

## Q4-2011 Newsletter

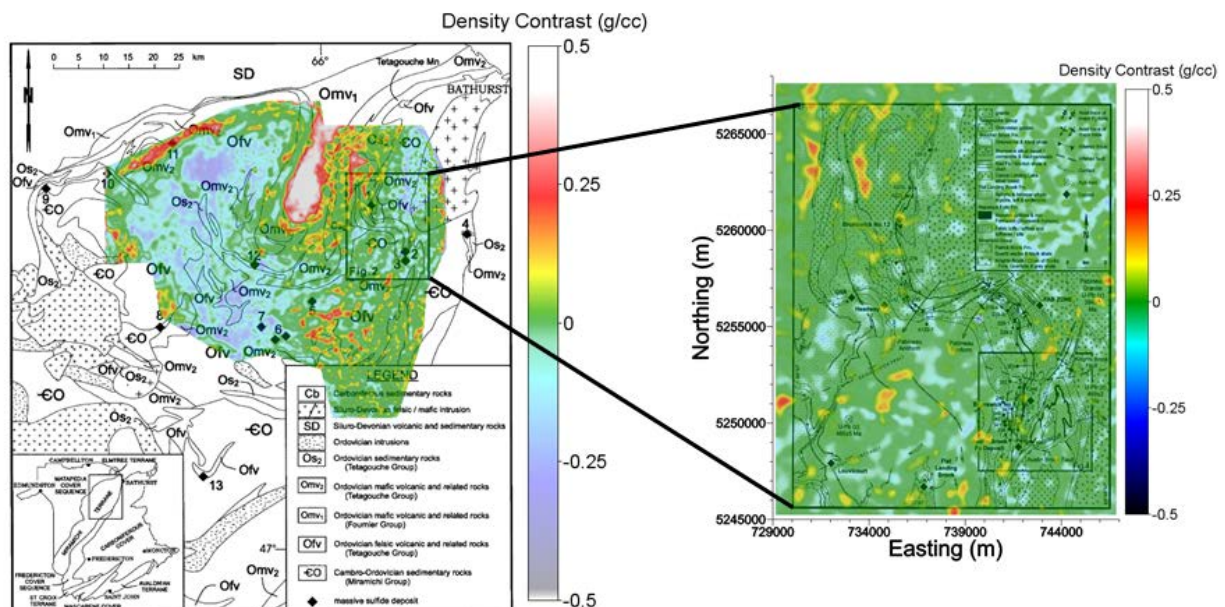
### Introducing TechnoImaging

Founded in 2005 by Professor Michael S. Zhdanov as a spin-off from the University of Utah, TechnoImaging is an independent Salt Lake City-based company which provides commercial software products, inversion and interpretation services, contract research and development, and project management for all electromagnetic and potential field methods relevant to mineral exploration and environmental monitoring.

### Breaking the billion cell barrier Giga-cell 3D potential field inversion

TechnoImaging offers the only massively parallel 3D inversion for gravity, gravity gradiometry, magnetics, and magnetic gradiometry. Our software is unprecedented in the unlimited scale of both survey and model that can be inverted – we are now routinely inverting entire surveys to mega- and giga-cell 3D density models. With our focusing inversion, we are able to recover 3D models with sharper boundaries and higher contrasts than obtained by smooth inversion.

During 2011, projects have been completed for Air-FTG and FALCON gravity gradiometry, full tensor magnetic gradiometry, and TMI data from Australia, Canada, Ethiopia, Mauritania, South Africa, the US, and Zambia.

