

Bell Geospace *Air-FTG*[®]

Airborne 3D Full Tensor Gravity Gradiometry

Bell Geospace Advantages

Bell Geospace provides the most experienced worldwide source of high quality full tensor gravity gradient data at significant savings to any alternative

Bell Geospace has acquired quality FTG data for both major and junior resource companies worldwide

Bell Geospace conducts free sensitivity model studies to determine survey applicability

Bell Geospace delivers gravity gradients quickly for rapid decision making

Bell Geospace continuously improves *Air-FTG*[®] acquisition and processing procedures

For additional information please contact:

Americas:

Bell Geospace Inc.
2 Northpoint Drive
Suite 250
Houston, TX 77060
USA
Ph. 281-591-6900
Fax 281-591-1985
sales@bellgeo.com



www.bellgeo.com

Africa, Asia, Australia, Europe:

Bell Geospace Ltd.
Aberdeen Science & Technology Park
Bridge of Don
Aberdeen, AB22 8GU
United Kingdom
Ph. +44 1224 227700
Fax +44 1224 227702
sales@bellgeo.com

Air-FTG[®] Applications

Diamond Exploration

Base Metal Exploration

Precious Metal Exploration

Petroleum Exploration

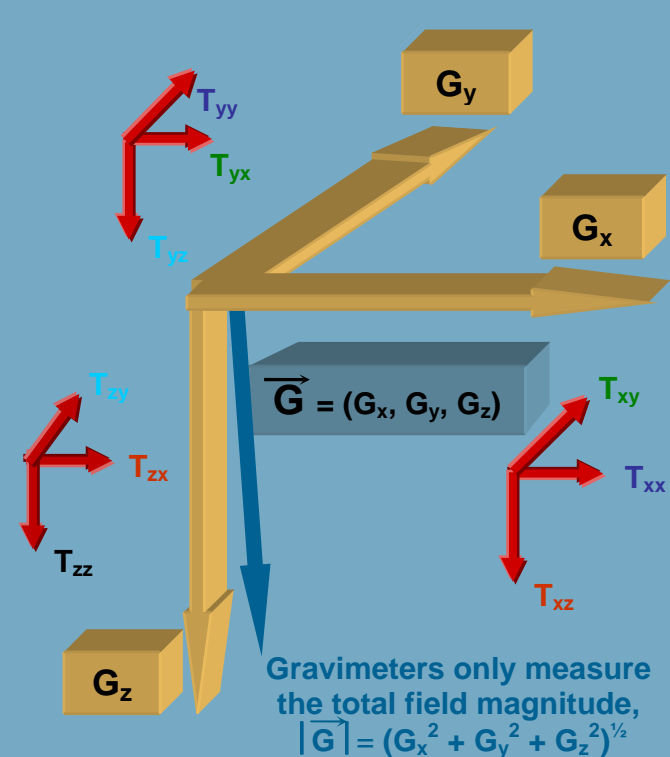
Ground Water Studies

Prospect Level Geological Mapping

Regional Gravity & Fault Studies



The Gravity Tensor



$$T_{i,j} = \begin{bmatrix} T_{xx} & T_{xy} & T_{xz} \\ T_{yx} & T_{yy} & T_{yz} \\ T_{zx} & T_{zy} & T_{zz} \end{bmatrix}$$

$$T_{xx} + T_{yy} = -T_{zz} \text{ (Laplacian)}$$

$$T_{xy} = T_{yx}$$

$$T_{xz} = T_{zx}$$

$$T_{yz} = T_{zy}$$

Gravity is a vector field with both a magnitude and a direction. Conventional gravimeters only measure the magnitude of the gravity field at one location. *Air-FTG*[®] gradiometry measures the variation of the three vector components in each of the three primary directions, thus producing a nine component tensor, $T_{i,j}$. Since the tensor is Laplacian, i.e., the sum of the diagonal components equals zero, and since opposite sides of the diagonal are equivalent, as indicated by like colors, only five of the nine tensor components are independent (T_{xx} , T_{xy} , T_{xz} , T_{yy} , T_{yz}). Additionally, the T_{zz} component is also displayed because it most closely relates to the subsurface geology.

Gradients are measured in units of Eötvös (E), where 1 E = 0.1 milligal/km.

