The Effective Spatial Sensing of Abandoned Oil Wells

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Introduction

- The decommission of oil wells began in the 1950s
- Estimated 40,000 abandoned wells in New York
- Improperly sealed/Unsealed wells are sources of large methane emissions
- The cost of sealing these is around $10,000 per well
- Little being done within governments to identify large pollution sources
- Oil Wells have a detectable magnetic field

Question

Is the use of aerial magnetometry more practical than terrestrial in the application of well discovery?

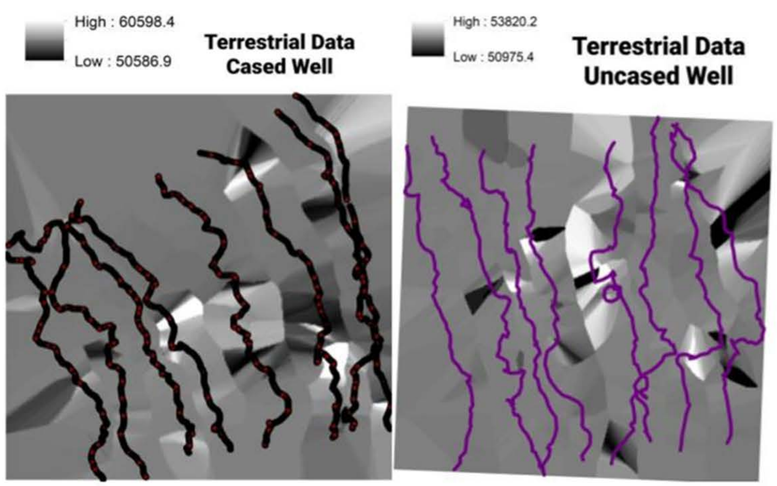
Hypothesis

It is believed that the aerial based survey will be more efficient at gathering data and determining true well locations compared to terrestrial surveying.

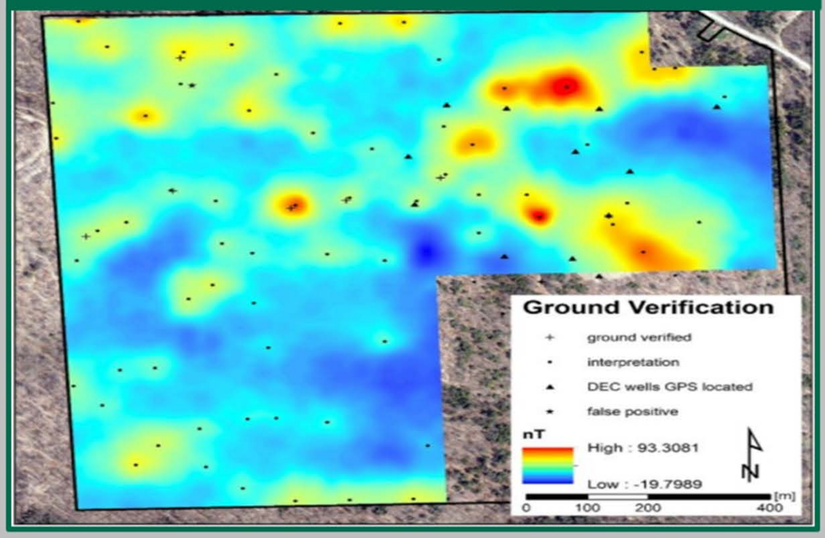
Methods

- Cicada UAV flown with M-FAM Magnetometer
- Predetermined gridded flight path, drone set to stay above tree canopy
- Trimble Geo7x Transceiver loaded with magnetic anomaly data
- Trimble used to validate and document well locations
- Terrestrial data was collected over two separate known wells, each in a 70m^2 area, with the Geometrics G-858 Magmapper and Magnetometer
- 70 meter terrestrial grids were set up to guide surveyor

Terrestrial Data



Aerial Data



References

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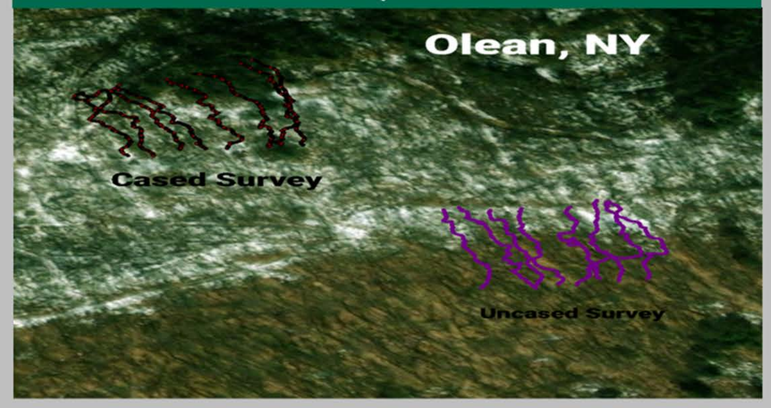
Survey Area



Results

- Aerial-based sensor took approximately 1 hour to survey ¼ mile^2
- After 3 flights, 72 anomalies were identified as wells
- 32 of the well locations have been verified
- Ground-based sensor took 3.5 hours to survey two wells
- Data collected was riddled with dropouts
- Terrestrial data was more difficult to perform in field analysis on

Conclusion

- Aerial-based sensing covered a larger area than terrestrial sensing in significantly less time
- Aerial data required less processing - Less human error and more sensor correction
- Aerial-based sensing can be conducted with less manpower in less time
- The future of locating abandoned oil and gas wells lies in aerial-based sensing
- Terrestrial Sensing can be practical in specific identification cases