Logistics
Report

For the

High Resolution Helicopter Magnetic and
Gamma-ray Spectrometric Airborne Geophysical Survey

Flown over

BBB and Dade Blocks, YT, Canada

From

Carmacks, YT, Canada

Carried out on behalf of

WOLVERINE MINERALS CORP.

By

New-Sense Geophysics Limited

Toronto, Canada
September 27th, 2011
(HMR110713-report)

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1. INTRODUCTION

A high sensitivity helicopter magnetic and gamma-ray spectrometric airborne survey was carried out for Wolverine Minerals Corp. (Client) over the project areas known as BBB and Dade blocks, located approximately 50 km west of Carmacks, YT, Canada.

New-Sense Geophysics (NSG) flew the survey under the terms of an agreement with Client dated July 13th, 2011 (Appendix G).

The survey was flown between July 13th and July 18th, 2011. A total of 396 line kilometers (BBB block) and 427 line kilometers (Dade block) of field magnetic and radiometric data was flown, collected, processed and plotted.

The geophysical equipment was comprised of 1 high-sensitivity Cesium-3 magnetometer mounted in a fixed stinger assemble, and a 1024-channel spectrometer with four downward looking crystals (total 16 liters), and one upward looking crystal (total 4 liters). Airborne ancillary equipment included; digital recorders, fluxgate magnetometer, radar altimeter, and global positioning system (GPS) receiver. The GPS receiver provided accurate real-time navigation and subsequent flight path recovery. Surface equipment included a magnetic base station with GPS time synchronization, and a PC-based field workstation which was used to check the data quality and completeness on a daily basis.

The technical objective of the survey was to provide high-resolution total field magnetic and radiometric maps suitable for anomaly delineation, detailed structural evaluation, and identification of lithologic trends. Fully corrected magnetic and radiometric maps were prepared by New-Sense Geophysics Limited, in their Toronto office, after the completion of survey activities.

This report describes the acquisition, processing, and presentation of data for the Wolverine Minerals Corp. airborne survey over BBB and Dade blocks flown from Klaza camp and Carmacks, YT, Canada (Tables 2.1-2.2 and Figure 2.1).

2. SURVEY LOCATION

Datum: NAD83
Projection: Universal Transverse Mercator Zone 8N
Local Datum Transform: North America – Canada and USA

Table 2.1: BBB Block Coordinates

UTM Zone 8N	
NAD83_X	**NAD83_Y**
365438	6902072
373282	6897592
371473	6894543
368259	6896403
367652	6895669
366893	6896087
366412	6895416
362831	6897580
365438	6902084

Table 2.2: Dade Block Coordinates

UTM Zone 8N	
NAD83_X	**NAD83_Y**
391140	6893040
386855	6888934
391261	6884750
395425	6888891

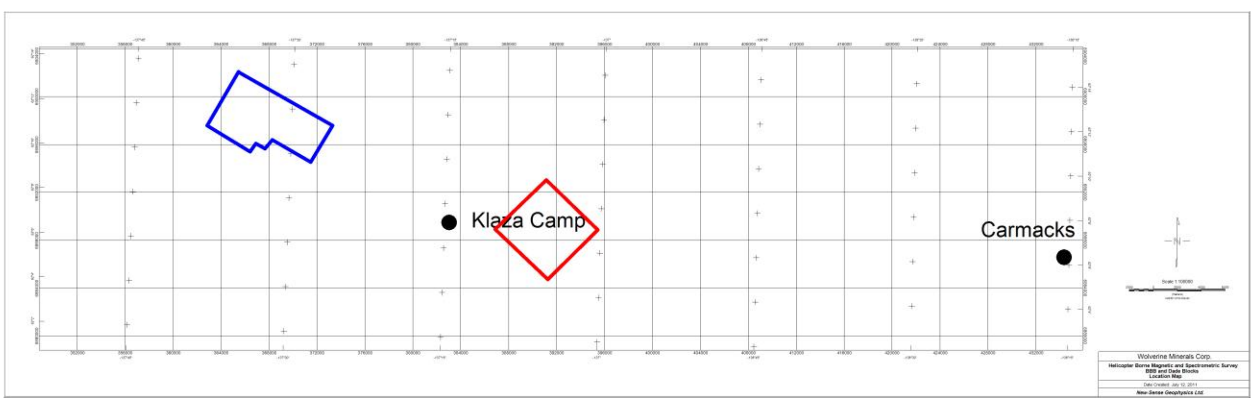


Figure 2.1 Map depicting outlines of the BBB block (blue) and Dade block (red). Coordinate system, WGS84, World, UTM Z8N. UTM grid cell size 4km.

3. PERSONNEL

3.1 FIELD OPERATIONS

New-Sense Geophysics Ltd., Geophysicist:	Pawel Starmach
Northern Air Support Ltd., Pilot:	Jim Stibbart

3.2 OFFICE DATA PROCESSING AND OFFSITE QA/QC

QA/QC (NSG):	Andrei Yakovenko
.	
Data Processing and Grids (NSG):	Andrei Yakovenko Pawel Starmach
Maps (NSG):	Andrei Yakovenko
Logistics Report (NSG):	Andrei Yakovenko

3.3 PROJECT MANAGEMENT

New-Sense Geophysics Ltd.:	Andrei Yakovenko, Vice President, Operations
Wolverine Minerals Corp.	Heather Smith, P.Geo, Project Geologist/Supervisor

4. SURVEY PARAMETERS

BBB block:

Traverse Line spacing:	100 m
Control Line spacing:	1000 m
Average Terrain clearance:	35 m
Navigation:	GPS
Traverse Line direction:	29^0, 209^0
Control Line direction:	119^0, 299^0
Measurement interval:	0.02/0.1 sec for magnetic; 1.0 sec for radiometric; 1.0 sec for GPS
Groundspeed (average):	141 km/hr
Measurement spacing (average):	3.9 m/0.1 sec for magnetic; 39/1.0 sec for radiometric

Dade block:

Traverse Line spacing:	100 m
Control Line spacing:	1000 m
Average Terrain clearance:	31 m
Navigation:	GPS
Traverse Line direction:	135^0, 315^0
Control Line direction:	45^0, 225^0
Measurement interval:	0.02/0.1 sec for magnetic; 1.0 sec for radiometric; 1.0 sec for GPS
Groundspeed (average):	109 km/hr
Measurement spacing (average):	3.1 m/0.1 sec for magnetic; 31/1.0 sec for radiometric

Airborne Digital Record:
- Line Number
- Flight Number
- Radar Altimeter
- Total Field Magnetics
- Live Time
- Thorium counts
- Potassium counts
- Uranium counts
- Upward looking Uranium counts
- Cosmic counts
- Down Spectrum
- Up Spectrum
- Total Counts
- Time (System and GPS)
- Raw Global Positioning System (GPS) data
- Magnetic compensation parameters (fluxgate mag.)

