

DRONE ENABLED GEOSCIENTIFIC MAPPING IS THE NEW PARADIGM FOR ENVIRONMENTAL SITE CHARACTERIZATION

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Geoscience data acquired using autonomously operated small unmanned aerial systems (sUAS) are manifesting a paradigm shift in the surface and sub-surface site characterization best practices. As a result, high quality, high definition geoscience data have never been so readily accessible to environmental site investigators, project managers, and regulators. The net effect is an information rich data volume resulting in better informed decisions that will ultimately drive down the cost of returning contaminated sites to the inventory of useable land.

The principal geoscience application of drones for purpose of environmental site characterization is arguably color photogrammetric mapping due, in large part, to the availability of sophisticated, affordable sUAS fitted with high definition visible light cameras. A new generation of sUAS enabled LiDAR systems are providing an unprecedented level of accuracy and precision in a high definition topographic mapping of the ground surface in forested and vegetation covered areas. Spectral imagers and gamma ray spectrometric systems fitted to robotic, low flying unmanned aircraft are literally bringing the satellite remote sensing data down to earth resulting in major benefits to the practitioners of surface geologic mapping.

Drone enabled aeromagnetic and VLF-EM mapping is a reality. Other electromagnetic methods employing drones will no doubt appear soon. The use of drones to support ground gravity and seismic data acquisition is becoming more prevalent.

Small UAS are limited to small footprint projects because of air space regulations and performance limitations of the aircraft. The air traffic management system will eventually accommodate larger UAVs capable of covering larger areas. Nevertheless, the benefits of sUAS are so compelling that the industry is currently undergoing a paradigm shift in the acquisition of and other geoscience data for environmental site characterization.