World Leaders in Ground Geophysics
Company Overview

Toronto, Canada

Las Vegas, USA

Arequipa, Peru

Santiago, Chile

Mendoza, Argentina

Australia
Three Key Markets

Mineral exploration
• Grassroots & brownfield environments

Geothermal exploration
• Evaluate potential geothermal resources

Oil & Gas exploration
• Image through permafrost, heavy oil & volcanic cover
• Augment seismic in challenging environments with 3D resistivity
3 reasons to choose Quantec

1. Reliable
   - Proven record of client successes
   - Improved drill planning

2. Safe
   - High standards and safe record

3. Accurate
   - Most advanced technology
   - Improved drill success

750m depth is routine with Quantec
• Multinational provider
• Advanced, deep exploration technologies:
  • TITAN 24, ORION 3D and SPARTAN MT
  • Gravity, magnetics, CSAMT, TDEM and VLF surveys
• Over 5,000 projects completed in over 50 countries
Committed to Safety

Safety

- HSE management system
- Full-time HSE specialist
- Member of ISNetworld & GGSSA
- Insured with Chartis
- Pre-field risk assessment
- Training (First Aid, WHMIS, driving, ATV, worker HSE awareness training, etc.)

Experience

Our safe operations keep our most demanding clients happy. We operate safely for Junior Explorers and are approved operators for Major Mining companies like Rio Tinto, BHP and AREVA.
World Leading Deep Exploration Technology

2D Deep earth imaging – distributed data acquisition of multi-parameter geophysics: Resistivity, IP and broad band magnetotellurics (MT resistivity)

3D Imaging – complete 3D data acquisition for complex environments providing accurate surface to depth imaging of Resistivity, IP and MT

Flexible 2D and 3D deep resistivity imaging utilizing high resolution 24-bit MT

Broad Range of Expertise and Services

- Survey design, planning, acquisition, QA/QC, interpretation, data integration and consulting services
- Complete suite of conventional ground geophysical surveys including; gravity, magnetic, radiometric, IP (surface and borehole), TEM (surface and borehole), Max-Min, CSAMT and VLF
World Leaders in Ground Geophysics

QUANTEC Geoscience
Deep Innovation Since 2002
Quantec Technology

- 2D Distributed Array DCIP & MT
- Full 3D Data Acquisition of DCIP & MT
- High Resolution MT
- Full Service Geophysics

- Deep high resolution imaging
- Complex deep surface to depth environments
- Shallow to deep resistivity surveys
- Multiple applications
TITAN 24 DCIP & MT
Distributed multi-parameter data acquisition

- Penetrates deeper than conventional geophysics
- DC Resistivity, IP, MT
- Depth of investigation to 700 - 1,500 m
- Well-established in the industry
  - 15 Years
  - Over 400 surveys
- Effective for exploration in mine site environments
  - 60 surveys
What is TITAN 24 DCIP & MT?

• A “real-time” distributed array system
  • Multiple source-receiver combinations sampled simultaneously
  • Multiple redundancy resulting in high density data sets
  • Higher data density
  • Current monitor, real time quality control
  • Easily configured into standard DCIP source-receiver arrays (i.e. Pole- Dipole, Dipole-Dipole, Centre Pole, etc.)

• Time-series data acquisition:
  • Application of digital signal processing software
  • Full time series recorded, not discrete windows, therefore more complete data acquisition

• 24-bit sigma-delta filtering
  • Accurately measure very small voltages
TITAN 24 distributed acquisition system layout

Standard line length is 2400m

Current electrode (mobile)

Dipole variable from 50 to 400 metres

100m

Cross-line potential electrode (fixed)

In-line potential electrode (fixed)

Infinity current electrode (fixed)

100m

LAN link to Data harvesting centre

Multichannel acquisition module

Battery

Typical station set up

On line magnetometer site

This example: line length: 2400 m
24 Ex, 100m dipoles
12 Ey, 100m dipoles
25 current stations
2 Bx/Bz magnetometer sites

Remote magnetometer site

>20 km from line

Multi-channel acquisition module

TITAN 24
• Thorough, accurate imaging for improved drill planning
  • Detection of deeper, more subtle geophysical responses
  • Imaging through deep overburden conditions
  • Surveying in high noise environments (active mining operations)
  • Decreases the chance that the “big one” will be missed
  • Decreases overall exploration cost by providing better targeting information