Base Station Record:
- Ambient Total Field Magnetics
- Raw Global Positioning System (GPS) data
- Time (System and GPS)

5. AIRCRAFT AND EQUIPMENT

5.1 AIRCRAFT

The aircraft used was a Bell 206 B3 helicopter (C-GMPS) equipped with a Cesium magnetometer mounted in a fixed stinger assembly and RS-500 airborne spectrometer mounted in the storage compartment. The aviation company providing the aircraft service was Northern Air Support based in Kelowna, BC, Canada.

5.2 AIRBORNE GEOPHYSICAL SYSTEM

5.2.1 MAGNETOMETER

One Scintrex CS-3 optically pumped Cesium split beam sensor was mounted in a fixed stinger assembly. The magnetometer's Larmor frequency output was processed by a KMAG-4 magnetometer counter, which provides a resolution of 0.15 ppm (in a magnetic field of 50,000 nT, resolution equivalent to 0.0075 nT). The raw magnetic data was recorded at 50 Hz, anti-aliased with 51 point COSINE filter and resampled at 10 Hz .

5.2.2 MAGNETIC COMPENSATION

The proximity of the aircraft to the magnetic sensor creates a measurable anomalous response as a result of the aircrafts movement. The orientation of the aircraft with respect to the sensor and the motion of the aircraft through the earth's magnetic field are contributing factors to the strength of this response. A special calibration flight, Figure of Merit (i.e., FOM), was flown to record the information necessary to compensate for these effects.

The FOM maneuvers consist of a series of calibration lines flown at high altitude to gain information in each of the required line directions. During this procedure, pitch, roll and yaw maneuvers are performed on the aircraft (typical angle ranges are 10^o pitch, 10^o roll, and 10^o yaw). Each variation is conducted three times in succession (first pitch, then roll, then yaw), providing a complete picture of the aircraft's effects at designated headings in all orientations.

A three-axis Bartington fluxgate magnetometer (recorded at 50 Hz) was used to measure the orientation and rates of change of the magnetic field of the aircraft, away from localized terrestrial magnetic anomalies. The QC Tools digital compensation algorithm was then applied to generate a correction factor to compensate for permanent, induced, and eddy current magnetic responses generated by the aircrafts movements.

5.2.3 GPS NAVIGATION

A U-BLOX RCB-LJ sixteen channel GPS receiver, which is an integral component of the iNAV V3 computer system, was used to run the flight control system and provide precise positioning of the aircraft.

5.2.4 ALTIMETER

A TRA 3500 radar altimeter was mounted inside the stinger. This instrument operates with a linear performance over the range of 0 to 2,500 feet and records the terrain clearance of the sensors. The raw radar altimeter data was recorded at 50 Hz, anti-aliased with a 21 point COSINE filter and re-sampled at 10 Hz.

5.2.5 GEOPHYSICAL FLIGHT CONTROL SYSTEM

New-Sense's iNAV V3 geophysical flight control system monitored and recorded magnetometer, spectrometer, altimeter, and GPS equipment performance. Input from the various sensors was monitored every 0.005 seconds for the precise coordination of geophysical and positional measurements. The input was recorded fifty times per second (one time per second in the case of GPS and radiometric data).

GPS positional coordinates and terrain clearance were presented to the pilot by means of a panel mounted indicator display. The magnetometer response, forth difference, altimeter profile and profiles of the radiometric windows were also available on the touch screen display, for real-time monitoring of equipment performance.

5.2.6 SPECTROMETER

The RS-500 Airborne Spectrometer with RSX-5 detector pack, manufactured by Radiation Solutions Inc. (RSI), was used for the survey. The RS-500 spectrometer has a multi-peak gain stabilization algorithm and is capable of recording 1024 channels with accuracy of 0.1 to 10 counts/second.

The RS-500 is connected to a crystal pack comprising four downward looking crystals (16 liters total) and one upward looking crystal (4 liters total). The downward crystals record the radiometric spectrum from 410 KeV to 2810 KeV over 1024 discrete energy windows, as well as from a cosmic ray channel that detects photons with energy levels above 3.0 MeV. From these 1024 channels, the standard Total Count, Potassium, Uranium and Thorium channels are extracted. The upward crystal is used to measure and correct for atmospheric Radon interference. The shock-protected Sodium Iodide (Thallium) crystal package is unheated and automatically stabilizes with respect to the multiple peaks. The RS-500 provides raw data that has been automatically corrected for gain, base level, ADC offset, and dead time.

5.2.7 IDAS DIGITAL RECORDING

The output of the CS-3 magnetometer, fluxgate magnetometer, altimeter, temperature, pressure, GPS coordinates, and time (system and GPS), were recorded digitally on a Compact Flash drive at a sample rate of fifty times per second (one time per second for GPS) by the iNAV V3 system.

5.2.8 PRESSURE AND TEMPERATURE

A Honeywell Precision Pressure Transducer, model PPT0020AWN2VA-A, was used to record the ambient pressure and temperature during the survey. The device was mounted within the helicopter stinger. The pressure and temperature output units were mbar and degrees Celsius respectively.

5.2.9 SPECTROMETER DIGITAL RECORDING

The output of the RS-500 spectrometer, GPS coordinates, and time (UTC), were recorded digitally on an internal RS-500 flash drive at a sample rate of 1 Hz. After each flight the data were copied and synchronized using UTC clock with the iDAS digital records.

5.3 GROUND MONITORING SYSTEM

5.3.1 BASE STATION MAGNETOMETER

A Scintrex CS-3 optically pumped cesium split beam sensor was used at the base of operations within the airport boundaries, in an area of low magnetic gradient and low/free from cultural electric & magnetic noise sources. The sensitivity and absolute accuracy of the ground magnetometer is +/- 0.01 nT. Data was recorded continuously at least every one second throughout all survey operations in digital form on a TC-10 data acquisition system. Both the ground and airborne magnetic readings were synchronized based on the GPS clock.

5.3.2 RECORDING

The output of the magnetic and GPS monitors was recorded digitally on a dedicated TC-10 computer. A visual record of the last three hours was graphically maintained on the computer screen to provide an up to date appraisal of magnetic activity. At the conclusion of each production flight raw GPS and magnetic data were transferred to the main field compilation computer.

5.4 FIELD COMPILATION SYSTEM

A field laptop computer was used for field data processing and presentation. The raw data was imported to Geosoft Oasis montaj for QA/QC and processing purposes. After the data was checked for quality control, the database with uncompensated magnetic readings was exported to QC Tools software package for magnetic compensation and base station data merging purposes. The compensated database was then imported back to Oasis for the subsequent and final processing.

6. PRE-SURVEY SPECTROMETER CALIBRATIONS

Calibrations, and testing of the RS-500 (SN 5516) airborne gamma-ray spectrometry system were carried out on July 20th and 21st, 2011 in the vicinity of the survey area. The installed equipment and configurations were selected to conform to the contracts technical specifications.

Calibration of the spectrometer system is a vital process to airborne gamma-ray spectrometry. The calibration of the spectrometer system involved three tests:

- **Calibration Pad** measurements, which are used to determine the "spectral overlap" (Compton scattering) coefficients. The calibration test was performed within a 12 month period before the survey by the manufacturer (Radiation Solutions Inc.), at its headquarters location in Mississauga, Ontario.

