Drones

City of Palm Coast

Drone Team

Explosive Growth of Drones

- Total number of drones now registered with the FAA has surpassed one million
- As of January 10, 2018:
  - 878,000 hobbyist registrations
  - 122,000 commercial registrations
  - Source: https://www.transportation.gov/briefing-room/faa-drone-registry-tops-one-million
- The Drone Team was formed to explore the application of this burgeoning technology in order to help our operations become more efficient and to reduce costs

Why should the City of Palm Coast utilize drones?

- High resolution (cm vs m)
  - Meets detail requirements for our projects
- Up to date (near real time vs more than a year old)
- Less expensive than airplane or helicopter captured imagery
- Only need 1 to 2 people to operate
- Enhances the City of Palm Coast's "Smart City" initiatives


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The ESRI Flagler County basemap imagery is acceptable for some purposes…

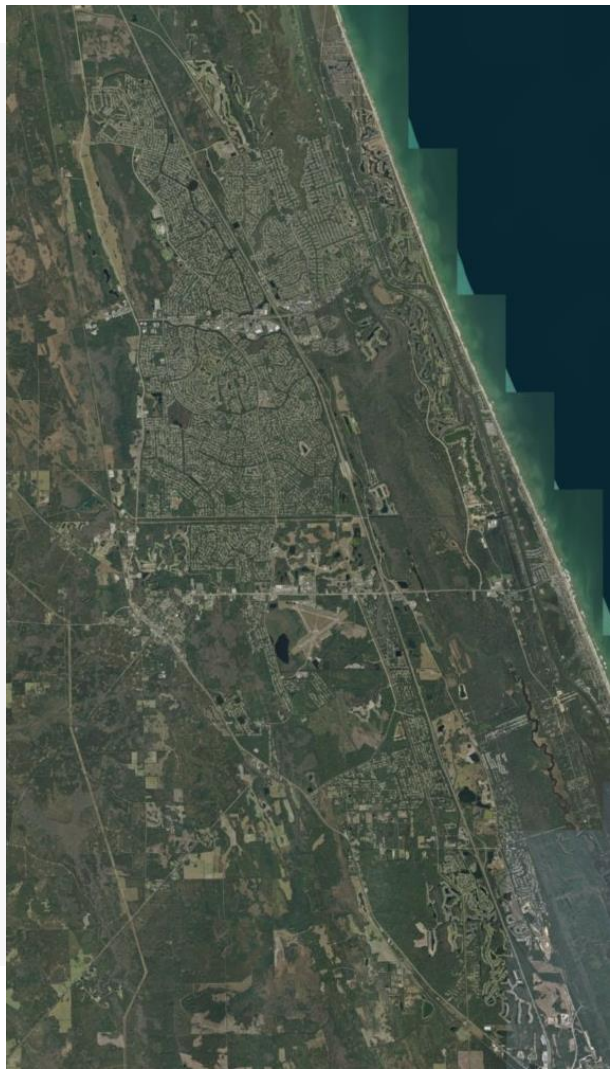
State of Florida (FlaglerCounty2017) imagery taken 1 year 6 months ago, on **Mon, Jan 23, 2017.**

Resolution: Ground resolution of the source data is 0.15 meters.

