

MobileMT: Mobile MagnetoTellurics Technical Overview & Specifications



Expert Geophysics Limited has introduced MobileMT, technology that utilizes naturally occurring electromagnetic fields associated with lightning discharges. Thunderstorms release energy, some of which is converted into electromagnetic fields that propagate through the ionosphere-Earth interspace. The EM fields and currents induced by these fields in the subsurface are used in MobileMT to identify variations in subsurface electrical resistivity.

FEATURES

- An airborne bird, towed by a helicopter, measures variations of the magnetic field with three orthogonal induction coils, while a ground station measures variations of the electric field in two directions;
- The ratio of magnetic to electric field components provides with analytic parameters ultimately expressed in apparent conductivity in selected bands of frequencies;
- Frequency range 25 Hz – 20,000 Hz;
- Advanced noise processing of both electronic and signal processing levels ensures high data quality;
- The lightweight, aerodynamic bird is ideal for surveys with small helicopters in rough terrain.

ADVANTAGES

- Resistivity contrast in geology structures of any shape;
- Broad frequency range provides excellent resistivity discrimination for both deep and shallow geology;
- High data quality even for low natural signal - ground electrodes provide an electrical reference signal for removing noise bias;

- High signal to noise ratio - all three orthogonal components of magnetic field are measured at the receiver in the air, as opposed to a single vertical component measurement.

APPLICATIONS IN MINERAL & HYDRO-CARBON EXPLORATION

- Direct detection of conductive metal ores without the conductance and depth limitations inherent to time-domain systems;
- 3D full-scale deep structural mapping for wide range of structurally controlled minerals: gold, PGM, polymetals, diamonds (kimberlites);
- Detection and mapping precious metals ore bearing systems and porphyry-type ore deposits;
- Cost-effective, rapid and detailed 3D full-scale complement to seismic techniques with high resolution from near surface to depth;
- Applicable for sedimentary geology due to measurements of total field.

SPECIFICATIONS

Airborne receiver	Three orthogonal induction coils (1.4 m diameter each)
Airborne shell	Aerodynamic shaped capsule
Digitizing rate	98,304 Hz
Tow cable length	97 m
Ground sensors	4 pairs of electrodes
Electrodes separation	30 m (typical)
Frequency range	25 Hz – 20,000 Hz
Output computed parameters	Ratio of magnetic and electric field magnitudes in both in-phase and out-of-phase components
Output frequencies	Selectable from 25 Hz – 20,000 Hz depending on signal strength
Magnetics Sensor	Geometrics cesium magnetometer G-822A
Auxiliary Equipment	GPS navigation system, radar altimeter, data acquisition system