- **Cosmic Flight Test**, which is used to determine cosmic coefficients and aircraft background noise, was conducted on July 20th, 2011.

- **Height Attenuation Test**, which determined the altitude attenuation coefficients, was conducted on July 21st, 2011.

6.1 ENERGY WINDOWS

The airborne radiometric technique requires measurement of count rates for specific energy regions or windows in the natural gamma-ray spectrum. The standard energy regions (in accordance with the International Atomic Energy Agency (IAEA) 323), and their corresponding channel limits are:

Table 6.1 Downward spectrometer energy windows

Designation	Energy Limit (keV)		Channel Limit (inclusive) Unit Values	
	Lower	Upper	Lower	Upper
Total Count (TC)	410	2810	137	937
K	1370	1570	457	523
U	1660	1860	553	620
Th	2410	2810	803	937
U (upward)	1660	1860	553	620
Cosmic	3200	infinity		

6.2 CALIBRATION PAD TEST

The Compton stripping coefficients as provided by RSI are listed below:

Table 6.2 Compton stripping coefficients

Stripping Ratios	Spectrometer (SN 5516)	"normal" values
Th into U (alpha = a23/a33)	0.271	0.250
Th into K (beta = a13/a33)	0.399	0.400
U into K (gamma = a12/a22)	0.752	0.810
U into Th (a = a32/a22)	0.046	0.060
K into Th (b = a31/a11)	0	0
K into U (g = a21/a11)	0	0.003

6.3 COSMIC FLIGHT TEST

In each of the spectral windows, the radiation increases exponentially with height due to radiation of cosmic origin. As well, the aircraft itself contributes a constant background to the count rate. By completing a series of flights within the same region, over a range of altitudes, these background contributions can be determined.

6.3.1 SETUP AND MEASUREMENT PROCEDURE

1. A resolution check was completed at the aircraft base prior to the cosmic test to insure the sensitivity and accuracy of the spectrometer.
2. Once the aircraft reached the desired altitude (first at ~9,200 feet), survey data were recorded for approximately ten minutes.
3. Step 2 was then repeated at the following remaining altitudes: ~10,300, 11,300 and 12,300 feet above sea level (see table 6.3).

Table 6.3 Cosmic Test data

	Cosmic Test Flight Data (average counts)					
Altitude (ft)	Cosmic	UU	K	U	Th	TC
9236	217	4	23	14	14	318
10293	256	4	26	15	16	358
11316	297	5	29	19	20	412
12279	344	6	32	21	23	463

6.3.2 RESULTS FROM COSMIC FLIGHT TEST

At each altitude, the raw data for the five windows of interest (Th, K, U, TC, and U upward) were evaluated for quality. The mean values were then extracted and plotted against the cosmic background window (see Appendix A). The result is a linear trend, where the slope and intercept represent the cosmic stripping ratio and the aircraft background respectively. The results from the graphs are summarized below.

Table 6.4 Cosmic and aircraft background coefficients

Cosmic Flight Test Result		
Element	Cosmic	Aircraft Background
K	0.071	7.7387
U	0.0592	0.751
Th	0.0735	0
TC	1.1587	65.06
UU	0.0168	0.0828

6.4 ALTITUDE ATTENUATION TEST

The height attenuation of the spectrometer systems was calculated by flying a series of passes across a line over flat ground with uniform radioelement ground concentration. The test range was flown by acquiring data on a series of seven passes over a set path, at the following altitudes: 50, 100, 150, 200, 300, 500, 700, and 1000 feet above ground.

6.4.1 RESULTS FROM ALTITUDE ATTENUATION TEST

The airborne data from the altitude attenuation test was checked for quality, edited and divided into lines, where each line represents a pass. The radiometric windows were then corrected for background (aircraft and cosmic) and stripped of Compton contributions. After averaging the data for each line, the four windows of interest (K, U, Th, and Total Count) were plotted against the altimeter in order to obtain the height attenuation. The results were obtained using an exponential regression, where the slope represents the attenuation coefficient and the 'y' intercept represents the counts at 0 feet (see Tables 6.7-6.8 and Appendix A).

Table 6.5 Height Attenuation coefficients

Element	Altitude attenuation coefficients
K	-0.014
U	-0.007
Th	-0.009
TC	-0.009

6.5 RADON HOVER TEST

On all survey flights one radon normalization test was flown before or after data collection.

The test consisted of the helicopter hovering over a designated test area at nominal survey altitude once per flight. The tests consisted of the pilot being guided using the iDAS navigation system, at fixed speed, and for approximately 5 min to allow for adequate statistics to be collected.

Since no noticeable radon fluctuations were observed on any of the flights, no radon corrections corrections were applied to the data set.

6.6 RADIOELEMENT GROUND CONCENTRATIONS AND SYSTEM SENSITIVITIES

The radiometric ground concentrations were measured using a calibrated portable spectrometer (RSI-125) during the same time as the airborne altitude attenuation flights took place (i.e., July 21st, 2011). The sensor was positioned one meter above the soil and away from the operators' body in the vicinity of altitude attenuation test strip. Fourteen 300-second measurements were taken over the length of the calibration range.

The resulting mean radiometric equivalent ground concentrations for the calibration range on were as follows:

Table 6.8 Ground concentrations

Radio Element	Ground Concentration	
Potassium	0.9	%
Equivalent Uranium	1.86	ppm
Equivalent Thorium	5.28	ppm
Total	35.98	nGy/h

Using these ground concentrations and the altitude attenuation calibration flight data, the System Sensitivities were obtained:

$$S = N/C$$

Where:

- S is the sensitivity for each window
- N is the striped count rate in the window at the survey altitude (i.e, 30m)
- C is the respective ground radioelement concentration.

With the following results:

Table 6.9 Sensitivities @ 30m from

	Sensitivities @ 30m
K	89.34 $cps/(\%)$
U	6.43 $cps/(ppm)$
Th	3.98 $cps/(ppm)$
TC	22.78 $cps/(nGy/h)$

Note: Determining of radioelement ground concentrations and system sensitivities were not part of the singed agreement. Such data are made available to the client as a courtesy.

7. OPERATIONS AND PROCEDURES

7.1 FLIGHT PLANNING AND FLIGHT PATH

The block outline coordinates (section 2.0) were used to generate pre-calculated navigation files. The navigation files were used to plan flights at the designated traverse line spacing of 100 meters and control lines of 1000.

Preliminary flight path maps and magnetic maps were plotted and updated, to monitor coverage of the survey area.

7.2 BASE STATION

The magnetic base station was established in magnetically quiet area at the camp site at latitude: 62.118220; Longitude: -137.250146.

The base station readings were monitored to ensure that the diurnal variation were within the peak-to-peak envelope of 20 nT from a long chord distance equivalent to a period of two minutes.

7.3 AIRBORNE MAGNETOMETERS

The FOM test of the performance of the CS-3 and fluxgate magnetometers was performed on July 20th, 2011 in order to monitor the ability of the system to remove the effects of aircraft motion on the magnetic measurement.