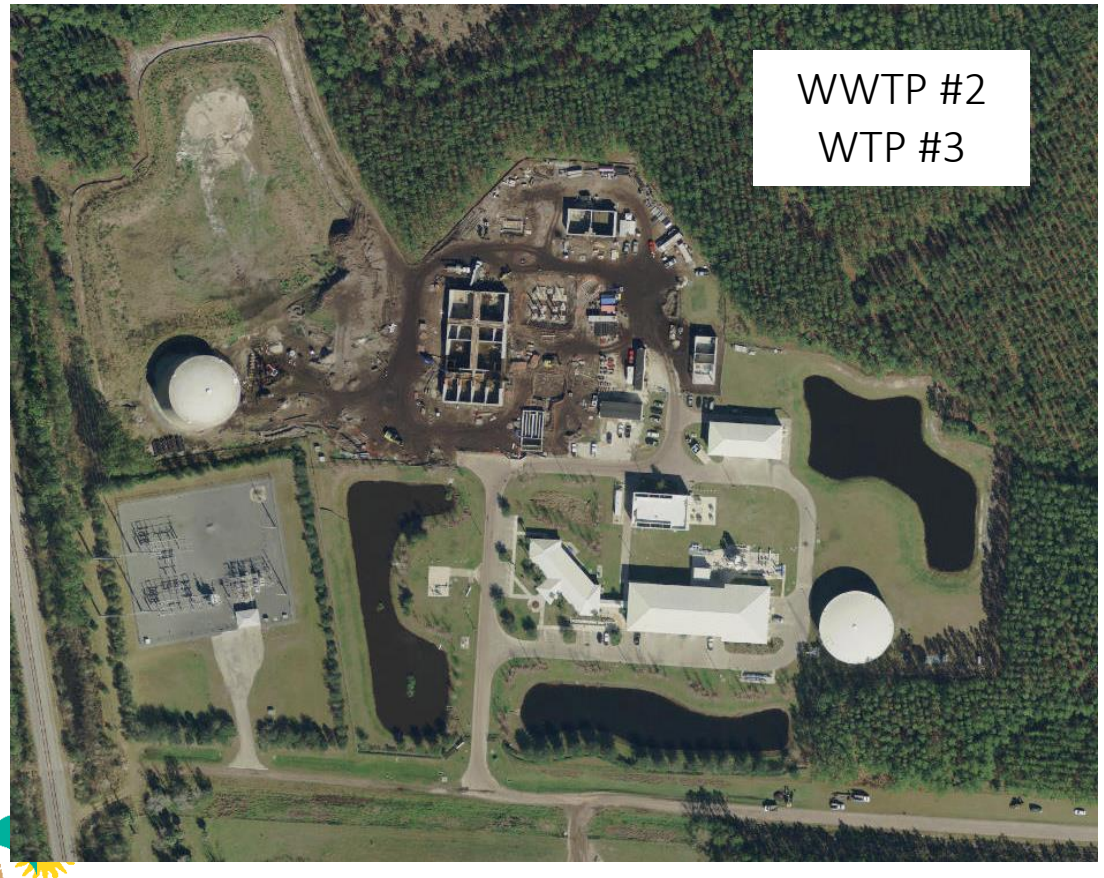
Accuracy: Objects in map are within 0.3 meters of true location.

