

The Drones Are Coming!

How UAVs are being used to improve
Stormwater Management



BEAUFORT 
COUNTY

October 4, 2018

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Beaufort County Mapping and Applications

FAA Part 107 Pilot

Beaufort County UAV Program

- Started in 2016
- FAA Public Aircraft Certification 2016
- FAA Part 107 Certification 2018
- Benefits
 - Real-time up-to-date imagery
 - Higher Resolution
 - Able to reach inaccessible areas
 - Time saving
 - Cost effective



Beaufort County UAV Program

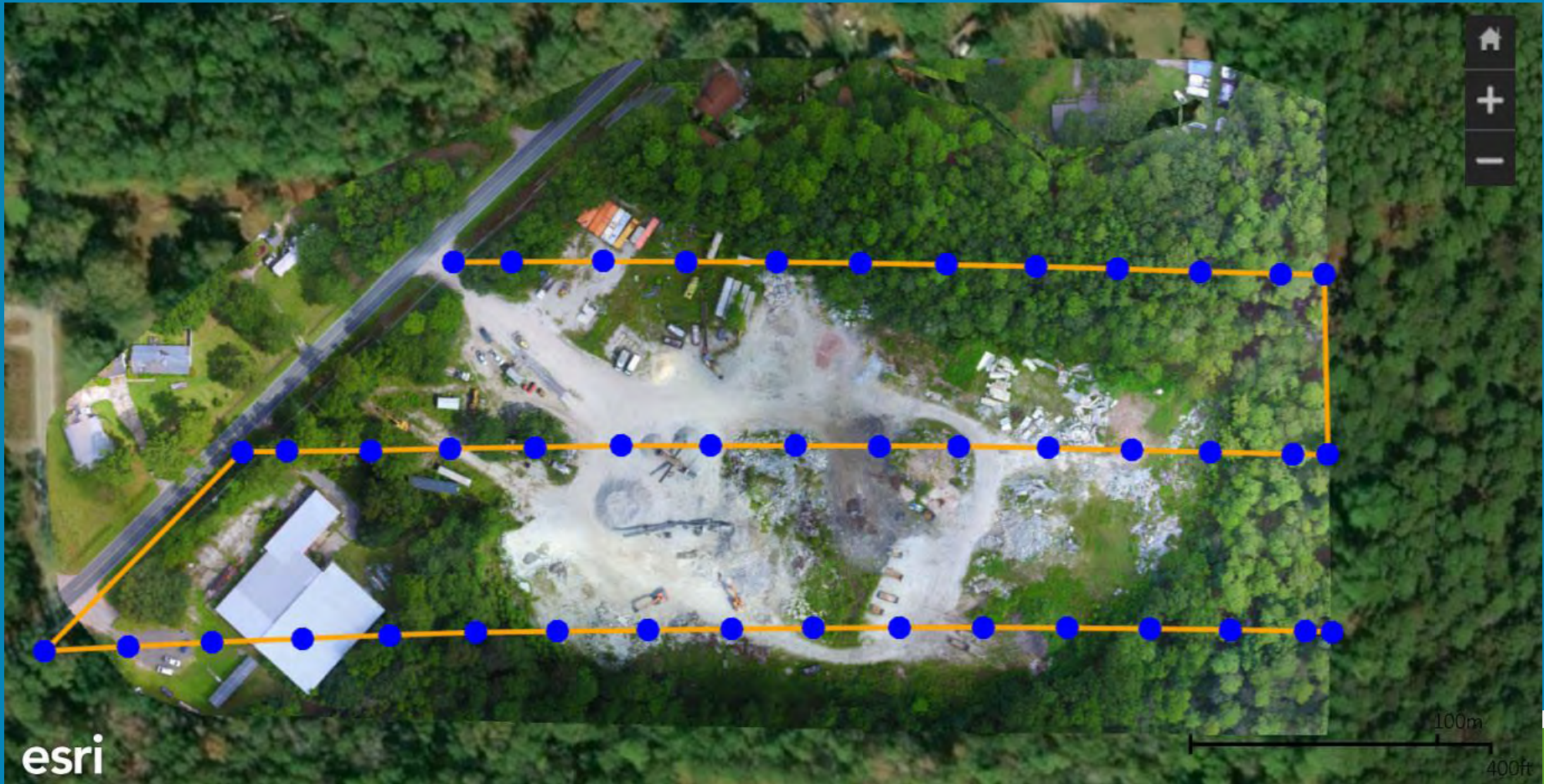
- **Inspections**
 - Facilities
 - New Construction
 - Impervious Surface Data
- **Site Contour Information**
 - Drainage
- **Volumetric Measuring**
 - Debris Piles
 - Ponds/Excavation/Mining
- **Post Disaster Imagery**



