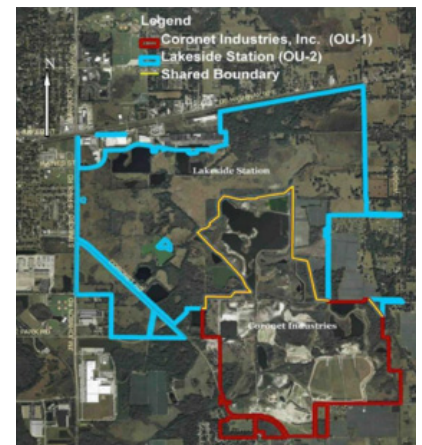


AIRBORNE ASPECT

Case Study: Aerial and Ground Radiological Surveys of Phosphate Mines Conducted in January 2011

OVERVIEW

In January 2011, EPA Region 4 initiated a joint ground-based radiological survey effort among the EPA Environmental Response Team (ERT), EPA Region 4, and the Department of Energy (DOE) Remote Sensing Laboratory (RSL) of a portion of the Coronet Superfund Site, near Plant City, Florida. During the ground-based survey effort, an aerial radiological survey was performed over the same area by the EPA Airborne Spectral Photometric Environmental Collection Technology (ASPECT) Program. Funding for the aerial survey was provided through an interagency agreement from the Federal Emergency Management Agency (FEMA), Nuclear Incident Response Team (NIRT) Program.



Operable Units for the Coronet Site

The ASPECT aircraft used the following flight procedures for data collection on January 19, 2011:

- » Altitude above the ground level (AGL): 300 feet 500 feet
- » Target Speed: 100 knots (115 mph)
- » Line Spacing: 300 feet
- » One second data collection frequency

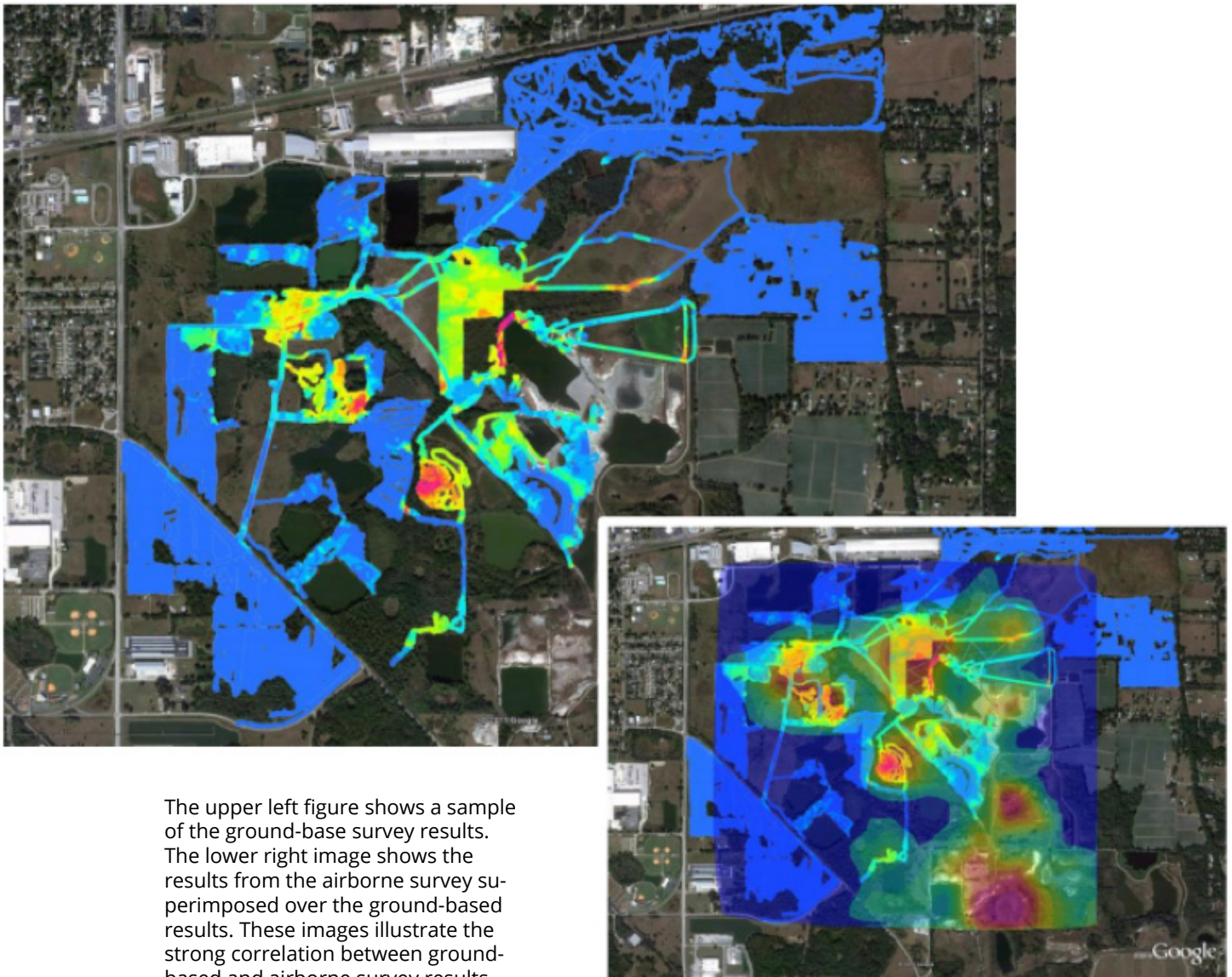
A unique feature of the ASPECT remote sensing technologies includes the ability to process spectral data automatically in the aircraft with a full reach back link to the program QA/QC program. As data is generated in the aircraft using the pattern recognition software, a support data package is extracted by the reach back team and independently reviewed as a confirmation to data generated on the aircraft.