Contribute to Community Maps

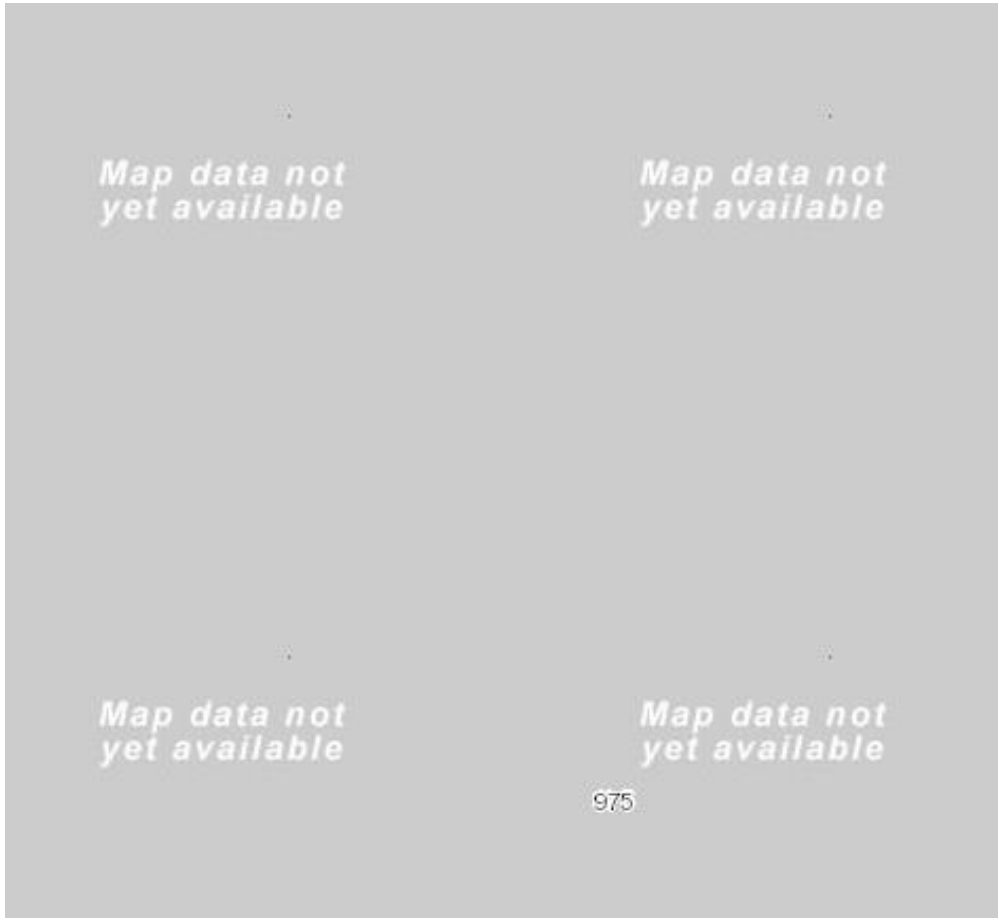
Zoom to Get Directions



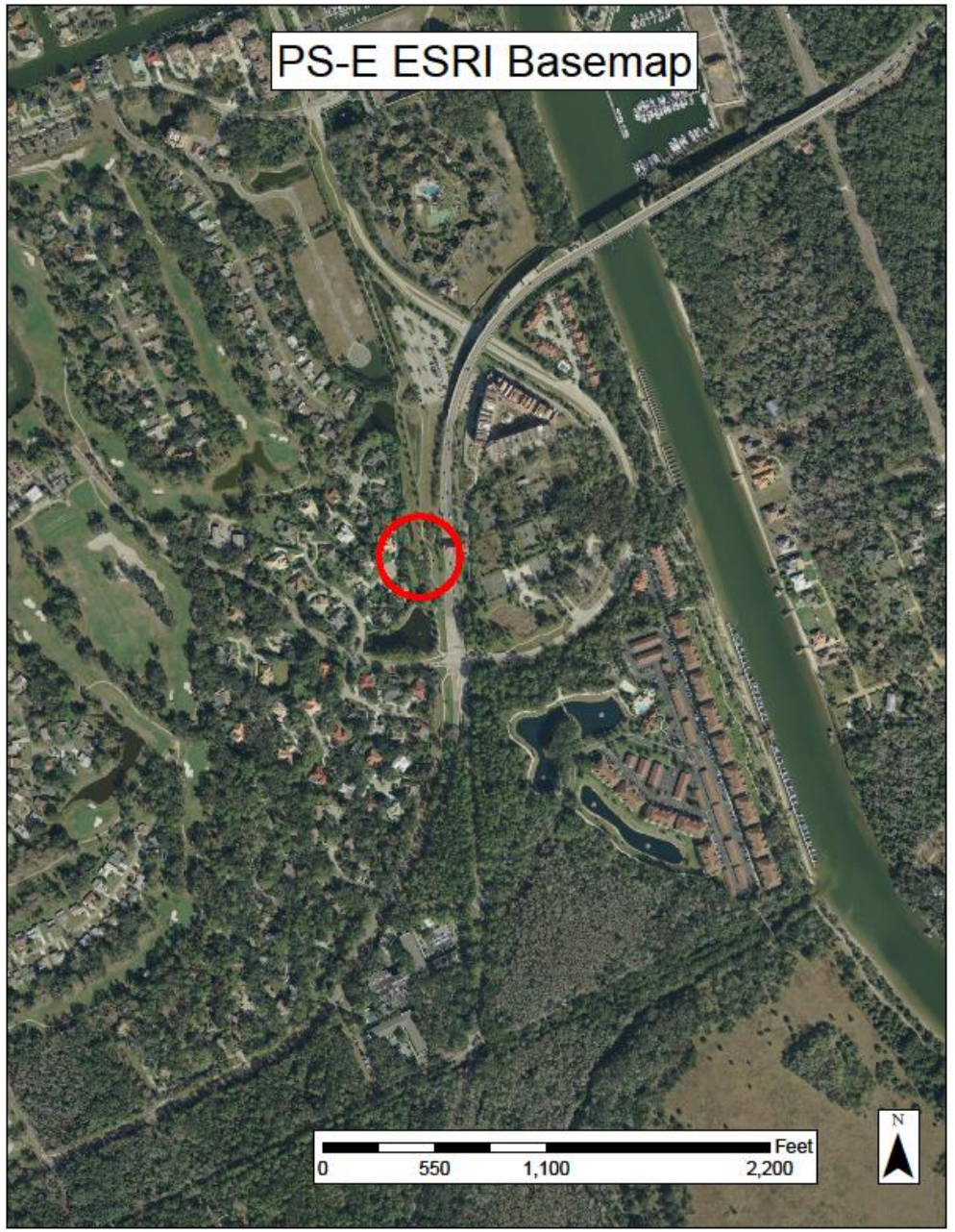
…But it does not meet the detail requirements for many of our projects



Even 0.15 meter resolution is blurry or not available at the project level



Example:



