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Presentation Outline

- MobileMT technique
- MobileMT configurations
- Field examples





Primary field

A typical lightning flash is **about 300 million Volts and about 30,000 Amps (weather.gov)** On Earth, the lightning frequency is **approximately 44 (± 5) times per second**, or nearly 1.4 billion flashes per year (Lightning - Wikipedia)



Average yearly counts of lightning flashes per square kilometer, based on data collected by NASA satellites between 1995 and 2002. (NASA, Visible Earth) MobileMT technique - broadband total-field airborne natural source audio-frequency magnetotellurics







MobileMT technique



OUTPUT: Apparent Conductivity



EXPERT GEOPHYSICS GEOP **H**field in the air A ALLE 8

4



Frequency range and frequency windows



Total field

X



Remote reference station





Technical solutions for exploration advantages and capabilities



Three component measurement of magnetic field variations

Sensitivity to any direction of geoelectrical boundaries

- 3+ orders of frequency measurement: MobileMT 26Hz-21kHz; MobileMTm 50Hz-26kHz; Drone configuration: 15Hz-13kHz.
- Sensitivity to both, near surface and deep geological structures
- The frequency range is divided into up to 30 windows

High in-depth resolution and a wide range of data selection

74 kHz digitizing frequency, reference and signal base station

Unbiased and denoised data

Advantages over systems with controlled sources:

- Sensitivity to differentiations in a wider range of resistivities
- Depth of investigation always exceeds capabilities of controlled source systems
- Much less dependance on terrain clearance safe surveying in the rugged terrain

MobileMTm

TargetEM (+AFMAG)

.8



MobileMT







GPS

90

antenna1

MAG

sensor

GPS

XYZ inductive coils

antenna2

radar

altimeter

MobileMT – primary system Three orthogonal induction coils (1.4 m diameter each); 26 (22) Hz – 21,000 Hz; Survey ground speed 90 km/hour; Nominal terrain clearance ~60 m Air platform weight 250 kg Complimentary data: magnetic field, VLF





MobileMTm light version

- Three orthogonal induction coils (0.7 m diameter each);
- 50 Hz 21,000 Hz; .
- Survey ground speed 90 • km/hour;
- Nominal terrain clearance ~50 . m;
- Air platform weight 150 kg; ٠
- Magnetic horizontal gradiometer ٠ supported by gyro;

XYZ

- Spectrometry on demand; •
- Precise positioning. ٠





XYZ coils 40 cm diameter; Terrain clearance 20-30 m; Frequency range:15(10?)Hz – 21,000 Hz Ground speed 20-30 km/hour



drone radar-altimeter GPS antenna

DAQ

XYZ inductive coils



TargetEM hybrid (timedomain + AFMAG+VLF) system Three orthogonal induction coils (1 m diameter); 80 Hz – 21,000 Hz (Tr off); 8000-21,000 Hz (Tr on); Tow cable 50 m; Survey ground speed 90 km/hour; Nominal terrain clearance ~40 m; Streaming data; VLF is extracted; AFMAG data is extracted with a combination of an E-field base station.



Southeastern part of the Athabasca Basin (650 m depth to unconformity contact)









Shea Creek deposit, Athabasca basin







Kianna zone: left – resistivity section extracted from ground TAMT tipper (Zxy/Zyx/Tx/Ty) 3D model; right – MobileMT resistivity section



Saddle North porphyry Cu-Au deposit, Golden Triangle, British Colombia 298 Mt 0.28% Cu, 0.36 g/t Au, 0.8 g/t Ag





2500 ohm-m

250

950

_0 m

9500

Ground IP



Saddle North

Saddle North porphyry model





TargetEM (time-domain + AFMAG). Transmitter ON





Montana (USA) survey, 2024

MobileMTdrone, Forrestania IR2

(IR2) is of limited areal size (<75x75m), shallow depth <100m, high conductance >7000S and dips northward ~30-40 degrees.







Types of AEM

MobileMTdrone Forrestania IR2

34759500

-100

-200

-300





View Inclination : 0 deg. Scale 1:2500 Southern Geoscience Consultants Pty Ltd ACN 067 552 461 Forrestania WA Project Flying Fox Region Fixed Loop TEM - IR9 Loop **3D Model Results** West View with Hole

View Azimuth : 90 deg.

Conclusions



1. **Versatile for Different Exploration Needs**: The MobileMT system is highly adaptable for a variety of exploration tasks in different geological conditions.

2. Effective for Deep and Shallow Targets: It can detect both deep and shallow structures, covering a broad range of resistivity, and identifying small, discrete targets.

3. Works Well in Challenging geoelectrical Conditions: MobileMT excels under conductive overburden.

4. **Customizable for Specific Tasks**: Its configurations can be adjusted to meet the unique requirements of different projects, making it highly efficient.

5. **Future Potential**: MobileMT's flexibility and strong performance make it a valuable tool for exploration industry requirements



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