# UltraTEM: One Pass Detection & Classification

In August 2019, the UltraTEM towed-array system passed the hardware validation test at the DoD DoD Advanced Geophysical Classification Accreditation Program (DAGCAP) test-site at Aberdeen Proving Grounds. The UltraTEM system, developed by Gap Explosive Ordnance Detection in partnership with Black Tusk Geophysics, is a multi-component multi-sensor system that uses time-domain electromagnetic induction (EMI) to detect and characterize buried metal. It can be deployed for both terrestrial and marine applications and is nominally comprised of the following four components:

1) A high-current transmitter connected to multiple transmitter loops mounted to the detection system;
2) Multiple three-component receiver sensor cubes;
3) An UltraTEM data acquisition system (DAQ) running BTField software; and
4) A position and attitude system for tracking the position and orientation of the sensors.

The UltraTEM represents a next generation EMI sensor that provides Advance Geophysical Classification (AGC) capabilities. The system has a number of unique characteristics when compared to sensors developed and deployed by other UXO firms for AGC including: (1) large transmitter coils and high transmitter dipole moment for increased detection depth performance; (2) extremely rugged and reliable electronics with precision time synchronization of all sensor streams to the pulse per second (PPS) from an integrated GPS receiver; (3) a wide swath wide for rapid coverage of large areas; and (3) the ability to work in a one-pass detection and classification mode rather than the two pass mode currently used for AGC. The one-pass approach has the potential to significantly reduce the costs and financial risks of UXO remediation as survey costs are only weakly dependent on the number of anomalies per acre.

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