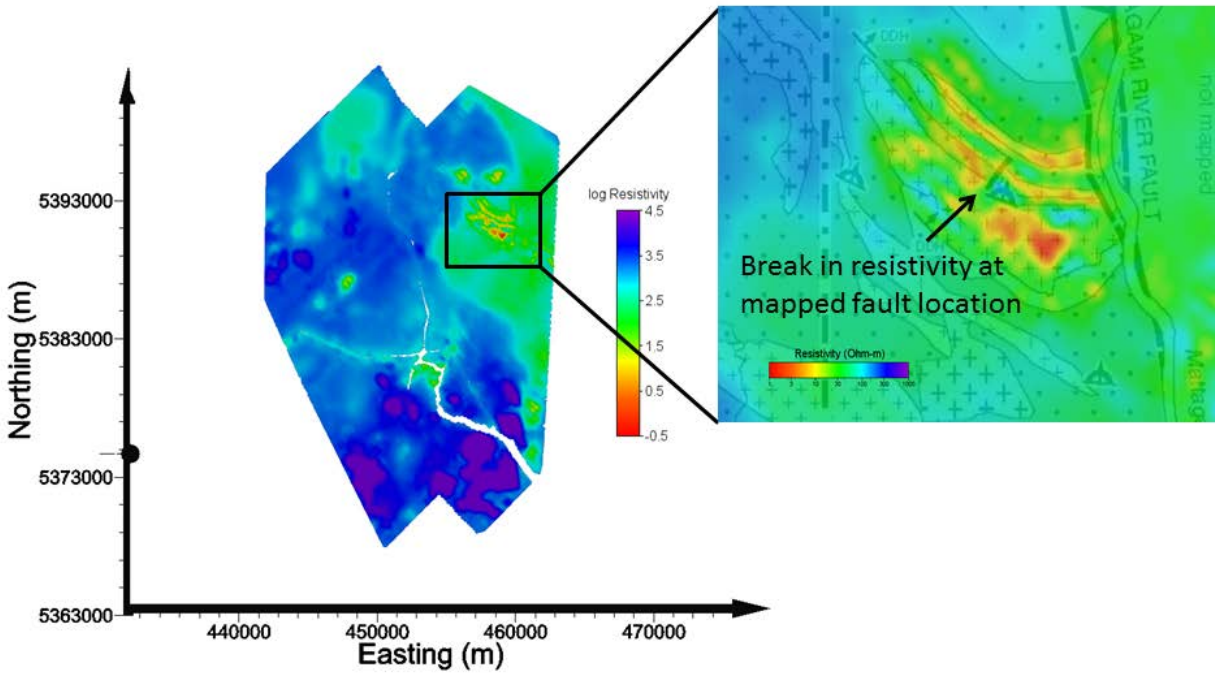


**3D inversion of all 15,500 line km of Air-FTG full tensor gravity gradiometry data over the Bathurst Mining Camp (BMC), New Brunswick, Canada. The 3D model contains over 80 million cells of 50 m x 50 m x 25 m resolution, and required less than a day to complete. The 3D density model contains features that correlate very well with known geology, and identifies many features which warrant further investigation.**  
**The BMC model suite is available from TechnoImaging on a non-exclusive basis.**

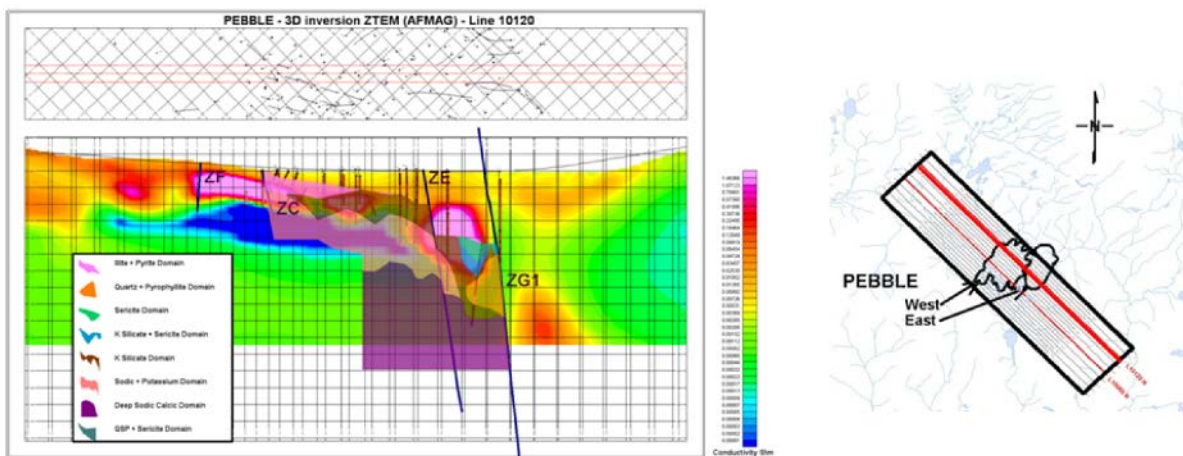
## Mega-cell 3D AEM inversion

TechnoImaging offers the only 3D inversion for entire airborne electromagnetic surveys for any AEM system using its unique moving footprint approach. We are now routinely inverting entire AEM surveys up to several thousand line km in size to 3D conductivity models with up to tens of millions of cells.

Since late 2010, over fifty 3D AEM inversion projects have been completed for Aerodat, AeroTEM, DIGHEM, GEOTEM, HELITEM, MEGATEM, RESOLVE, SPECTREM, TEMPEST, VTEM, ZTEM and AirMt data from Australia, Canada, Finland, Ghana, Peru, Sierra Leone, Tanzania, the US, and Zambia.



3D resistivity model obtained from joint inversion of 3,800 line km of inline and vertical MEGATEM II dB/dt data from the Kamiskotia area, Ontario. The 3D inversion was unconstrained, yet the 3D resistivity model captured geological complexity such as faults, conductive overburden, steeply dipping conductors.



