

Spartan Magnetotellurics for Oil & Gas Exploration

Spartan MT Technology

Spartan MT is an electromagnetic survey technology that uses broadband natural energy sources such as lightning, solar activity and ionospheric resonances to induce current flow in the ground. Data are measured as electrical resistivities and correlate with lithology, structure, porosity and potential hydrocarbon occurrence. Spartan MT is a deep seeking imaging technology that routinely penetrates from 200 m to 10 km or more.

What is Spartan?

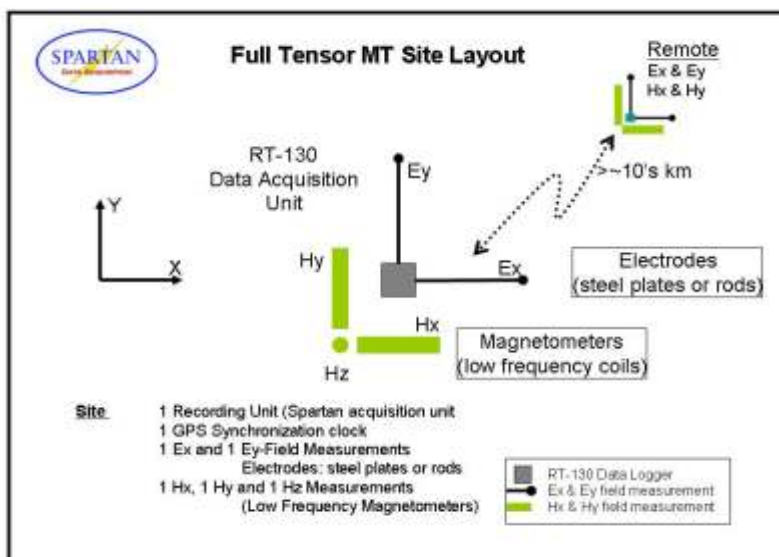
Magnetotellurics and the use of Spartan MT continue to increase in the oil and gas exploration industry. Spartan magnetotellurics is a proven technique for acquiring high quality ground magnetotelluric measurements in a variety of geologic terrains. Here we discuss:

- What is Spartan?
- How is it configured?
- What do the data look like?
- What are the benefits of Spartan?
- What are the benefits of Spartan for Oil and Gas?
- Why Quantec?



How is it Configured?

The following diagram shows the configuration of Spartan MT measuring components.



The key components of Spartan MT are shown. These include electrodes for measurement of electric fields in two directions and magnetometers for measurements of magnetic field in three directions (full tensor). Location of remote site for noise removal is also shown.

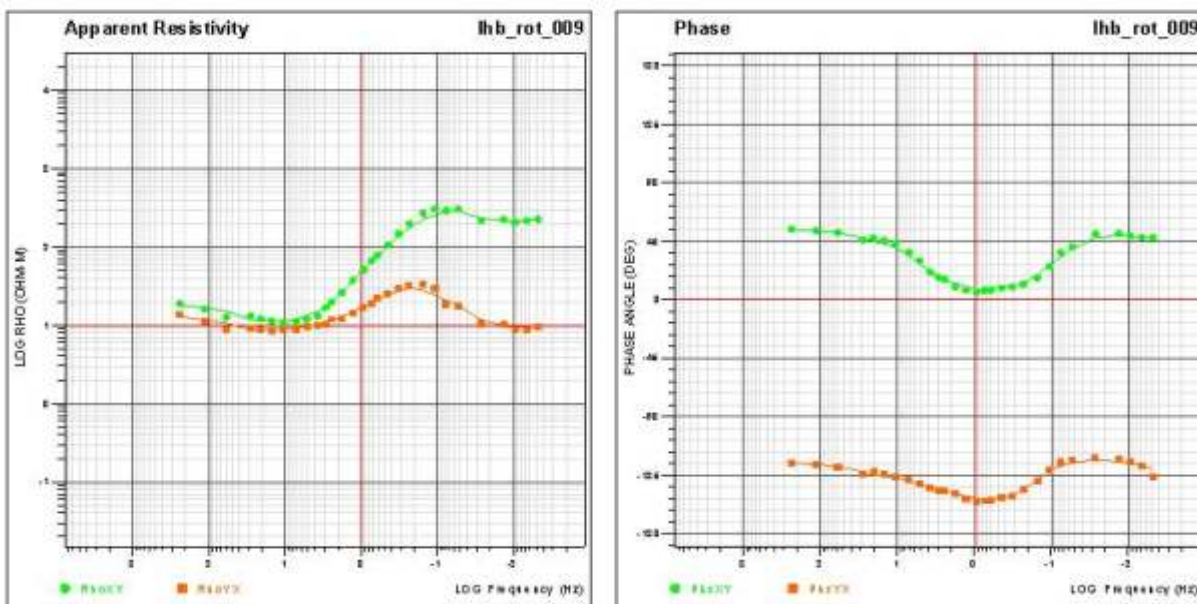
The following images capture some of the elements of field work -- conducted with a focus on data quality and safety in acquisition.