The FOM maneuvers consisted of a series of calibration lines flown at high altitude (10,000+ ft above sea level) to gain information in each of the required line directions. During this procedure, pitch, roll, and yaw maneuvers were performed on the aircraft.

The following ranges were used:

Pitch: 10-15^o
Roll: 10-15^o
Yaw: 10-15^o

The total FOM noise was 1.26nT with an envelope of 0.18nT (Appendix B).

7.4 THORIUM RESOLUTION TESTS

In order to monitor the resolution of the crystal pack, a twice-daily a resolution test of the spectrometer was performed in RadAssist (RSX-5 spectrometer interface program) using ~2000 thorium background counts per crystal.

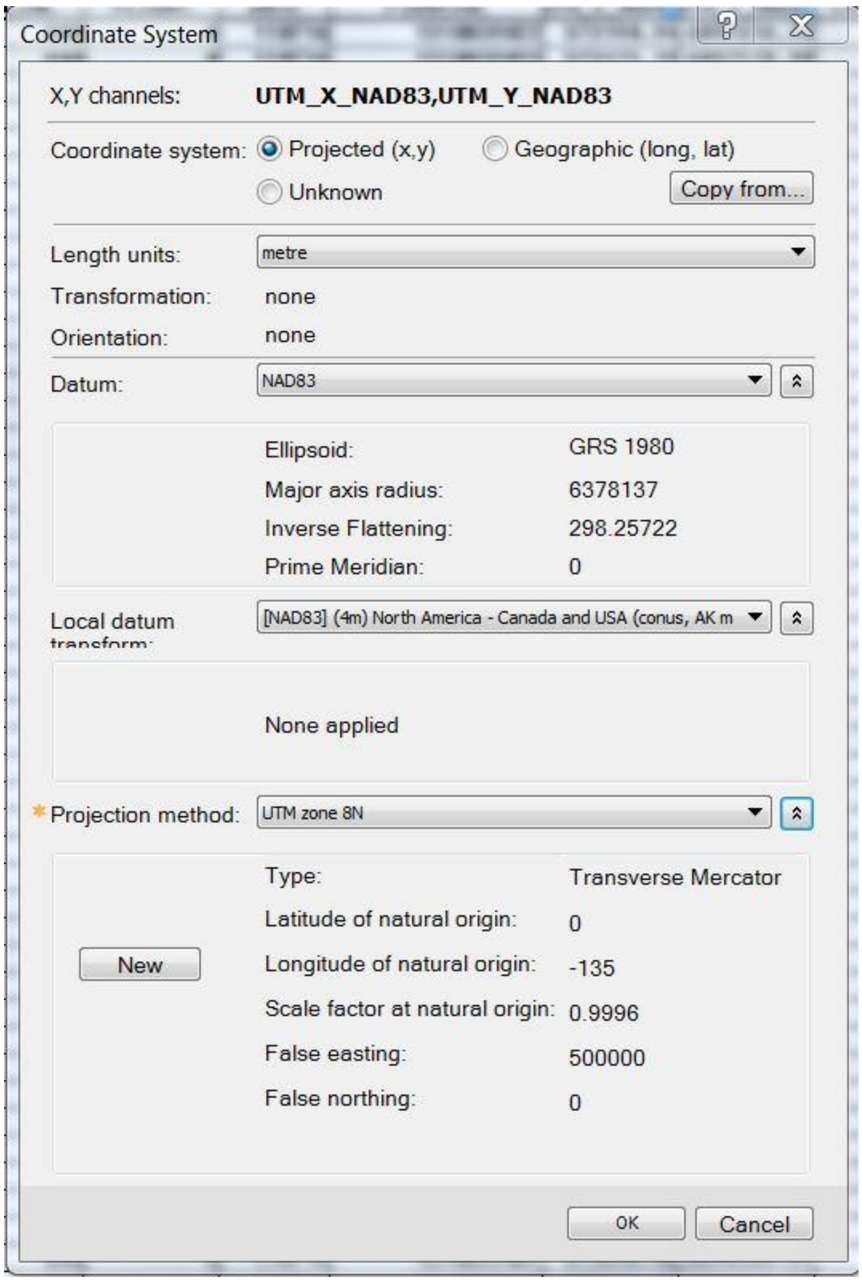
The results from the resolution tests were always found to be within the contract specifications (see Appendix D for the daily test results).

7.5 DATA COMPILATION

Data recorded by the airborne and base station systems was transferred to the field compilation system. As each flight was completed, the following compilation operations were carried out:

7.5.1 FLIGHT PATH CORRECTIONS

The navigational correction process yields a flight path expressed in WGS84, World and transformed to correspond to NAD83, North America – Canada and USA.



All 1.0 Hz GPS records were linearly interpolated and resampled at 10 Hz (0.1 sec) intervals.

7.5.2 MAGNETIC CORRECTIONS

7.5.2.1 FILTERING AND COMPENSATION

The raw 50Hz magnetic data were filtered, along with the fluxgate magnetometer data, with a 51 cosine anti-aliasing algorithm and re-sampled at 10 Hz.

The filtered and re-sampled data were stored in the MAG_FILT channel.

Then the MAG_FILT data were compensated for permanent, induced, and eddy current magnetic noise generated by the aircraft using data from the fluxgate magnetometer error (see Appendix B).

The compensated magnetic data were then stored in the MAG_COMP channel.

7.5.2.2 DIURNAL CORRECTIONS

The compensated magnetic data were adjusted to account for diurnal variations. When the magnetic variations recorded at the base station recognized to be caused by man-made sources, (such as equipment, vehicles passing by the sensor), they were removed and gaps interpolated.

The diurnal data were recorded at 1Hz and filtered with a 31-point low pass filter. The filtered data were then subtracted directly from the aeromagnetic measurements to provide a first order diurnal correction.

After base station removal, the total magnetic field values become very small. To bring the total magnetic measurements back to ‘normal’ values, project averages (i.e., BBB: 57,309.73 nT; Dade: 57,304.79) from the base station readings were added back to the magnetic data.

The resulting base station corrected data were stored in the MAG_DIURNAL_CORR channel.

7.5.2.3 HEADING CORRECTIONS

Optically pumped magnetic sensors have an inherent heading error, typically 1 to 2 nT peak-to-peak, as the sensor is rotated through 360 degrees. On flight line directions of the opposite heading, the affect is reasonably predictable.

<u>BBB block:</u>

The BBB block did not have visible systematic heading error. For that reason no heading corrections were applied to that block.

<u>Dade block:</u>

A heading test flight was flown at magnetically quite area at 10,000+ ft above sea level altitude, with the following results:

Table 7.1 Heading Test flight results

Direction (deg.)	**Mean on line (nT)**	**Mean in direction (nT)**	**Mean on heading (nT)**	**Error (nT)**
45	57109.4			
45	57107.17	57108.29		-0.6
225	57106.58			
225	57107.59	57107.09	57107.69	0.6
135	57092.96			
135	57094.88	57093.92		1.46
315	57098.21			
315	57095.45	57096.83	57095.38	-1.46
360	interpolated heading error for true north			-1

The following heading corrections were applied to the data set:

```
/ Geosoft Heading Correction Table
/=   Direction:real:i
/=   Correction:real
/      Direction   Correction
     45    -0.6
     135     1.46
     225    0.6
```

315	-1.46
360	-1

The output of the heading corrected data were stored in MAG_HEADING_CORR channel.