3D resistivity model obtained from inversion of 250 line km of ZTEM data from the Pebble Cu-Au-Mo porphyry deposit, Alaska, with alteration patterns superimposed (from Pare et al., 2012). The 3D ZTEM inversion was unconstrained, yet the 3D resistivity model captured geological complexity such as alteration patterns, faults and overburden.

## 3D joint inversion of geophysical data

Technolmaging have developed an entirely new method and prototype software for the simultaneous 3D joint inversion of magnetic, magnetic gradiometry, gravity, gravity gradiometry, electromagnetic and seismic geophysical data.

We are soliciting interest from companies or organizations to support this exciting development, particularly through the contribution of geological and geophysical data for case studies.

Please contact [Glenn Wilson](#) for further details.

## Non-exclusive 3D inversion products

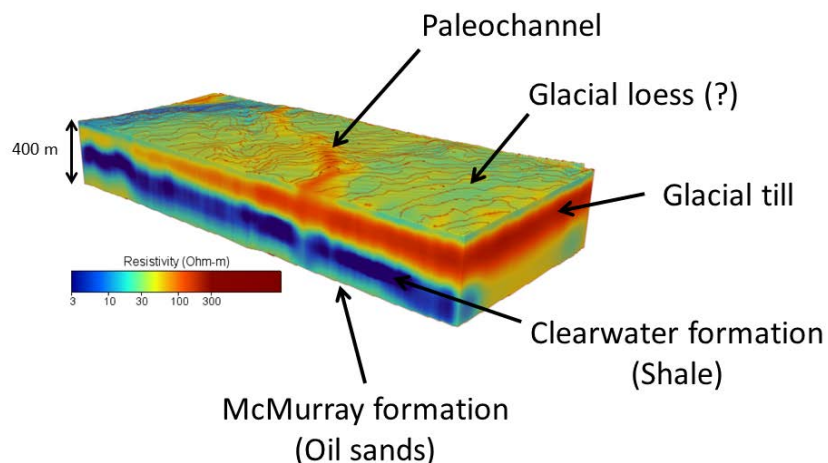
Technolmaging is developing a suite of non-exclusive 3D inversion products based on open file data.

At present, we have the following 3D models available for licensing:

- Alaska: A suite of 3D density models to depths of 50 km, 100 km, and 150 km, discretised to 500 m horizontal resolution, recovered from 3D inversion of 90,000 stations of USGS complete Bouguer gravity data.
- Broken Hill: A suite of 3D density models to depth of 2.4 km, discretised to 50 m cubic cells, recovered from 3D inversion of 5,600 line km of FALCON airborne gravity gradiometry data.
- Brunswick Mining Camp: A suite of 3D density models to depths of 3 km, discretised to 50 m x 50 m x 25 m cells, recovered from 3D inversion of all 15,500 line km of Air-FTG full tensor gravity gradiometry data.
- Alberta: Data and 3D resistivity models recovered from 3D inversion of 175 line km of AeroTEM data for oil sands exploration in northern Alberta, Canada.

Please contact [Technolmaging](#) for prices of these non-exclusive 3D inversion products.

We are now soliciting expressions of interest for the licensing of continental-scale 3D density models for Australia, Canada and the US.



**3D inversion of AeroTEM helicopter time-domain electromagnetic data  
for oil sands exploration in northern Alberta, Canada.**

**These data and 3D model are available from Technolmaging or AeroQuest on a non-exclusive basis.**

## **AMIRA International project P1058**

*“One of the major challenges for mining geophysics is the ability to confidently distinguish between economic and uneconomic mineralization.... The goal of this Project is to develop techniques for mineral exploration and mineral discrimination based on spectral induced polarization.”*

On July 1, TechnoImaging commenced [AMIRA International Project P1058 Spectral IP for 3D Mineral Discrimination](#).

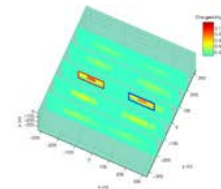
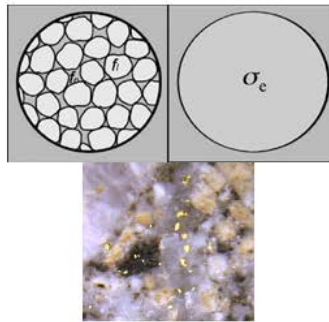
AMIRA P1058 is currently sponsored by Barrick Gold, BHP Billiton, First Quantum Minerals, Geophysical Resources and Services, Khumsup, Teck Resources, Quantec Geoscience, and Zonge International.

Opportunities exist for additional sponsors to join. Please contact [Glenn Wilson](#) for further information.



