

USACE – Galveston District

Technological Advances in Topographical Surveying

Small Unmanned Aerial System (sUAS) and Mobile LiDAR

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Overview

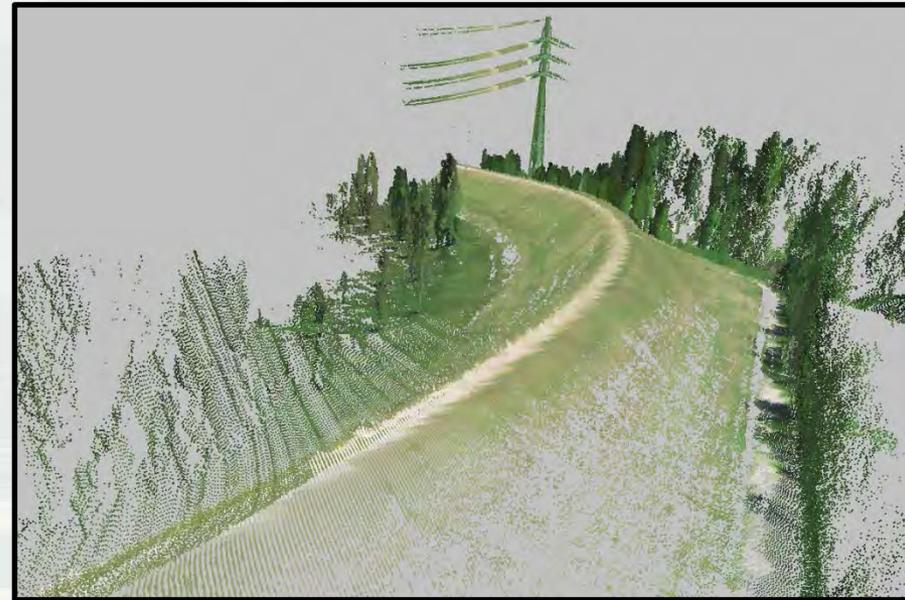
- LiDAR
 - ▶ Accuracy and Limitations
- UAS Surveys
 - ▶ Accuracy and Limitations
- Products and Analysis





Mobile LiDAR

- *Light Detection and Ranging*
 - ▶ Real Time Kinematic (RTK)
- *GPS - Satellites*
- *Laser - Line of Sight*
- *IMU*
 - ▶ *Pitch, Roll, Yaw*



- Generally the same as Bathymetric Survey



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Accuracy and Limitations

- *RMS on previous collections:*
 - ▶ Base/Radio: 2 inches
 - ▶ VRS: 4 inches
- Heavy Vegetation
- Weather – Rain, Fog, etc.
- Control Needed – VRS Network or Monument
- Access – Mounted to a JD Gator





sUAS

- *SenseFly eBee*
 - ▶ 1 Real Time Kinematic (RTK)
 - ▶ 1 *Non-RTK*
- *Fully Autonomous*
 - ▶ *Enter AOI and get planned flight lines*



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Accuracy and Limitations

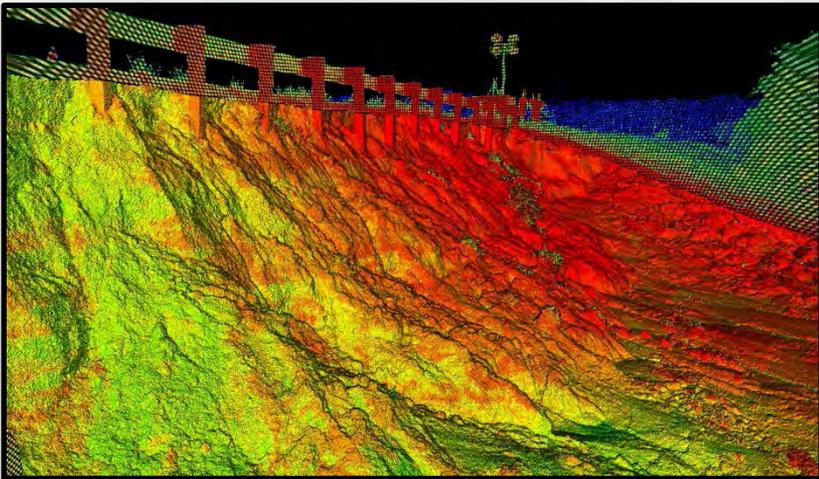
- *RMS on previous collections:*
 - ▶ RTK: 1.5 inch Horizontal – 3 inch Vertical
 - ▶ *non-RTK*: 6 inch Horizontal – 3 inch Vertical
- *** Accuracy's will depend on Visibility and Weather ***
- Must maintain Line of Sight
- Army Aviation Application Process
- Airspace Restrictions (FAA)
- Heavy Vegetation when extracting elevations





Products and Analysis

- Point Cloud (Surface Elevation)
 - ▶ Cut/Fill and Loss/Gain Calculation
 - ▶ Capacity Calculations
 - ▶ 3D Modeling