Impervious Surface Calculations

- Once a project is completed, UAV can be deployed to capture up-to-date aerial imagery
- Higher Resolution Imagery allows for better surface identification and measurement
 - current pictometry - 4 in/pixel
 - UAV - 2 in/pixel
- Calculations are provided earlier in the billing process
- Minimize loss of revenue
- Increased efficiency vs personnel on the ground

Impervious Surface Calculations



Impervious Surface Calculations



Hurricane Irma – Harbor Island



esri

Hurricane Irma – Fripp Island



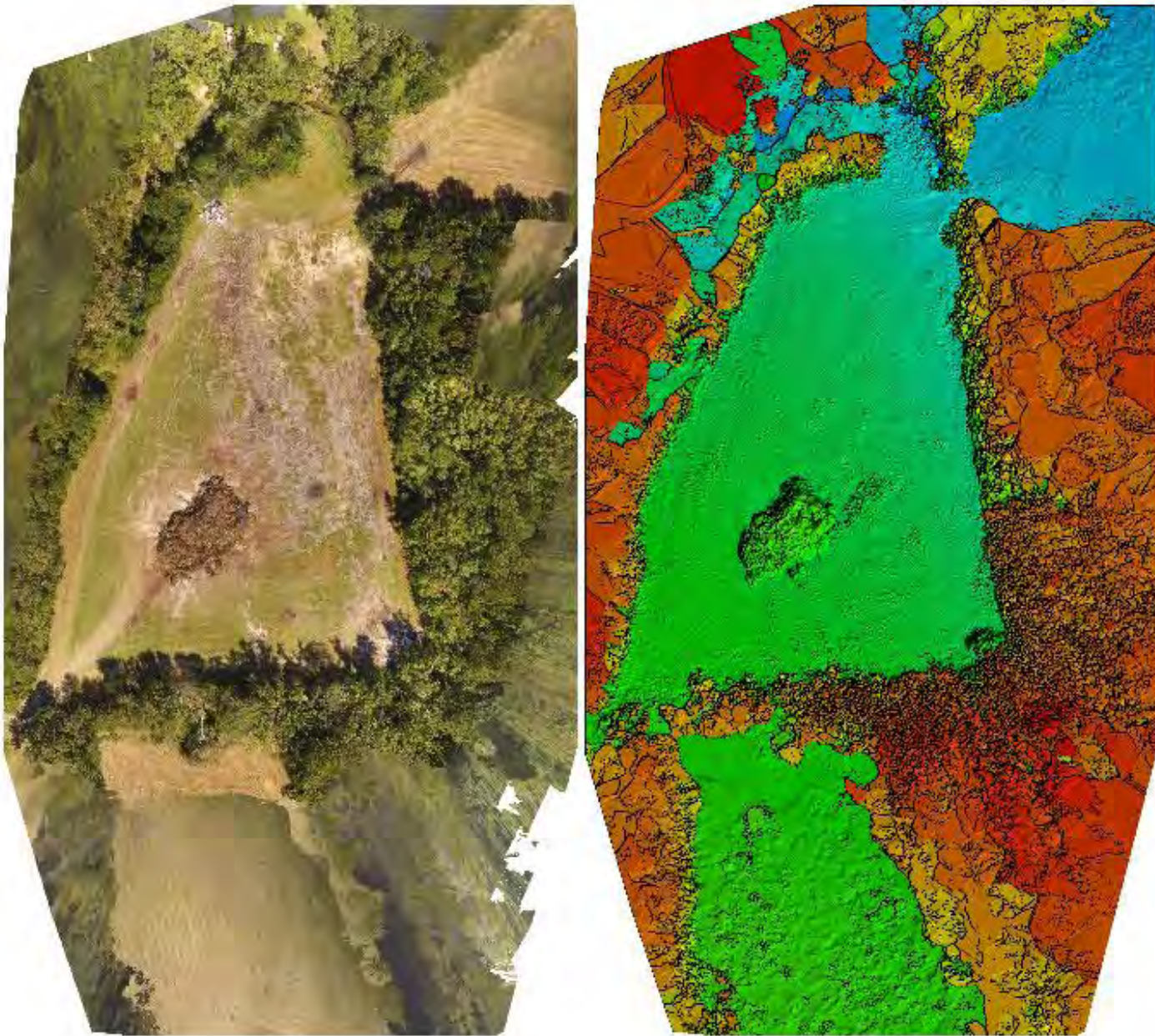


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Resulting DSM (Digital Surface Model)

The screenshot displays the ArcGIS Pro interface. The main map area shows a grayscale Digital Surface Model (DSM) with a green polygon overlaid on a hill. The polygon is labeled "Polygon1 3,295.98 yd".

The **Elevation Profile** window is open, showing a line graph titled "Profile #1 - DSM". The y-axis is labeled "Elevation - U.S. Survey Feet" with values 112 and 120. The x-axis is labeled "Distance - U.S. Survey Feet" with values 0, 30, 60, 90, and 120. The graph shows a red line representing the elevation profile across the distance. Below the graph, the "Units" are set to "U.S. Survey Feet" and the "Source" is set to "DSM". A "Calculate" button is visible.

The **Calculate Volume** window is also open, showing a table with one row:

Volume
Polygon1 3,295.98 yd ³

Below the table, the units are set to "Cubic Yards" and a "Calculate" button is present.

The **Contents** pane on the left shows the following layers:

- Project Data
 - Images
 - Enabled
 - Disabled
 - Flight Path
- 2D My Data
 - Volume
 - Enabled
 - Profile
- 2D Products
 - Orthomosa
 - DTM Hillsha
 - DSM Hillsha
- Basemap



Not connected MODE N/A