Acquisition

### Rock physics



3D inversion

**AMIRA P1058 will develop techniques for mineral discrimination based on spectral induced polarization using distributed acquisition systems, laboratory and petrophysical analyses, 3D inversion, and data mining.**

### **AMIRA P1058 upcoming events**

Sponsors Review Meeting (Teleconference): 9:00 am, 21 December 2012, AEST

Sponsors Review Meeting (Mantra at Southbank, Brisbane): 1:30 pm, 25 February 2012, AEST

## **Web-hosted cluster computing services**

TechnoImaging offers web-hosted cluster computing services for access to TechnoImaging's software or for hosting client's proprietary software. Clients have secure access to TechnoImaging's cluster resources.

## Upcoming Events

TechnoImaging will be represented at the following events during 2012:

- [AME BC Mineral Exploration Round Up](#), Vancouver, Canada, 23-26 January 2012
- [22<sup>nd</sup> ASEG Geophysical Conference and Exhibition](#), Brisbane, Australia, 26-29 February 2012

Keynote address: *Recent advances in large-scale 3D inversion of airborne geophysical data*, by Professor Michael S. Zhdanov

M. Combrinck, L. Cox, G. A. Wilson & M. S. Zhdanov: *3D VTEM inversion for delineating sub-vertical shear zones in the West African gold belt*, presented by Magdel Combrinck (Tau Geophysical Consultants)

S. J. Fraser (CSIRO), G. A. Wilson, L. H. Cox, M. Čuma, M. S. Zhdanov & M. A. Vallee (Fugro): *Self-organizing maps for pseudo-lithological classification of 3D airborne electromagnetic, gravity gradiometry and magnetic inversions*, presented by Steve Fraser (CSIRO)

P. Pare (Anglo American), A. V. Gribenko, L. H. Cox, M. Čuma, G. A. Wilson, M. S. Zhdanov, J. Legault (Geotech), J. Smit (Anglo American) & L. Polome (Spectrem Air): *3D inversion of SPECTREM and ZTEM data from the Pebble Cu-Au-Mo porphyry deposit, Alaska* (Poster), presented by Jean Legault (Geotech)

Natural Fields EM Forum, 26 February 2012

M. S. Zhdanov, A. V. Gribenko, M. Čuma & G. A. Wilson, *3D mega-cell inversion of land, marine, and airborne natural field EM data*

3D EM Inversion – An Update on Capabilities and Outcomes, 1 March 2012

- [PDAC Convention](#), Toronto, Canada, 4-7 March 2012

[KEGS 2012 PDAC Symposium](#), 3 March 2012

- [25<sup>th</sup> Symposium on the Application of Geophysics to Engineering and Environmental Problems](#) (SAGEEP), Tucson, Arizona, 25-29 March 2012
- [74<sup>th</sup> EAGE Conference and Exhibition](#), Copenhagen, Denmark, 4-7 June 2012
- [82<sup>nd</sup> SEG Annual Meeting and Exhibition](#), Las Vegas, Nevada, 4-9 November 2012

## **Recent publications**

M. Cuma, G. A. Wilson & M. S. Zhdanov, 2012, Large-scale 3D inversion of potential field data: Geophysical Prospecting, to appear.

M. S. Zhdanov, X. Liu (U. Utah), G. A. Wilson & L. Wan, 2011, [Potential field migration for rapid imaging of gravity gradiometry data](#): Geophysical Prospecting, **59**, 1052-1071, doi: 10.1111/j.1365-2478.2011.01005.x.

M. S. Zhdanov, H. Cai (U. Utah) & G. A. Wilson, 2011, [3D inversion of full tensor magnetic gradiometry \(FTMG\) data](#): Presented at SEG 81<sup>st</sup> Annual Meeting, San Antonio, Texas.

M. S. Zhdanov, A. V. Gribenko, M. Čuma, R. Smith (U. Utah) & M. Green (U. Utah), 2011, [Large-scale 3D inversion of EarthScope MT data from the area surrounding Yellowstone National Park](#): Presented at SEG 81<sup>st</sup> Annual Meeting, San Antonio, Texas.

M. S. Zhdanov, M. Čuma, L. Wan, X. Liu & G. A. Wilson, [3D potential field migration for rapid imaging of gravity gradiometry data – A case study from Broken Hill, Australia, with comparison to 3D regularized inversion](#): Presented at SEG 81<sup>st</sup> Annual Meeting, San Antonio, Texas.

G. A. Wilson, S. J. Fraser (CSIRO), L. H. Cox, M. Čuma, M. S. Zhdanov & M. A. Vallee (Fugro), 2011, [Lithological classification of large-scale 3D inversion of airborne electromagnetic, gravity gradiometry, and magnetic data: A case study from Reid-Mahaffy, Ontario](#): Presented at SEG 81<sup>st</sup> Annual Meeting, San Antonio, Texas.

## **Contact**

For further information on our products and services, please contact:

**Glenn Wilson**

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