

ABOVE THE DUMP: A SUAS ENABLED AEROMAGNETIC SURVEY OF A LANDFILL

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A small unmanned aircraft system (a.k.a. sUAS or drone) was tasked to autonomously execute a low-altitude aeromagnetic survey over a closed landfill using a prototype of the MagArrow™ magnetometer built using the micro-fabricated atomic magnetometer (MFAM) technology from Geometrics, Inc. A ground magnetic survey using a cesium vapor magnetometer was conducted over the same site. The same line spacing was employed for each survey. The sensor altitude was varied from 10 to 20 meters above ground level for the low altitude aeromagnetic survey and kept at a constant 2.3 meters above ground level for the ground survey.

The drone enabled magnetic survey required less time and was less costly than the ground based data acquisition. However, prevailing weather conditions can adversely impact the success of sUAS field operations as well as the quality of the data. Nevertheless, the quality of the low altitude aeromagnetic survey data is arguably better than the quality of the ground survey data due the application of robotic technology. When combined with other geophysical methods, for example a ground based time domain electromagnetics (TDEM) survey, drone enabled magnetometry is an effective approach to mapping the distribution of ferromagnetic material within the landfill as a means for identifying areas with a greater likelihood to generate methane or contaminants leaking into the near surface aquifer.