



Jerad Hicks UAV Pilot

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Technology Manager





- Must possess a Part 107 Certification from the FAA to operate UAVs commercially
- Aircraft has to be registered with the FAA
- Can not fly higher than 400 ft above the tallest structure you are scanning
- Must fly in VLOS or have an Observer if necessary and maintain direct communication
- Need ATC approval to operate in Class B,C,D & E airspace
- Part 107 waivers required for certain operations (night flight, over crowds, multiple UAVs, etc)





#### UAV Safety – Drone and Controller

- Pre Flight Self Diagnostic Test
- All payloads are secured to UAV
- Obstacle avoidance
- Sensors (front, bottom, top)
- Intelligent Battery
- Switch between flight modes
- Virtual Geofence
- Mission Planning





**UAV Safety** 

- Program Settings
- Calibration
- Max Altitude / Speed Setting
- Return to Home (RTH) Function
- Loss of GPS Signal
- Loss of Controller Signal
- Obstacle Avoidance
- Autonomous Flight Mapping
- Flight Log



## Verifiable Accuracy



GCP Name	Accuracy XY/Z [US survey foot]	Error X [US survey foot]	Error Y [US survey foot]	Error Z [US survey foot]	Projection Error [pixel]	Verified/Marked
121 (3D)	0.020/ 0.020	0.010	-0.007	-0.002	0.950	16 / 16
184 (3D)	0.020/ 0.020	-0.014	· -0.015	· -0.004	1.232	.9/9
MON-4 (2D)	0.020/ 0.020	0.003	. 0.029		1.049	. 11 /.11
MON-7 (2D)	0.066/ 0.066	0.002	0.001		0.603	10 / 10
Mean [US survey foot]		-0.001342	0.002213	-0.003076		
Sigma [US survey foot]		0.008952	0.016754	0.001185		
RMS Error [US survey foot]		0.009052	0.016900	0.003297		







UAV Capabilities and Advantages







### Inspections

- 30x Zoom Capability
- Increased Safety
- Removes Personnel Exposure to Heights or Hazardous Environments
- Craft Remains a Safe Distance from Operating Equipment





- Pipeline inspection
- Fire Fighting Hot Spot Detection
- Flare Stacks and Mechanical Equipment
- Structural Heat Loss
- Oil Spill Response
- Security
- Search & rescue





- Internal Inspections
- Hazardous or Uninhabitable Spaces
- On Board Lighting for Inspection in Spaces With Zero Light
- Variable Signal Emission Point for Pilot Control and Video Uplink





- Existing Condition Verification and Documentation
  - Imagery
  - Infrastructure
  - Topography
- High Level Pre-construction
  Design Review
  - Slope Arrows and Shading by Slope Range Provide Simulated Watersheds
- Identify Potential Impacts During Project Planning
  - Point Clouds and Design Files are Easily Merged
- Accurate Quantity Tracking During Construction





High Resolution Geo Tiffs







# Progress Tracking and Quantification





- Facility Monitoring / Parking Utilization
- Project Planning
- Project Updates and Progression
- External and Internal Inspections of Hard to Access Areas
- Volumetrics and Stockpile Quantities
- Expedited Data Sharing and Transfer