Airborne Gravity Gradiometry

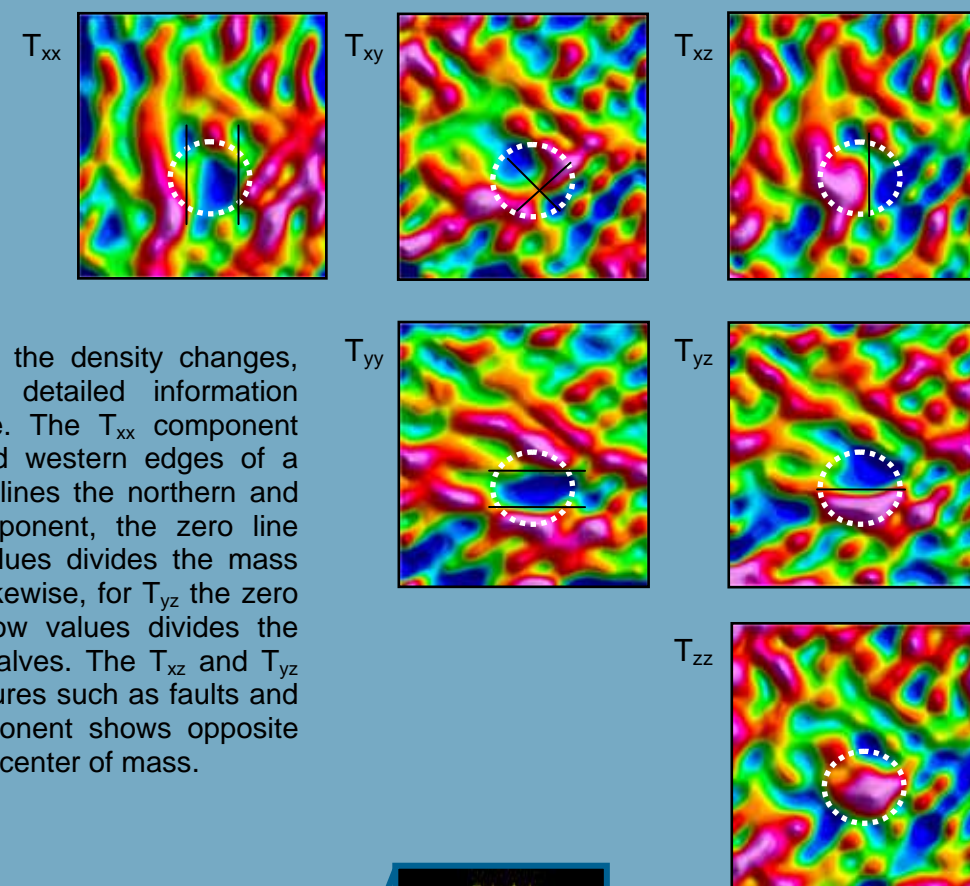
Air-FTG[®] measures changes in the gravity field between matched pairs of accelerometers to effectively cancel much of the noise caused by aircraft accelerations. Thus the gradiometer has the resolution to detect effects of relatively small geologic features with small density contrasts.

Air-FTG[®] records a large volume of data quickly. In-line measurements are recorded each second (approximately every 60 meters) and, depending upon the survey objective, survey lines can be spaced from fifty meters to hundreds of meters apart. Collecting several hundred line kilometers each day, a large survey area can be covered within days or weeks.

In addition to in-field checks, each day's *Air-FTG*[®] data is electronically transferred to processing centers where specialists determine its quality. Noisy lines are quickly identified and, if necessary, reacquired. Daily data transfers and high quality acquisition allow production of final maps within a few weeks of completing the survey.

Bell Geospace has developed proprietary data processing methods that use all of the tensor components to reduce noise and improve *Air-FTG*[®] data quality.

Interpreting Tensor Components



Whereas T_{zz} maps a plan view of the density changes, other tensor components reveal detailed information relating to the geological structure. The T_{xx} component effectively outlines the eastern and western edges of a feature, and the T_{yy} component outlines the northern and southern edges. For the T_{xz} component, the zero line between adjacent high and low values divides the mass into eastern and western halves. Likewise, for T_{yz} the zero line between adjacent high and low values divides the mass into northern and southern halves. The T_{xz} and T_{yz} components also identify linear features such as faults and lithological contacts. The T_{xy} component shows opposite highs and lows that point toward the center of mass.