7.5.2.4 LAG CORRECTIONS

There are two potential types of Lag offsets when collecting airborne data: time lag and distance lag.

NSG insures that there is no time lag in the data acquisition system by recording unique markers every 1-second based on the GPS time stamp (associated with the EXACT change in GPS positioning). This information is used to realign (if necessary) the individual data records.

The distance lag is determined by dividing the distance from the GPS antenna to the sensor head by the averaged sample rate distance.

BBB block:

5.3 / 3.9 = 1.36 records

A lag correction of -1 records was applied to the MAG_DIURNAL_CORR channel and stored in the MAG_LAG_CORR channel.

Dade block:

5.3 / 3.1 = 1.71 records

A lag correction of -2 records was applied to the MAG_HEADING_CORR channel for and stored in the MAG_LAG_CORR channel.

7.5.2.5 IGRF CORRECTIONS

The total field strength of the International Geomagnetic Reference Field (IGRF, 2010 model) was calculated for every data point, based on the spot values of Latitude, Longitude and altitude. This IGRF was removed from the measured survey data on a point-by-point basis from the lag corrected channel.

After IGRF correction the total magnetic field values become negative. To bring the total magnetic measurements back to 'normal' values an average (i.e., BBB: 57,848.05nT; Dade: 57,265.12nT) of IGRF values based on the whole project were added back to the magnetic data.

The IGRF corrections were applied to the MAG_LAG_CORR channel and stored in the MAG_IGRF_CORR channel.

7.5.2.6 LEVELING CORRECTIONS

After the data were corrected for IGRF, a survey traverse/control line intercepts array/matrix (i.e., Simple Leveling) was created for determining differences in magnetic field at the intersection points. The somewhat rugged terrain of the survey blocks, resulted in some line-to-line difference in altitude, and relatively strong magnetic anomalies made magnetic signal at some Traverse/Control line intersection points quite different. As a result, some of those intersection points needed to be manually adjusted in order to reduce line-to-line magnetic differences.

The resulting simple leveled magnetic data were stored in MAG_SMPL_LVL channel.

Further it was decided to apply microlevelling techniques to the conventionally leveled magnetic data (see Appendix F for full description of the procedure).

The following key parameters were used:

Table 7.2 Magnetic data microlevelling parameters

Block Name	Line Spacing (m)	Line Direction (deg.)	Grid Cell Size (m)	Decorrugation Cutoff (m)	Amplitude Limit (nT)	Amplitude Limit Mode	Naudy Filter Limit
BBB BK	100	29	20	400	13.7	clip	200
Dade BK	100	135	20	400	35	clip	0

The resulting microleveled magnetic data were stored in the TMI_FINAL channel.

7.5.3 VERTICAL DERIVATIVE

A 1-st Order Vertical Derivative (VDV) dataset was calculated using 2D FFT2 algorithm based on final TMI grids. The resulting VDV grids were sampled back to the databases.

The VDV data were stored in the VDV channel.

7.5.4 DIGITAL TERRAIN MODEL (DTM)

The DTM data was produced by first adjusting the GPS sensor height to that of the radar altimeter height (lowering GPS height by 2.1m). Next the radar altimeter channel (in meters) was subtracted from the GPS height data producing a raw DTM channel. Due to changing satellite positions (constellation configuration) and varying atmospheric conditions, the receiver may measure slightly varying GPS heights line-to-line. In addition, due to rugged topography, the radar altimeter measures inaccurately when the helicopter is pitched forward position (example: approach a steep hill), as the radar beam would be directed away or down the slope. Because of these inherent errors, the raw DTM channel required leveling.

It was decided to apply a microlevelling technique to the raw DTM data, developed by Paterson, Grant & Watson Limited and available through Geosoft Oasis montaj as miclev.GX extension (see Appendix F for full description of the procedure).

The following key microlevelling parameters were used:

Table 7.3 DTM data microlevelling parameters

Block Name	Line Spa cing (m)	Line Direction (deg.)	Grid Cell Size (m)	Decorrugation Cutoff (m)	Amplitude Limit (nT)	Amplitude Limit Mode	Naudy Filter Limit
BBB BK	100	29	20	400	15	clip	0
Dade BK	100	135	20	400	15	clip	0

The final DTM data were stored in the DTM channel name.

7.5.5 GRIDDING

The final TMI, VDV, and DTM grids were produced from the TMI_FINAL, VDV, and DTM channels respectively.

The data were gridded using a bi-directional line gridding method with a grid cell size of 20 meters, Akima interpolation method for across and down line spline and trend angles perpendicular to those of traverse line directions (i.e., 45^0).

7.5.6 RADIOMETRIC DATA CORRECTIONS

7.5.6.1 LIVE TIME CORRECTIONS

The spectrometer uses the notion of “live time” to express the relative period of time the instrument was able to register new pulses per sample interval.

The live time correction is applied to the total count, potassium, uranium, thorium and upward uranium channels.

The formula used to apply the correction is as follows:

$$C_{LT} = C_{raw} \times \left(\frac{1000}{LT} \right)$$

Where:

- C_{LT} is the live time corrected channel
- C_{raw} is the raw channel
- LT is the Live Time channel

7.5.6.2 PRE-FILTERING

The cosmic channel data were processed with a 15-point low pass filter to remove spikes.

The radar altimeter channel while recorded at 50Hz was filtered with 21-point COSINE filter and then sampled to 1Hz.

7.5.6.3 AIRCRAFT AND COSMIC BACKGROUND

Aircraft background and cosmic stripping corrections (see section 6.3.2) were applied to the live corrected total count, potassium, uranium, thorium and upward uranium channels using the following formula:

$$C_{ac} = C_{LT} - \left(ac + bc \times cof \right)$$

Where:

- C_{ac} is the background and cosmic corrected channel
- C_{LT} is the live time corrected channel
- ac is the aircraft background for this channel
- bc is the cosmic stripping coefficient for this channel
- cof is the filtered cosmic channel

All negative counts after this correction step were replaced with zeroes.

7.5.6.4 RADON CORRECTION

No Radon corrections were applied to the data.

