time to reduce the yield loss.
- The implementation of the technology can significantly save time and labor-costs in crop monitoring and scouting, which can promote the crop best management for sustainable agriculture.

CONTACTS

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