# Aeromagnetic Compensation Software

## Designed for 4 Sensor Gradient Measurement

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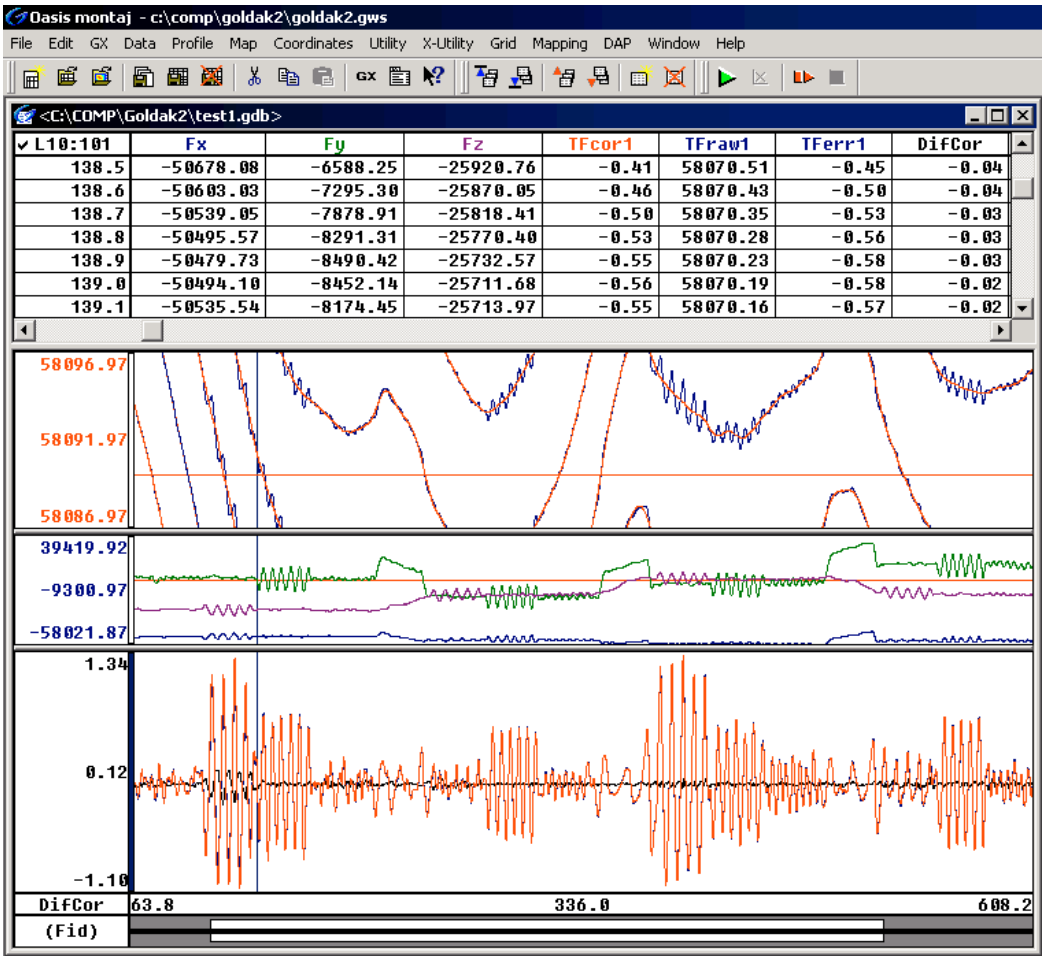
Aeromagnetic measurements include a noise component from the aircraft as well as the signal of interest arising from the underlying geology. This magnetic interference from the aircraft can be modeled with components representing permanent and induced magnetization as well as the effect of eddy currents induced in the conductive surface of the wings and fuselage. An additional source of measurement error is the heading effect associated with optically pumped sensors, particularly the popular cesium magnetometers. Depending on the orientation of the sensor within the earth's field, several nT of variation is typical. Scott Hogg & Associates have developed a compensation system to measure, calibrate and remove these errors from raw aeromagnetic data. The calibration process requires the aircraft to carry out a standard sequence of pitches, rolls and yaws on four headings. This data is analyzed and the error model calibrated for up to 4 sensors simultaneously. The calibration coefficients are then applied to the survey data post flight. Both the calibration and the correction software is available as a GX routine for ease of use within the popular Geosoft environment.

Presented below is a sample calibration flight, carried out by a Goldak Airborne Survey Navajo Trimaxial aircraft, equipped with 4 sensors. The process analyses the input from 3 fluxgate sensors, Fx, Fy and Fz and the raw magnetic signal TFraw1. The process identifies the error to be compensated, TFerr1, and develops a model that predicts the correction needed, TFcor1, to cancel the error. In the example below the difference between the actual and predicted error is minimal and the profiles superimpose. The difference between actual and predicted error, DifCor, shows an average peak to peak excursion within 0.03 to 0.05 nT with one motion near the start of the profile reaching a maximum peak to peak variation of 0.35 nT. The figure of merit for the aircraft as compensated here is 0.8 nT, a very good result.




**Total Magnetic Field**

-Raw
-Compensated

**Fluxgate Sensors**

-Fx -Fy -Fz

**Aircraft error / noise**

-Actual
-Predicted
-Residual error after compensation