• Broad industry use:
  • VMS, porphyry, gold, silver, copper
  • Nickel, PGE’s, IOCG, uranium, diamonds
  • Minesite
  • Geothermal and Hydrocarbons
Deep multi-parameter information

Top panel: MT Resistivity
- PW 2D inversion;
- Typically 1500 metres

Middle panel: DC Resistivity
- UBC smooth inversion;
- Typically 500-750 metres

Bottom panel: Chargeability
- UBC smooth inversion.
17 years of proven success

- Copper Mtn
  - 94m @ 0.72% Cu
  - 2.77 gpt Ag
  - 0.11 gpt Au
  - 292m @ 0.55% Cu
  - 2.23 gpt Ag
  - 0.14 gpt Au

- Kemess

Chloride anomaly and high chargeability anomaly.
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Mine site applications with TITAN 24

Mine Planning
• Ground investigations pre tailings
• Ground condemnation
• Monitoring

Delineate
• Resource mapping, extensions and discover new ore

Explore
• At mine sites and near mine exploration
High volume data allows windowing: needed to minimize cultural noise

Titan IP time-series (4 Rx dipoles)

Window good time-series

Decay after selective windowing

IP value = 16.4 ± 8.17

IP value = 27.2 ± 0.49
Some of our mine site clients...

- Copper Mountain
- Tenke Fungurume
- Kidd Creek
- Tati Nickel
- Raglan
- Ren
- Red Lake Gold Mine
- Geikle
- Voisey’s Bay
- Levack
- San Nicolas
- Black Fox Gold Mine
- Fortitude
- Chelopech
- Borroo
- Red Chris

Experience at over 60 minesites
ORION 3D DCIP & MT
- **Accurate imaging for complex environments**
  - Depth of investigation to 1,500 m for Resistivity, 750m for IP
  - Confidence in interpretation

- **True 3D acquisition**
  - Omni-directional simultaneous sampling

- **Multi-parameter**
  - DC Resistivity, IP, MT
ORION 3D layout

- True 3D DCIP measurement
- Simultaneous receiver sampling
- Omnidirectional data free from receiver geometry bias

Receiver dipole
Data recorder
Current injection
“Conceptual” current path
• Survey flexibility
  • Distributed acquisition allows for customization of the survey layout

• 3D geometry
  • The survey samples local geology from all directions simultaneously

• High signal-to-noise ratio
  • Low-noise electronics ensure high quality data

• Depth penetration
  • Large-offset data acquisition ensures maximum depth penetration

• High resolution
  • High data volume boosts the resolution of the survey and supports confident and accurate interpretations

Yields best representation of the subsurface for drill planning
Sampling everything (from all directions)

2D Data

3D Data

More than 140,000 samples
Omni-directional sampling for unparalleled definition in complex environments
ORION results

Looking North
(Az 360° Inc 25°)

UC Model

WS conductor with Phoenix drilling
ORION results

Mineralization inside geophysical target

Image “Before” drilling

Save Money... Survey says...

“DON’T DRILL HERE”
Orion 3D South Grid IP chargeability model
SPARTAN MT  full tensor magnetotellurics
Lower frequencies:
- f < 1 Hz
- Interaction of the solar wind with the earth’s magnetic field

Higher frequencies:
- f > 1 Hz
- Global lightning activity
Deep terrain-scale structural mapping
Regional potential target evaluation
Targeting of TITAN surveys
Basin mapping (depth of cover)
Crustal studies

Geothermal exploration - effective at mapping structures, cap rock, and reservoir morphology.

Oil & gas exploration - augment ambiguous seismic results. Volcanic cover and permafrost can limit the effectiveness of seismic data. SPARTAN MT readily penetrates through this type of geology. For best results, SPARTAN data should be integrated with other data types to develop a whole earth model.
SPARTAN MT results

Regional study, USA, depth to top 10 km

Portable, excellent tool for remote imaging, example geothermal exploration (4km depth)
SPARTAN MT SURVEY PLAN

14 KM

12 KM
3D Resistivity Inversion Model
Iso shells depicting low resistivity (volcanics)
MT survey utilising nominal 700 metres
3D Inversion
Resistivity plan view at 200m depth
Geophysical services - surveys

- IP/Resistivity
- Surface EM
- Downhole EM
- CSAMT
- Gravity
- Magnetics
- Magnetotellurics
Consulting and interpretive services

Registered Professional Geophysicists

- Enhancement of old data
  - Reprocessing, reinversion, integration of different data sets
- Survey planning and design
- Integrated interpretations
- Geophysical Modelling
- Targeting
Thank you!

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