The objectives of the ground and aerial surveys were to:

- 1) Establish the range of radiation levels, in excess of background
- 2) Identify general categories of areas based on past use and radiation levels
- 3) Establish general boundaries of areas for further characterization assessment
- 4) Identify areas, as feasible, absent of radiation above background
- 5) Compare EPA and DOE ground-based data with ASPECT aerial survey data
- 6) Collect airborne data under a variety of flight parameters to help optimize future flight parameters (e.g., altitude vs line spacing)
- 7) Estimate surface uranium contamination levels using ASPECT data

The aerial survey was completed in a few hours and collected about 1,300 data points. The result showed:

- 1) Very good correlation and resolution with ground data
- 2) The site had several areas with distributed sources and exposure-rates ranging from background (about 5 to 10 $\mu\text{R}/\text{h}$) to about 50 $\mu\text{R}/\text{h}$
- 3) Airborne data identified areas of potential contamination that were not accessible by the ground teams
- 4) Environmental characterization flight parameters showed very little difference between 300 ft vs. 500 ft altitude and line spacing of no more than two times the survey altitude



The upper left figure shows a sample of the ground-base survey results. The lower right image shows the results from the airborne survey superimposed over the ground-based results. These images illustrate the strong correlation between ground-based and airborne survey results.

CONCLUSION

Due to the timing of site activities, an opportunity developed which permitted the ASPECT System to make airborne measurements concurrent to three independent ground monitoring efforts over various portions of the Site (PIC Measurements, EPA survey, and DOE survey). This action permitted an excellent multi-dimensional comparison of both airborne and ground-based data products. While the ground-based measurement techniques were limited in the number of data products generated and the aerial coverage of their respective survey areas, all systems did develop exposure estimates over regions which were likewise flown by the ASPECT System. Figure 8 illustrates an area in which ground-based exposure estimates can be directly compared to similar estimates developed with the ASPECT System. Agreement in both magnitude and aerial distribution is excellent. Other regions of elevated exposure were also found to be in excellent agreement between the airborne and ground-based methods supporting the notion that the ASPECT airborne method is scientifically valid and comparable to a similar ground-based survey. A secondary result realized during this survey was the ground surveys were unable to assess the entire terrain due to topography, vegetation and water obstacles; a limitation not present in the ASPECT survey. These findings support the conclusion that calibrated airborne systems like ASPECT have the capability to collect scientifically valid data over an affected area in an efficient fashion.

Sources

- » <http://airborneaspect.com/aerial-and-ground-radiological-surveys-phosphate-mines-conducted-in-january-2011/>
- » <http://www.epa.gov/region4/superfund/images/nplmedia/pdfs/coroiflrt2011.pdf>