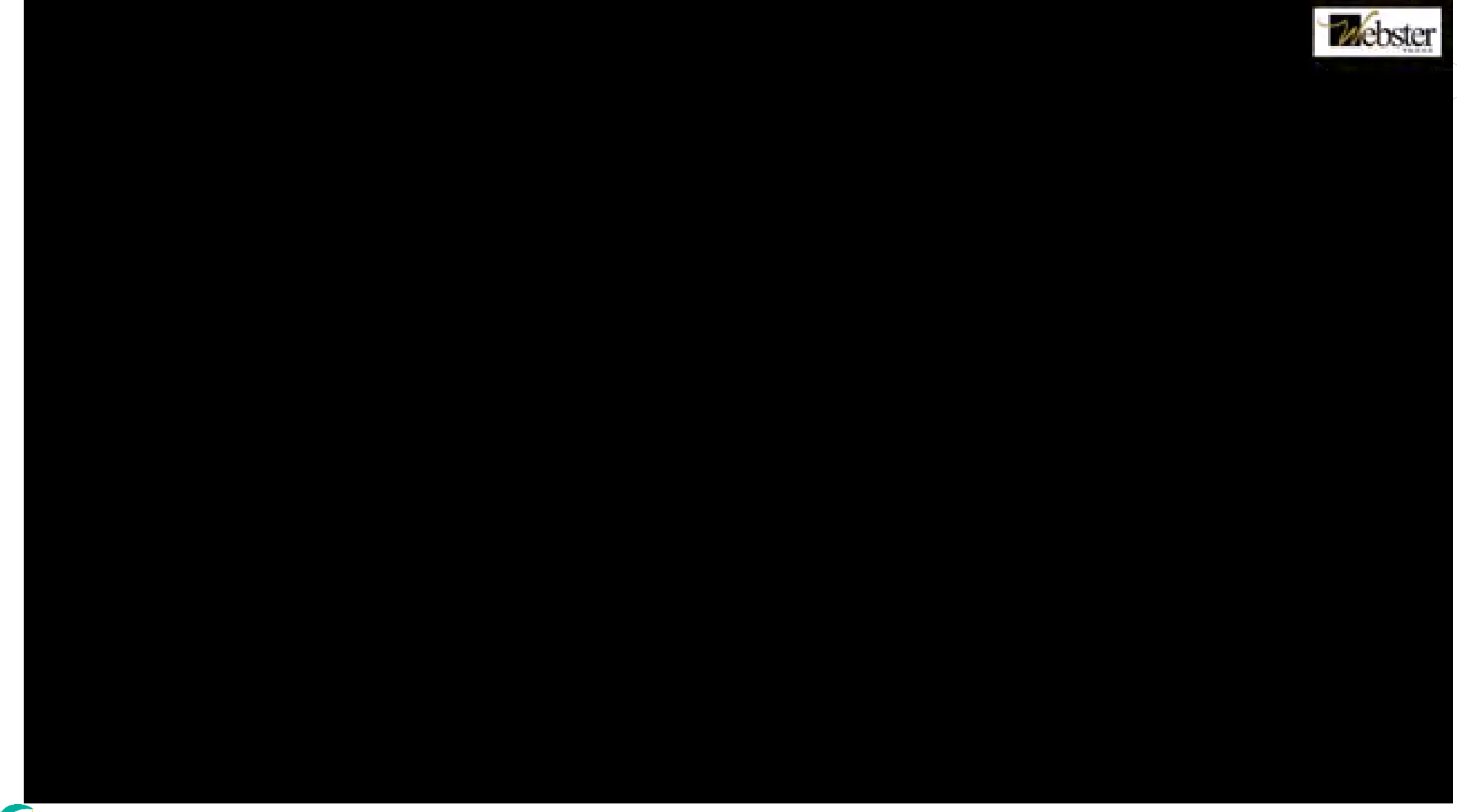

PS-E ESRI Basemap
Feet
0
10
20
40
N


PS-E Georeferenced Drone Image
Feet
0
10
20
40
N

What departments/divisions have a need for drones?