7.5.6.5 COMPTON STRIPPING

Following the cosmic and background corrections the potassium, uranium and thorium were corrected for spectral overlap (see section 6.2). First the stripping ratios α, β, and χ were modified according to altitude. Then an adjustment factor based on the reversed stripping ratio (a), uranium into thorium, was calculated.

$$\alpha h = \alpha + hef \times 0.00049$$
$$\beta h = \beta + hef \times 0.00065$$
$$\chi h = \chi + hef \times 0.00069$$

Where:

- α, β, χ are the Compton stripping coefficients
- $\alpha h, \beta h, \chi h$ are the height corrected Compton stripping coefficients
- hef is the height above ground in meters

The stripping corrections are then carried out using the following formulas:

$$ar = \frac{1}{1 - a\alpha h}$$

$$Th_c = (Th_{bc} - aU_{rc}) \times ar$$

$$U_c = (U_{rc} - Th_{bc}\alpha h) \times ar$$

$$K_c = K_{bc} - \beta h Th_c - \chi h U_c$$

Where:

- U_c, Th_c, and K_c are corrected Uranium, Thorium and Potassium
- $\alpha h, \beta h, \chi h$ are the height corrected Compton stripping coefficients
- U_{bc}, Th_{bc}, and K_{bc} are background and cosmic corrected Uranium, Thorium and Potassium
- ar is the backscatter correction
- a is the reverse stripping ratio U into Th

All negative counts after this correction step were replaced with zeroes.

7.5.6.6 EQUIVALENT HEIGHT AT STP

The following formula was used to calculate Equivalent Height at STP:

$$H_e = H \times \left(\frac{273.15}{T + 273.15} \right) \times \left(\frac{P}{1013.25} \right)$$

Where:

- H is the observed height
- H_e is the equivalent height at STP
- T is the temperature in degrees Celsius
- P is the barometric pressure in mbar.

7.5.6.7 HEIGHT ATTENUATION CORRECTIONS

The Total Count, Potassium, Uranium and Thorium data were then corrected to a nominal survey altitude of 35m (see section 6.4.1) using the following equation:

$$C_a = C \times e^{-\mu(h_0 - h_e)}$$

Where:

- C_a is the output altitude corrected channel
- C is the input channel
- μ is the attenuation correction for that channel
- h_e is the STP height
- h_0 is the nominal survey altitude

The altitude attenuation corrected data were then stored in U_CORR, Th_CORR, K_CORR and TC_CORR channels.

7.5.6.8 LEVELING OF HEIGHT ATTENUATION CORRECTED DATA

The resulting height attenuation corrected data were further microleveled using the following key parameters (see Appendix F for full description of the procedure).

Table 7.4 BBB block radioelement microlevelling parameters

Radioelement	Line Spacing (m)	Line Direction (deg.)	Grid Cell Size (m)	Decorrugation Cutoff (m)	Amplitude Limit (nT)	Amplitude Limit Mode	Naudy Filter Limit
U	100	29	20	400	3	Clip	100
K	100	29	20	400	8	Clip	100
Th	100	29	20	400	3	Clip	100
TC	100	29	20	400	62	Clip	100

Table 7.5 Dade block radioelement microlevelling parameters

Radioelement	Line Spacing (m)	Line Direction (deg.)	Grid Cell Size (m)	Decorrugation Cutoff (m)	Amplitude Limit (nT)	Amplitude Limit Mode	Naudy Filter Limit
U	100	135	20	400	3	Clip	100
K	100	135	20	400	11	Clip	100
Th	100	135	20	400	3	Clip	100
TC	100	135	20	400	74	Clip	100

The resulting microleveled altitude attenuation corrected line data were then stored in the final U_FINAL, K_FINAL, Th_FINAL and TC_FINAL channels.

Note: in the instances where no microlevelling was applied (i.e., all of the control lines), the data in the final channels were copied directly from U_ CORR, Th_ CORR, K _CORR and TC _CORR.

7.5.6.9 CONVERSION TO APPARENT RADIOELEMENT CONCENTRATIONS

The next step is to convert the corrected potassium (K_FINAL channel), uranium (U_FINAL channel) and thorium (Th_FINAL channel) to apparent radioelement concentrations (see section 6.6) using the following formula:

$$eE = C_{cor}/s$$

Where:

- eE is the element concentration $K_{\%}$ and equivalent element concentration of U_{ppm} & Th_{ppm}
- s is the experimentally determined sensitivity
- C_{cor} is the fully corrected channel

The resulting apparent concentration data were stored in K_Percent, eU and eTh channels.

Note 1: experimentally determined sensitivities (Table 6.9, Section 6.6) were used when calculating the above apparent radioelement concentrations. These channels were used in producing of the corresponding grids.

Note 2: determining of apparent radioelement concentrations were not part of the singed agreement. Such data are made available to the client as a courtesy.

7.5.6.10 AIR ABSORPTION DOSE RATE

Finally the natural air absorption dose rate was determined using the following formula:

$$E = 13.078 \times K_{\%} + 5.675 \times eU_{ppm} + 2.494 \times eTh_{ppm}$$

Where:

- E is the air absorption rate (nGy/h)
- $K_{\%}$ is the concentration of potassium (%)
- eU_{ppm} is the equivalent concentration of potassium (ppm)
- eTh_{ppm} is the equivalent concentration of potassium (ppm)

The resulting natural air absorption rate data were stored in E channel.

Note 1: K_percent, eU and eTh channels (Section 7.5.5.9) were used when calculating the above air absorption rate. This channel was used in producing of the corresponding grid.

Note 2: Determining of the absorption rate was not part of the singed agreement. Such data are made available to the client as a courtesy.

A detailed description of how most of the procedures, formulae and constants were determined could be found in:

I.A.E.A. *Report, Airborne Gamma Ray Spectrometer Surveying*, Technical Report Series No. 323, 1991.
and

I.A.E.A *Guidelines for Radioelement Mapping Using Gamma Ray Spectrometry Data*, Technical Document No. 1363, 2003.

7.5.6.11 GRIDDING

The radiometric data were gridded from U_FINAL, Th_FINAL, K_FINAL and TC_FINAL channels (all in counts/sec) using a bi-directional line gridding method with a grid cell size of 30 meters, Akima interpolation method for across and down line spline and trend angles perpendicular to those of traverse line directions (i.e., 45^0).

7.5.6.12 TERNARY MAP

The radioelement ternary map was produced by creating individual grids for each of the three radioelements (potassium, thorium and uranium), then assigning a specific colour to each. Cyan represents thorium, yellow uranium, and magenta potassium. The relative concentrations of the radioelements are represented by the blends of the three colours.

8. MAP PRODUCTS AND DIGITAL DATA DELIVERABLES

The following is the list of items delivered to **Wolverine Minerals Corp..**

1) **Hard Copy Maps for BBB and Dade Blocks @ 1:20,000 scale (x2)**:

- Maps of Total Magnetic Intensity
- Maps of 1st order Vertical Derivative
- Maps of Digital Terrain Model
- Maps of Ternary Image (Th, U and K)
- Maps of Potassium counts
- Maps of Thorium counts
- Maps of Uranium counts
- Maps of Total Count

2) **Hard Copy Logistics Report (x2)**:

3) **Digital Copy (DVD) Maps BBB and Dade Blocks @ 1:20,000 scale (x2)**:

- Maps of Total Magnetic Intensity
- Maps of 1st order Vertical Derivative
- Maps of Digital Terrain Model
- Maps of Ternary Image (Th, U and K)
- Maps of Potassium counts
- Maps of Thorium counts
- Maps of Uranium counts
- Maps of Total Count

4) **Digital Copy Grids (DVD) for BBB and Dade Blocks (x2)**:

- Grids of Total Magnetic Intensity (nT)
- Grids of 1st order Vertical Derivative (nT/m)
- Grids of Digital Terrain Model (m above MSL)
- Grids of Potassium (counts/sec)
- Grids of Thorium (counts/sec)
- Grids of Uranium (counts/sec)
- Grids of Total Count (counts/sec)

5) **Digital Copy (DVD) for BBB and Dade Blocks (x2)**:

- Magnetics data databases: MAGNETIC_*blockname*_BK.gdb (See Appendix C for details)
- Radiometric data database: RADIOMETRIC_*blockname*_BK.gdb (See Appendix C for details)

6) **Digital Copy (DVD) Logistics Report (x2)**

9. SUMMARY

This report describes the logistics of the survey, equipment used, field procedures, data acquisition and presentation of results.