No Camera

N/A

91%



350 FT



Ihly Farm Debris Site

Waypoints Qty. 10 PTS	Flight Length 4205 FT
MainPath No. 5 Lines	Cover Area 7.01 ACRE

Basic Advanced

Camera Model Phantom 3 Professional Cam... >

Shooting Angle Parallel to Main Path >

Capture Mode Capture at Equal Time Interval >

Flight Course Mode Inside Mode >

Speed 19.6 MPH Shutter Intv. 2.0 SEC

Altitude 150.3 FT Resolution 2.0 CM/PX

LAT 32.509404

LON -80.728989



Speed
N/A MPH

W LAT: N/A
G S LON: N/A

Altitude
N/A FT



Legal

Types of Drones

- **Consumer / Semi-Professional**

 - Phantom 3 & 4 Series (12mp camera)

 - Mavic Series (very compact)

- **Professional**

 - Phantom 4 Pro (mechanical shutter, 20mp camera)

 - Inspire Series (Interchangeable Lenses, FLIR)

- **Industrial / Enterprise**

 - Matrice Series (Hi-Accuracy GPS, Multiple Cameras, FLIR, LIDAR)

 - MG Series (Hi-Accuracy GPS, Multiple Cameras, FLIR, LIDAR, multi-rotor hexacopter)

www.dji.com

FAA Part 107 Summary

- UAV must weigh less than 55 lbs
- Maximum altitude of 400 feet *
- Maximum ground speed of 100 mph
- Fly within visual-line-of-sight
- Fly only during daylight or civil twilight
- Don't fly directly over people
- Don't fly in controlled airspace near airports without FAA Certificate of Authorization (COA)
- Must have ATC approval to fly within controlled airspace

State and Local Regulations

- **There are currently no state laws in place concerning the operations of drones in South Carolina.**
- **All drone pilots operating commercially in the state of South Carolina are subject to the FAA's Part 107 rules.**
- **Government agencies may operate under an FAA Public Aircraft Certification.**
- **Be aware of possible Municipality or Town Ordinances**

Safety....Safety....Safety!

**Set safety standards and
always fly within the law!**