- Information Technology
- Planning
- Communications and Marketing
- Utility
- Construction Management and Engineering
- Building
- Fire Department

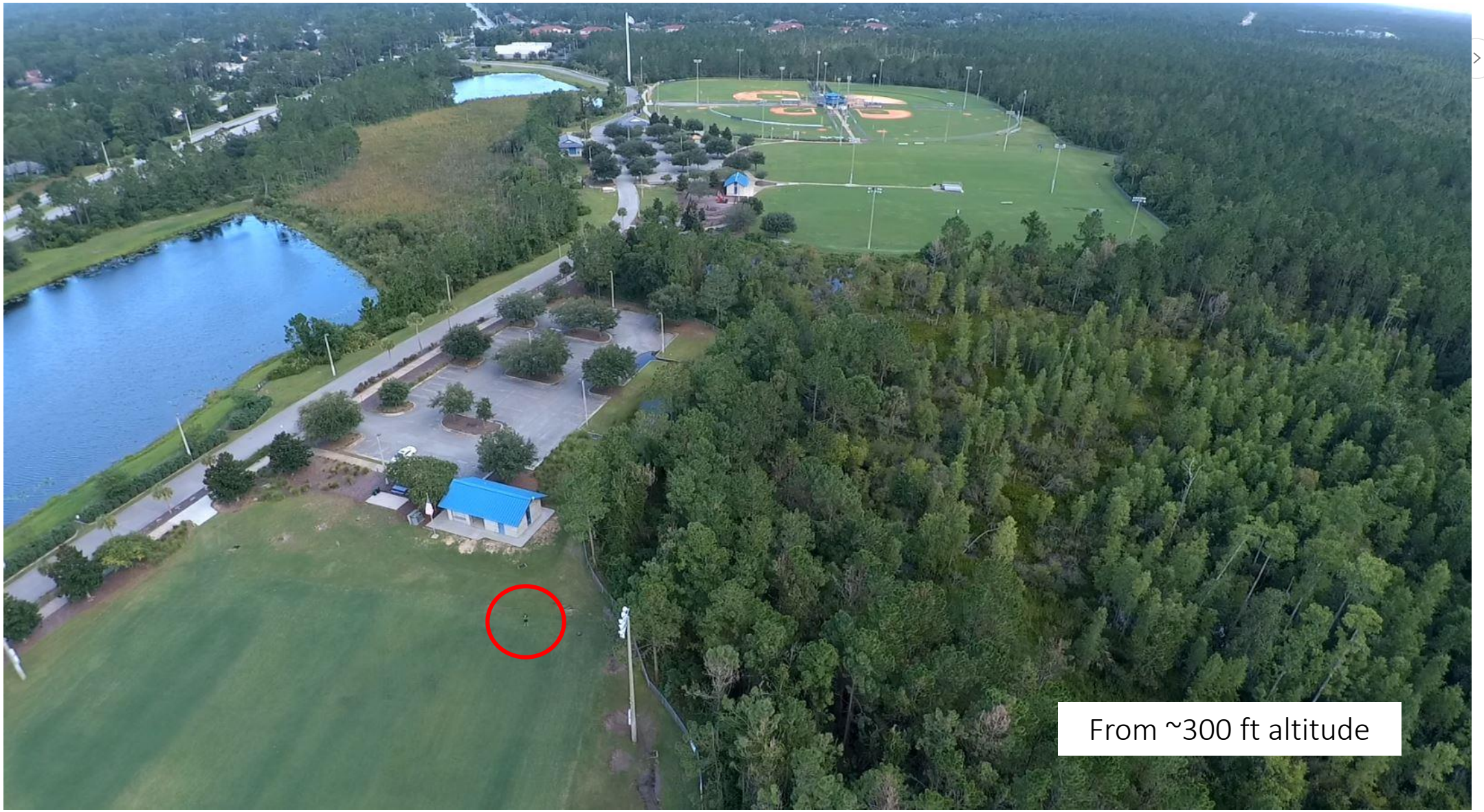
Drone Project Ideas



Drones and Society

Public Education Campaign

- Limited Uses
  - Public Safety
  - City Infrastructure
  - Not private property
- City drone pilots will be licensed, insured, and well trained


From ~300 ft altitude


From ~100 ft altitude
Nadir view

Code of Conduct

- Addresses public concerns
- Assists the City in complying with all laws and regulations
- The Drone Team developed the Code of Conduct to satisfy these requirements
- The Code of Conduct has been reviewed by our Legal Department

City of Palm Coast – Drone Program Code of Conduct

DRAFT – Under
Final Legal Review

Code of Conduct Outline

- Mission Statement
- Terminology
- UAV Operation Rules and Regulations – Federal Level
- Pilot Training and Qualifications
- Approved List of City Employees that Can Fly Drones
- Operational Use

Our Partners

- St. John's River Water Management District (SJRWMD)
  - They recently set up their own drone program (within the last 6 months)
  - We have sought their advice on various aspects of creating and operating a drone program:
    - How to set up our own program
    - What equipment to obtain
    - How to run such a program as a government entity
  - Interested in partnering with us
    - Share drone data back and forth
    - Community outreach and STEM education
    - Our school district currently has their own drone program