The various maps included with this report display the magnetic and radiometric properties of the survey area. It is recommended that the survey results be reviewed in detail, in conjunction with all available geophysical, geological and geochemical information.

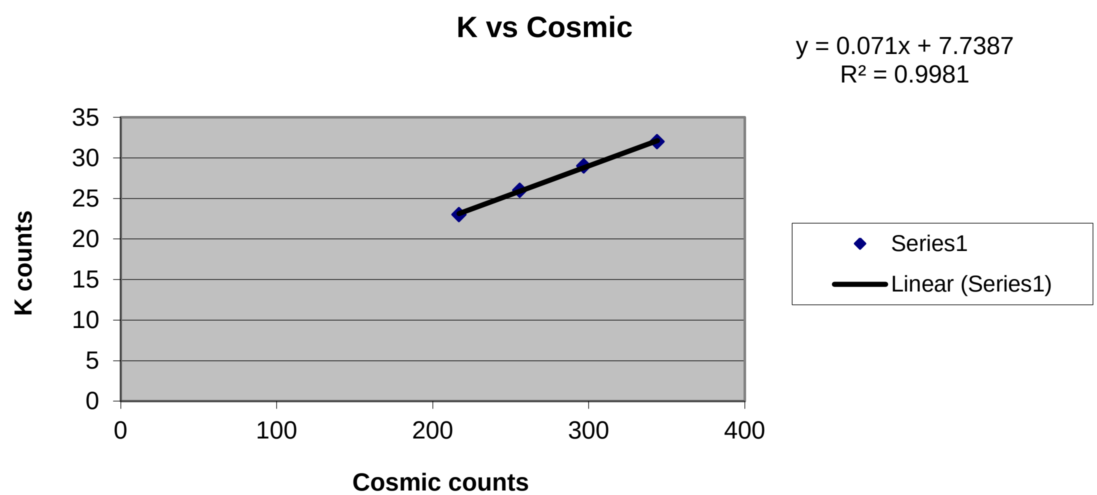
Further processing of the data may enhance subtle features that can be of importance for exploration purposes.

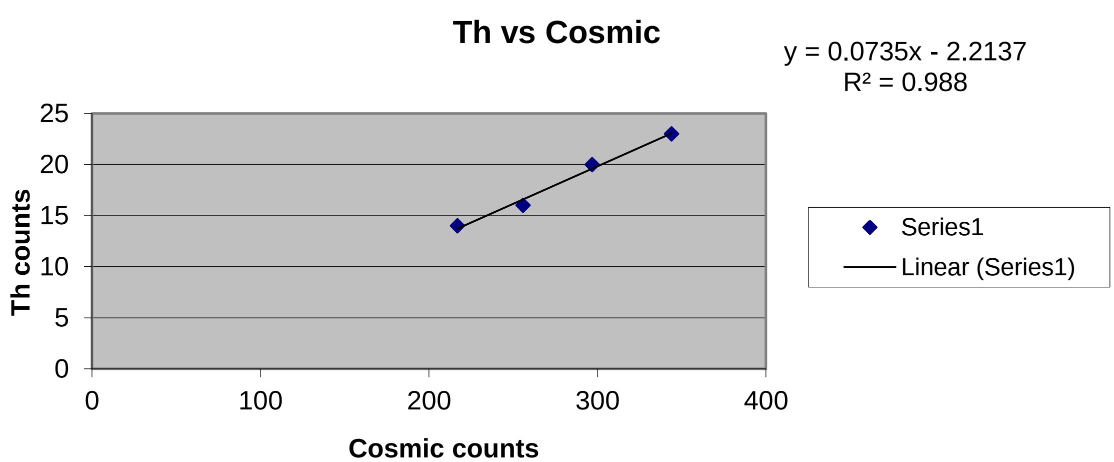
Respectfully submitted,

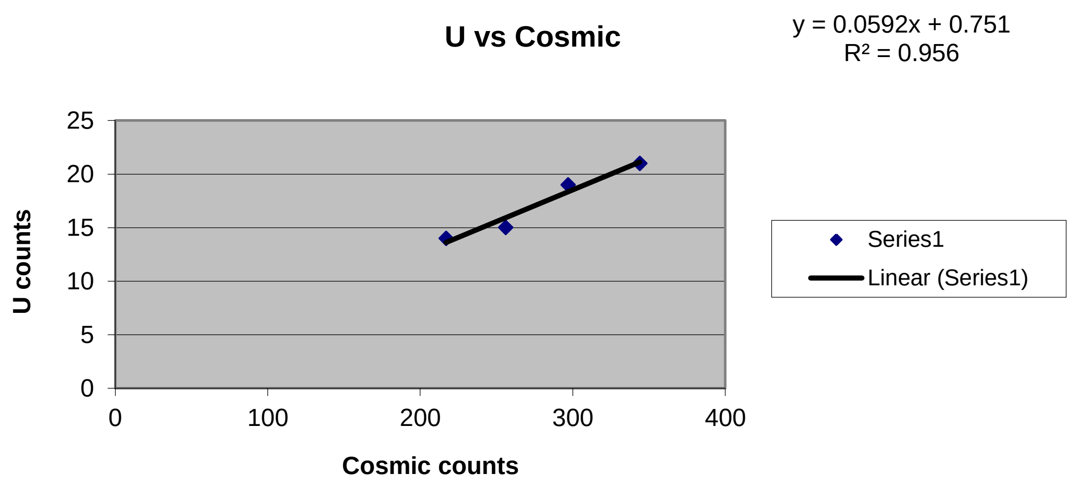
Andrei Yakovenko
New-Sense Geophysics Ltd.
Date: September 27th, 2011

