Glass Earth Gold LIMITED

A science driven **gold** exploration company

AIRBORNE ELECTRO-MAGNETICS

INTRODUCTION

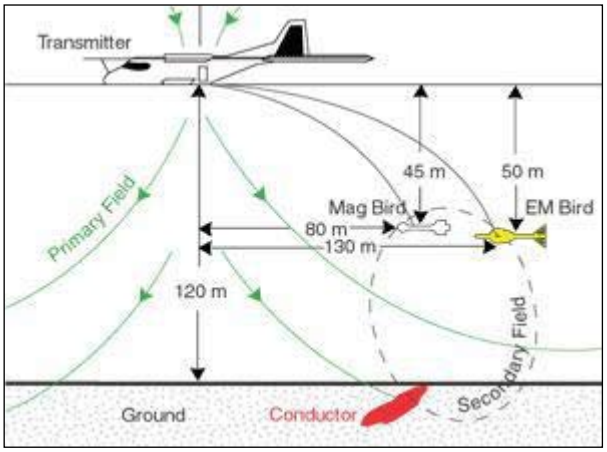
Electromagnetic (EM) / resistivity surveying is used to rapidly map the electrical properties of the subsurface, allowing information to be obtained about underground water (hydrology), soils and rocks. Resistivity measures how easily (or not) electrical current passes through a material. Fresh rock is generally a poor conductor of electricity so has a high resistivity. Metallic materials and water are good conductors and therefore have low resistivity.

Airborne EM surveys have very little environmental impact, allow the coverage of a large region, and are particularly useful for the areas where ground access is difficult. The surveys can be conducted using either a fixed wing aircraft, or a helicopter to provide greater operational flexibility and better lateral resolution.

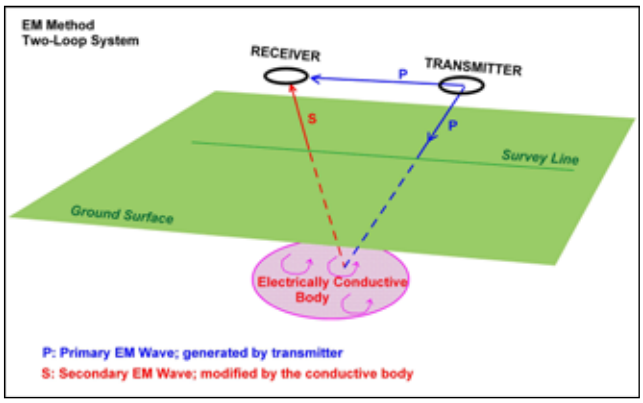
THE SCIENCE

The EM method is based on the response of the ground to the propagation of electromagnetic fields. Such response is associated mainly with the existence of conductive mineral bodies. However, electromagnetic anomalies can also result from non-economic sources such as graphite, water filled shear zones, clay layers etc. However, such non-economic sources are often indicative of the geological condition of the survey area and therefore can still provide some direct or indirect clues to the possible occurrence of economic mineral bodies.

The equipment for an EM survey usually consists of a transmitter for an alternating primary electromagnetic field (a coil or a large loop of wire) and a receiver (a coil) that detects the resultant field generated by the primary field and the secondary electromagnetic field response of the ground. Field operations can be carried out using either a two-loop system (transmitter and receiver are two coils of a similar size), a large source loop system (the transmitter coil is significantly larger than the receiver), or a single loop system (the same coil is used as a transmitter and receiver).

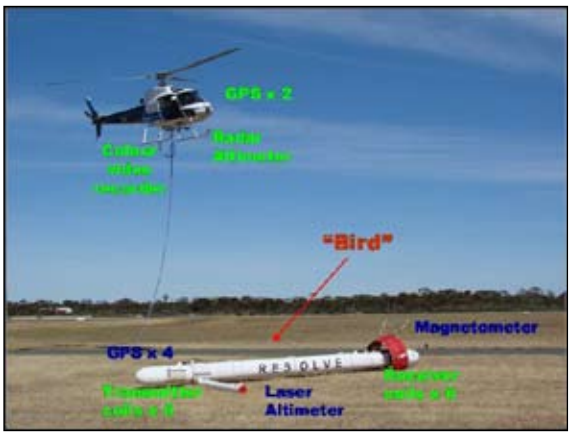


Nominal geometry for airborne EM survey (Fugro Airborne Surveys Australia)



Basic principle of EM survey (two-loop system)

The ground penetration of the EM method depends mainly on the frequency of the electromagnetic wave used, with lower frequencies providing deeper penetration. Hence, during the survey, the frequencies are adjusted to the likely depth(s) of the targets.



Fugro Resolve™ system

FLYING AN EM SURVEY

The plane or helicopter must fly at a set height over the ground at all times to get accurate readings. When the aircraft approaches a hill it must ideally climb to remain at the set height above the ground and then drop down into the valley afterwards.

In the case of Glass Earth's Otago Region airborne geophysical survey, a light helicopter (Squirrel series) flying at 60m above ground level tows a 9m sensor ("bird") at 30m AGL, following the contours of the ground.