Our Partners

- Flagler Executive Airport
  - The airport has no legal issues with the City flying drones
  - We just need to follow Part 107 FAA rules and regulations and notify them before we fly
  - Interested in possible collaboration with the City in a GIS/IT capacity
    - Inform citizens of what airspace can be flown in
    - Assist in making their airspace safer

Next Steps…

- City Council support for drone program
- Finalize Code of Conduct
- Obtain licenses, equipment, and liability insurance
  - Using Smart City IT funds
- Initial cost of program approximately $8000
- Annual cost of program approximately $4500

THANK YOU

Questions?

City of Palm Coast – Drone Program Code of Conduct

Mission Statement

The City of Palm Coast Drone Program will safely and responsibly make our operations more efficient and will bring value and cost savings to all of our various stakeholders by providing on demand, high quality aerial photography and videography.

Terminology

- UAS – Unmanned aircraft system. For the purposes of this document, "UAS" is equivalent and interchangeable with the term "drone".
- Drone Pilot – For the City's purposes, a drone pilot is an employee that has an up to date, FAA Part 107 license and is on the City's approved list of employee drone fliers.
- Part 107 – This is the 14 CFR Part 107 Small Unmanned Aircraft Systems Rule, as established by the FAA (Federal Aviation Administration). The Part 107 rules and regulations allow pilots who have a current Part 107 license to legally fly small unmanned aircraft systems for commercial use (this includes local government operations).
- FAA – Federal Aviation Administration

UAS Operation Rules and Regulations – Federal Level

Our Part 107 licensed pilots will follow these FAA mandated rules, along with any other operational or UAS requirements issued by the FAA, at all times:

- Unmanned aircraft must weigh less than 55 pounds, including payload, at takeoff
- Fly in Class G airspace*
- Keep the unmanned aircraft within visual line-of-sight unaided by any other device other than corrective lenses*
- Fly at or below 400 feet*
- Fly during daylight or civil twilight (30 minutes before official sunrise to 30 minutes after official sunset, local time)*
- Fly at or under 100 mph*
- Yield right of way to manned aircraft and emergency vehicles*

- Do not fly directly over people*
- Do not fly from a moving vehicle, unless in a sparsely populated area*
- Do not operate a small UAS in a careless or reckless manner or under the influence of drugs or alcohol

*The City of Palm obtaining a Certificate of Authorization (COA) or waiver from the FAA may eliminate or modify compliance for these requirements. Please contact a member of the Drone Team to learn more about this. Otherwise, all pilots will adhere to the Part 107 FAA rules and regulations.

Pilot Training and Qualifications

In order to fly a drone for City related projects, employee drone pilots will have to:

- Have an up to date, FAA Part 107 remote pilot certificate
    - A copy of a valid Part 107 remote pilot certificate will need to be submitted to the Drone Team.
    - When the remote pilot certificate expires, it will have to be renewed or reissued before an employee can fly for the City again.
    - Expiration, revocation or loss of a remote pilot certificate will result in the employee being prohibited from flying drones for the City and removal from the City's approved list of City employees that can fly drones for the City (Approved List).
- Be on the City's Approved List of employee drone pilots
    - The employee must have an up to date Part 107 remote pilot certificate.
    - The employee may not have a history of reckless behavior involving aircraft, manned or unmanned.
    - If the employee is not currently on the Approved List, the Drone Team will evaluate their qualifications and will add them to the Approved List, as listed in the "Pilot Training and Qualifications" section of this document.
- Participate in City led training and Drone Team training involving drones. All pilots will be required to demonstrate that they know how to fly a drone in a safe and compliant manner.

Approved list of city employees that can fly drones

Please refer to the "Approved List" document located in the Drone Team folder of the O:\ Drive. This list is kept up to date by the Drone Team and members are approved if they have an FAA Part 107 remote pilot certificate and have met or exceeded the standards listed in the "Pilot Training and Qualifications" section of this document for safe and responsible flying of drones. Employees must provide documentation that they have a Part 107 remote pilot certificate and must renew their certificate every 24 months (starting from when they obtained the certificate) to participate in the City's drone operations.

