An Aerial Perspective of Solid Waste Management

- The use of unmanned aircraft systems (UAS) to conduct aerial survey
- Quality of data collected
- Quality of data post processed
- Quality of information derived from data collected

Environmental Applications for Unmanned Aircraft Systems

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Traditional Survey Methods
The Landfill

- Location: Larimer County Landfill, Ft. Collins, Colorado
- Area: 650 acres
- Active Area: 160 acres
- Active Fill: 1.1 million cubic yards last year
- Life Expectancy: 2025

Planned Focus

- Remote UAS Aerial Dataset Collect
- Process Data/ Data Outputs
  - Orthomosaic
  - Photogrammetry
  - Digital Surface Model
  - Volumetric Survey(s)
  - Evaluate Data Accuracy

Mission Planning

- Risk Assessment
  - Airspace
  - Geology
  - Power-Lines
- Develop Autonomous Flight Plans
- Visual Line of Site
- Select Aircraft
- Select Sensor/Camera
  - Georeferencing
  - Sony A6000 Fixed Gimbal

Mission Implementation Summary

- Datasets: 234
- Area Covered: 68.27 acres
- Resolution: 24 MP
- Georeferenced: Yes
- Average GSD: 1.92cm
- Ground Control Points Used: No
- Number of Flights: 5
- Total Flight Time: 1 Hour, 7 Minutes
Post Data Processing

Point Cloud Densification: 1h:05m:58s
3D Textured Mesh Generation: 40m:41s

Processed Data

Contour Lines Generation: 06m:04s 2 FT

Post Data Discovery

Digital Surface Model (DSM)

Processed Data

Volumetric Survey: 6s 819.15 FT³
The use of Unmanned Aircraft Systems (UAS) for landfill surveying;
- Data collected provide current information and can be collected more frequently
- Photogrammetry provides accurate and actionable information
- Supplemental models (DSM, Models, Volumetric) offer information for comparison to historic data collects
- UAS methods provide time and safety benefits