Various images showing layout of field equipment including recording boxes, cables, electrode and buried magnetometer sites.

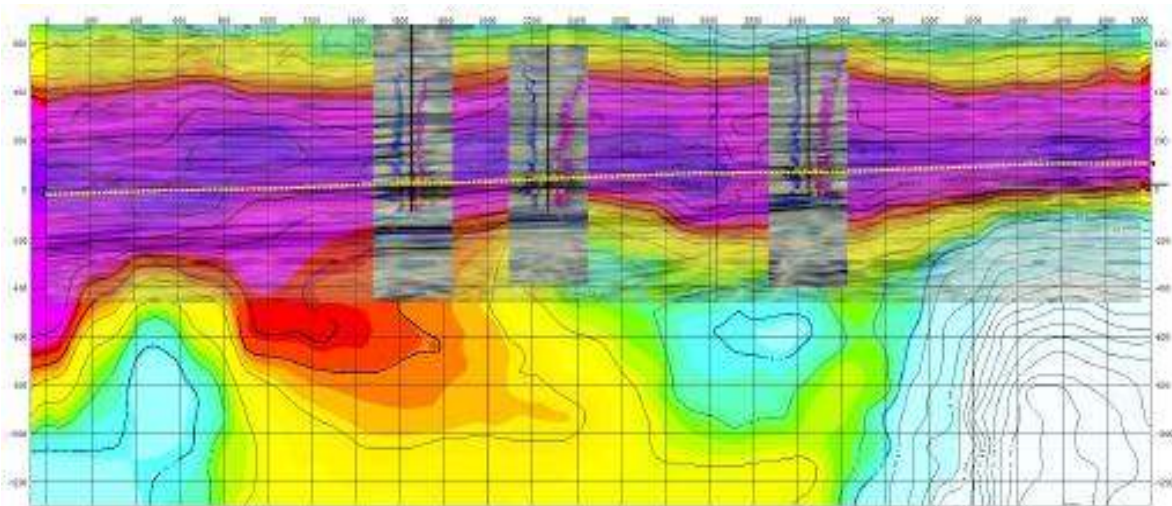
What do the Data Look Like?

Data acquired by the Spartan MT system are resistivities and phase values.



The resistivities are used for interpretation, typically using inverted (modeled) sections as shown on the following page.

The following modeled section is for a project in South America. Data are inverted using proprietary and commercial algorithms to produce sections that approximate geologic reality (i.e. the physical properties corresponding to geology, alteration and potentially, oil and gas).



The image above shows Deep MT results with reflection data indicating correlation between magnetotellurics and seismic, and augmentation of seismic results. White / blue areas indicate regions of basement. Overlying sediments are yellow / red / purple.

What are the Benefits of Spartan Magnetotellurics for Oil and Gas Exploration?

- Provides basin reconnaissance at low cost to effectively plan seismic coverage over prospective areas;
- Complements seismic data for multi-parameter interpretation to full depth of basin;
- Images structure, lithology and porosity related to oil & gas targets;
- Determines resistivity and depth of reservoirs;
- Provides comprehensive geologic imaging to depth in areas where seismic data quality or coverage is compromised;
- Provides additional parameters to aid target discrimination, reducing time and expense to discovery;
- Work can be done in 1D, 2D or 3D
- Images through volcanic cover units that limit the utility of seismic, aerogravity and aeromagnetic surveys;
- Crystalline rock is completely benign to MT survey results.



Oil & Gas Exploration

What are the Benefits of Spartan Magnetotellurics?

- Flexible survey - MT surveys using site intervals of 500 m, 1000 m separations and/or detailed surveys with site intervals of 200 m or less
- Depth of exploration - from 200 m to 10+ km
- Not limited to lines - random locations help accommodate topography, geology, culture, etc.
- Top quality data - full tensor measurement provides sensitivity and accuracy



Why Quantec?

Quantec is a multinational provider of advanced exploration technologies including magnetotelluric, electromagnetic, electrical, magnetic and gravimetric survey. Established in 1986, we are one of the largest ground geophysical companies in the world. We have proven expertise in MT acquisition and interpretation with over 250 MT surveys in the last 5 years.

Moreover, we have successfully adapted the technology from Mining (hard rock) to Uranium (sedimentary basins), Geothermal (passive and active systems) to Regional Geologic Studies (transects) and now to Oil & Gas exploration, giving us a wide range of knowledge in many geologic environments and for many applications.

Quantec Geoscience is your proven supplier of magnetotelluric solutions.



About Quantec

Quantec Geoscience Ltd. has been helping with discovery for over 20 years.

Our offices throughout the world allow access to a collective knowledge database of thousands of projects with practically all possible geophysical surveys.

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