Operational Use

Standard Operating Procedures

- All UAS will be maintained and kept in airworthy condition, according to the manufacturer's specifications and related industry standards.
- Prior to any flight, authorized pilots will inspect the UAS to ensure it is airworthy. Pilots will also inspect the UAS after every flight. The drone pilot will report any newly developed damage or defects to their respective City department and the Drone Team.
- Only authorized pilots with an FAA Part 107 remote pilot certificate will be permitted to fly for City operations. An authorized pilot for the City is an employee of the City of Palm Coast that has a current Part 107 remote pilot certificate and is on the approved list of City employees that can fly drones, as decided upon by the Drone Team.
- Authorized City pilots are only allowed to operate the specific City owned UAS they have been approved to operate, per the Drone Team. Also, pilots must be listed on the City's drone insurance and specifically be listed as an authorized pilot for that drone on the City's drone insurance policy.
- Pilots will log their flying hours after each time they fly a drone. See Exhibit A of this document. A copy of this document (named Drone_Pilot_Logbook.pdf) can be accessed in the Drone Team folder.
- Pilots will notify the Drone Team of planned projects and flights if they are outside normal operations. The Drone Team will then discuss these projects and determine if they are safe and approved to fly.

- Flying in Class B, C, D, and E airspace requires the permission of air traffic control. Obtaining permission can be accomplished by phone call, email, verbally, or through a software application. The drone pilot must keep documentation of any permission issued by air traffic control and provide it to the Drone Team once the flight is completed.
- The pilot will follow all Part 107 regulations at all times, unless a waiver or Certificate of Authorization (COA) has been issued by the FAA to operate outside of these regulations.
- Pilots must comply with all federal and state laws pertaining to the use and operation of drones at all times.

Emergencies, accidents, and other situations

- Manned (or unmanned) aircraft near drone
    - The remote pilot in command of the drone will immediately perform evasive maneuvers to avoid the aircraft, and if it is a manned aircraft, will establish a safe altitude level or land the drone so that the manned aircraft can fly uninhibited.
- Power failure of drone
    - The remote pilot in command will safely attempt to track down where the drone landed after a power failure occurred. The drone will then be retrieved and put out of commission until the batteries can be replaced and the drone can be fully repaired. Such an incident must be reported by the pilot to the Drone Team and the City Manager.
- Objects thrown at the drone or firearm discharged at drone
    - The pilot in command should take evasive action, if possible. The drone must be immediately landed in as safe a manner as possible. The remote pilot in command should leave the scene in order to achieve a safe distance. If an object was maliciously thrown at the drone or a firearm was discharged at the drone, the remote pilot in command must call 911 when safe to do so. Such actions are illegal and should be treated with the highest amount of caution. After the pilot's safety is no longer in jeopardy, they should alert the City Manager and the Drone Team about the incident.
- All accidents will be logged and reported to the Drone Team
    - Pilots who do not report accidents or who operate the drone in a careless or reckless manner will have their authorized pilot status from the City revoked by the Drone Team and will be removed from the Approved List. Requests for reinstatement of flying

privileges will be determined by the Drone Team. Any Drone Team member that is involved in an accident or recklessly flies a drone must recuse themselves from any Drone Team decision making until the situation is resolved and the Drone Team member is cleared of any potential violation of the Drone Program Code of Conduct.

- In the event of a crash, the incident must be logged and reported to the Drone Team by the remote pilot in command. A thorough operational check of the drone is required to be conducted by both the pilot and the Drone Team and a Drone Accident Report form must be filled out the remote pilot in command. Please see Exhibit B, attached hereto, for an example of a Drone Accident Report. An official copy of the Drone Accident Report (named Drone_Accident_Report.pdf) can be accessed in the Drone Team folder.
- If no damage was sustained to the drone, then it can be approved for flight after it has been thoroughly checked out and test flown.
- If damage was sustained, the drone must be immediately grounded and no longer flown. The Drone Team will report this damage to the appropriate authorities and the City's insurance company and the drone will either be repaired to the manufacturer's original specifications and quality standards or a new drone will be acquired as a full replacement.

- Vehicle Policy applied to drones
  - The remote pilot in command, if having been involved in an accident with a City owned drone, will follow the steps laid out in the City of Palm Coast's Vehicle Policy. The remote pilot in command will have to attend MediQuick and participate in a drug test.
  - Steps to take:
    - Employee (remote pilot in command) shall:
      - Call 911 (if the situation is dangerous).
      - Report drone accident to immediate supervisor.
      - Remain at accident scene until released by your supervisor to report to MediQuick.
    - Supervisor shall, immediately:
      - Notify HR.
      - Notify the Drone Team.
      - Assist staff in collection of all relevant evidence.
        - i.e. pictures of drone damage, etc.