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Point Cloud: LiDAR vs sUAS

Placement Area 3 on the Brownsville Ship Channel



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Products and Analysis

- *Aerial Imagery*

- ▶ Project Delineation
- ▶ *Land Use Change*

2015 South Carolina Flooding (via SAJ)

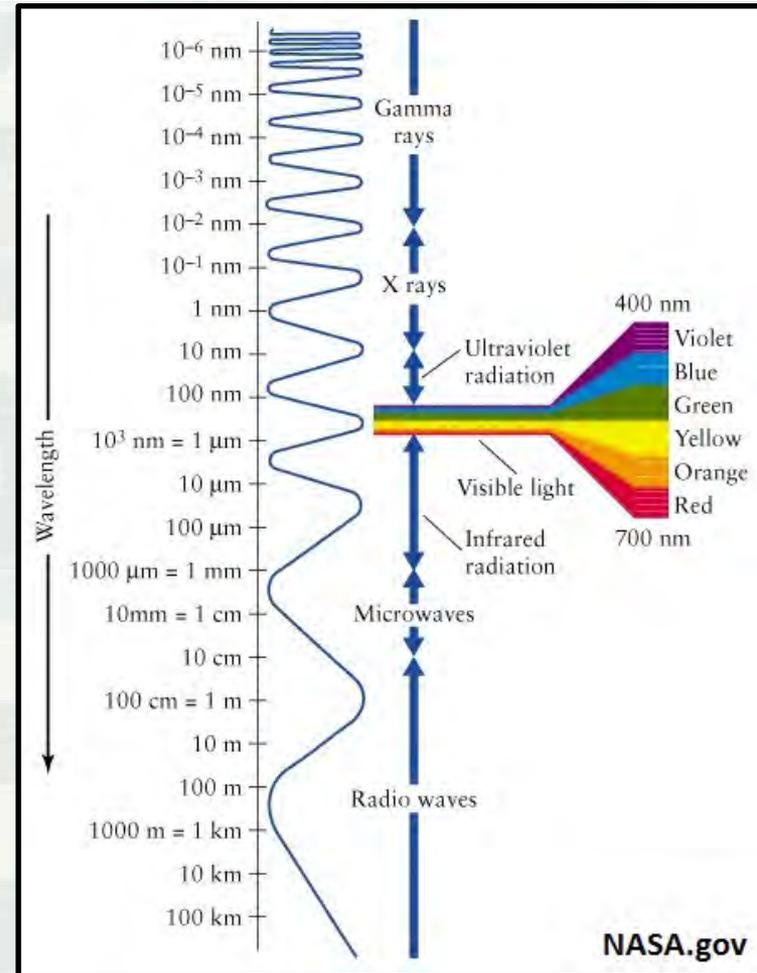
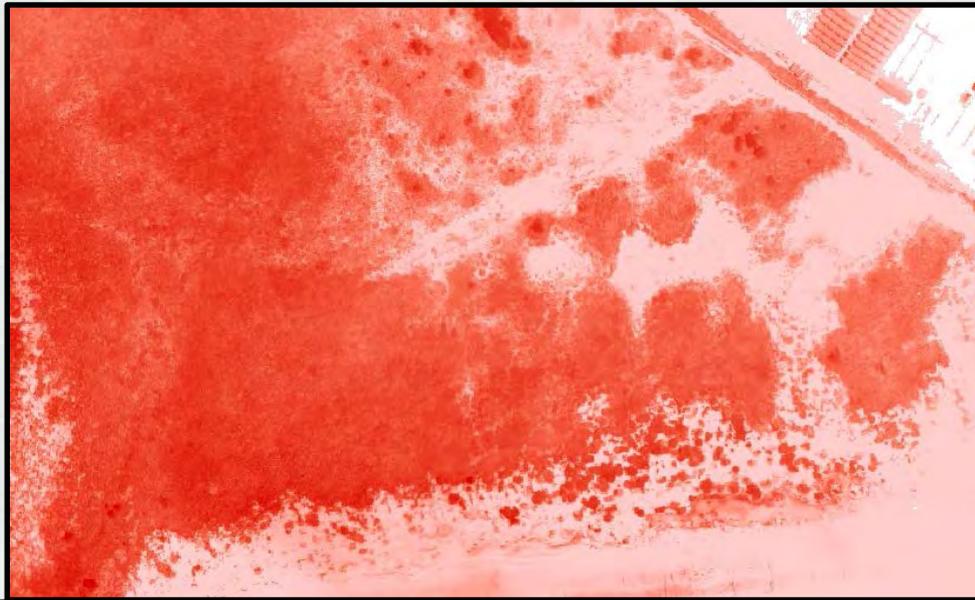


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Products and Analysis

- Multispectral Imagery
 - ▶ Vegetation Classification
 - ▶ Change Detection



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