- Send employee to MediQuick (or after hours to Florida Hospital Flagler Emergency Room).
    - For drug/alcohol screening and
    - Post-accident Work Comp medical evaluation.
- Complete the Work Comp Incident Report (available on the City's internal Intranet) and forward to HR.
- Forward to Risk Manager:
    - Drone Accident Report (See Exhibit B)
        - A copy of this document (named Drone_Accident_Report.pdf) can be accessed in the Drone Team folder.
    - Pictures of damage and scene.
- Notify Department Head, IT Director, and the City Manager as soon as possible.

- Equipment Policy
    - All City employee remote pilots in command must comply with the City of Palm Coast's equipment policy.

Authorized Uses

- Flying for department specific projects that fall within the Part 107 rules and requirements
- Flying on and over City owned property
- The pilot must obtain written permission from private land owners in order to fly on and over their property
- Examples of authorized uses*:
    - GIS and Mapping
        - Obtain imagery of City owned property in order to utilize in the City's GIS systems
        - Assist other departments in damage assessment by collecting imagery of post-disaster areas
    - Damage Assessment after Natural Disasters
        - Floods

        - Hurricanes
        - Tornadoes
    - Assist firefighters
        - Fire scene surveys
        - Storm surveys
        - Aerial photos of building footprints
        - Training exercises
    - High quality photography and videography for the Communications and Marketing Department
        - Event coverage
        - Video marketing

*Note: These are just some of the various ways that drones can be utilized for the City of Palm Coast. Please contact the Drone Team in order to inquire about other uses for the City, current and future.

Prohibited Uses

UAS equipment shall not be used:

- To record an image of privately owned property or of the owner, tenant, occupant or licensee of such property with the intent to conduct surveillance on the individual or property captured in the image in violation of such person's reasonable expectation of privacy without his or her written consent. See Florida Statutes Section 934.50.
- To conduct surveillance on individuals exercising their constitutional right of free speech and assembly.
- When other manned aircraft are operating in the immediate area.
- If utilizing it in contradiction to the manufacturer's specifications or instructions.
- In any way that would violate the Constitutional Rights of any citizen, or in violation of state or federal statute regarding use of a UAS.
- In situations where there may be an increased risk of injury to others in the operational area.
- To conduct personal business of any type.
- To harass or intimidate any individual or group.
- As a weapon.
- Situations where there may be an increased risk of injury to others.

Documentation and Retention of UAS Data

- Documentation of flights
    - The drone pilot will complete all City and department flight documentation before and after flights.
- Digital media (still images and video) captured by the drone will be retained by the City according to the classification of the digital media's retention schedule set by the State of Florida. This digital media shall not be deleted until the retention requirement for that video or image can be determined.
- Retention Schedule
    - The City Clerk's Division determines the retention schedule based off of the State's GS1 schedule. It is dependent on the video and the captured image(s). Please inquire with the City Clerk to obtain an official copy of the Retention Schedule.
- Certain parts of images can be redacted, as determined by the City Manager, or designee, the Drone Team and by the State of Florida's general records schedule. **See Retention Schedule section of this document.**

Drone Team Contact Information

- Austin Kladke, GIS Specialist
    - Drone Team Leader
    - akladke@palmcoastgov.com
    - Desk Phone: 386-986-4783
- Virginia Smith, City Clerk/Paralegal
    - vsmith@palmcoastgov.com
    - Desk Phone: 386-986-3713
- Jason Giraulo, Digital Communications Coordinator
    - jgirualo@palmcoastgov.com
    - Desk Phone: 386-986-2484
- Mike LaGreca, Firefighter/Paramedic
    - mlagreca@palmcoastgov.com

Exhibit A

sUAS PILOT FLIGHT LOG

Pilot:_____

Date	Aircraft	A/C Reg.#	Location	Day	Night	Instruct	Total flt.	Remarks

I certify that all entries in this logbook are true

_____

Pilot signature

Page:_____

Exhibit B

UAS CRASH REPORT:

Date/Time:_____ Location:_____

UAS:_____ UAV Registration #:_____

Pilot-in-command:_____

Person manipulating controls:_____

Visual observer/s:_____

Total mission flight time:_____ Total UAV hours at time of crash:_____

UAS in-service: Yes __ No__

Description of crash:_____

_____

_____

_____

Damage sustained to UAS:_____

_____

_____

Estimated cost to repair/replace: $_____

Crash investigated by:_____ Date:_____

Cause of crash determination: Yes __ No __

Crash investigator comments:_____

_____

_____

_____

Signature:_____ Pilot-in-command

Signature:_____ Crash investigator

Signature:_____ Chief Pilot