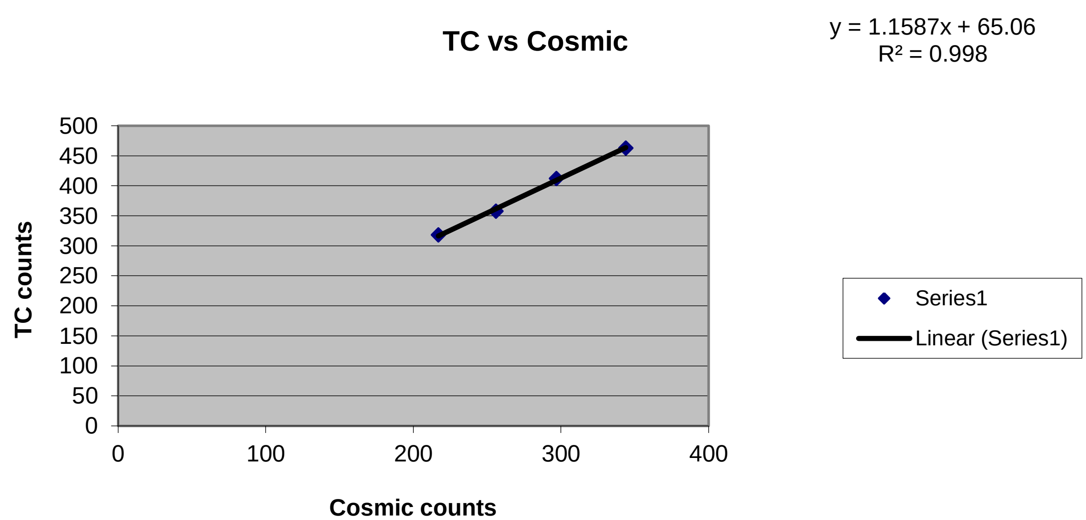
APPENDIX A: BACKGROUND, COSMIC AND ALTITUDE ATTENUATION TEST CHARTS

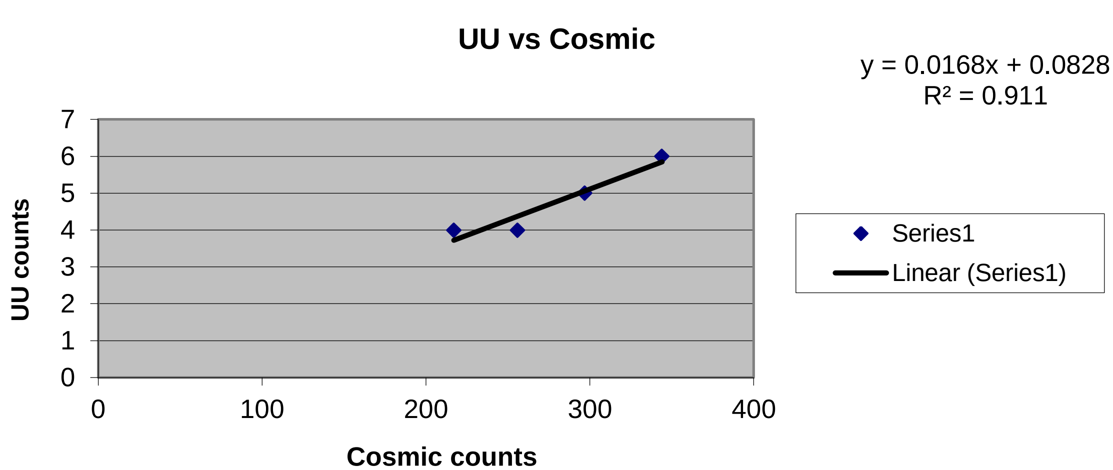
Background & Cosmic



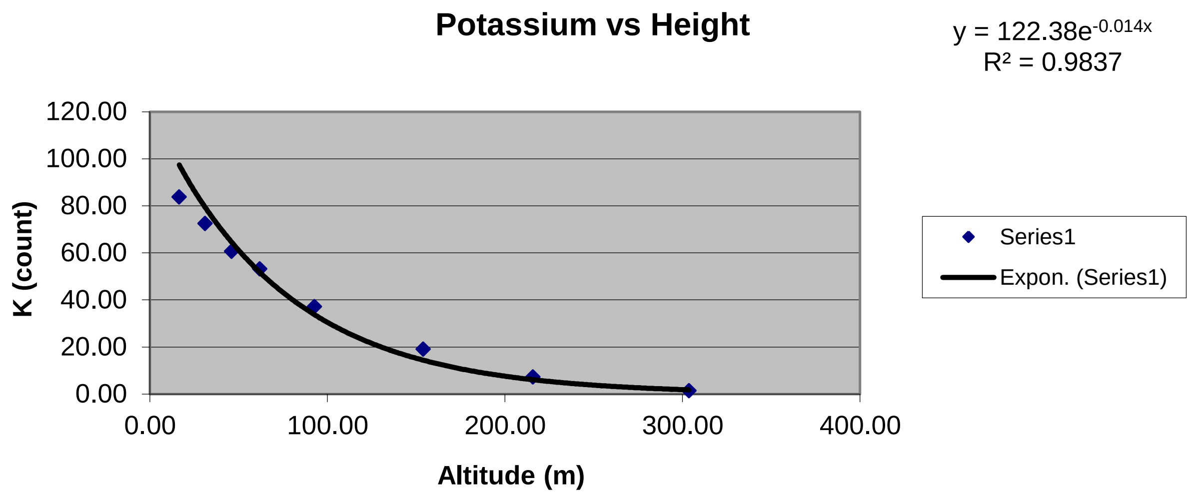


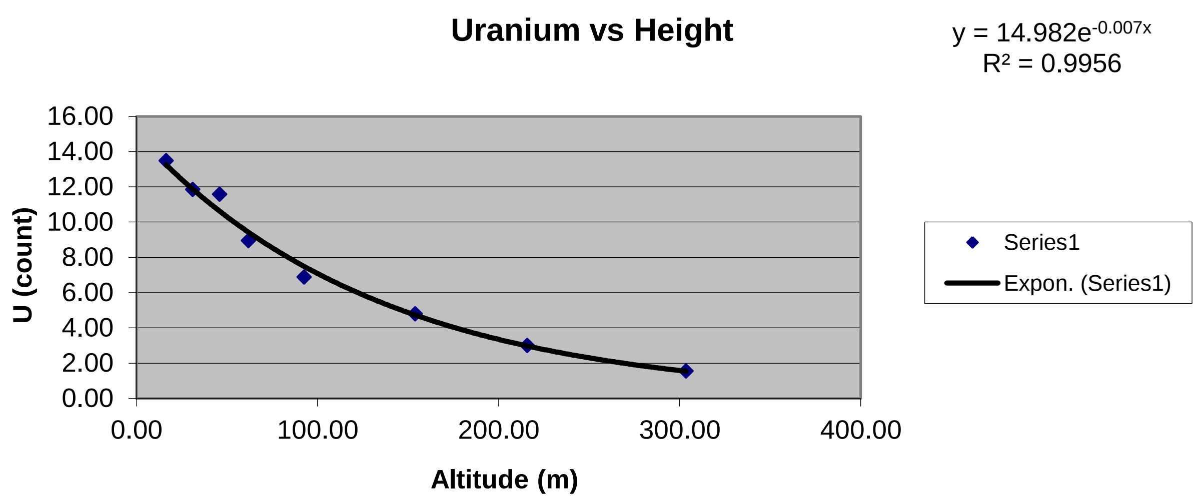

U vs Cosmic
y = 0.0592x + 0.751
R² = 0.956
25
20
15
10
5
0
U counts
0
100
200
300
400
Cosmic counts
Series1
Linear (Series1)

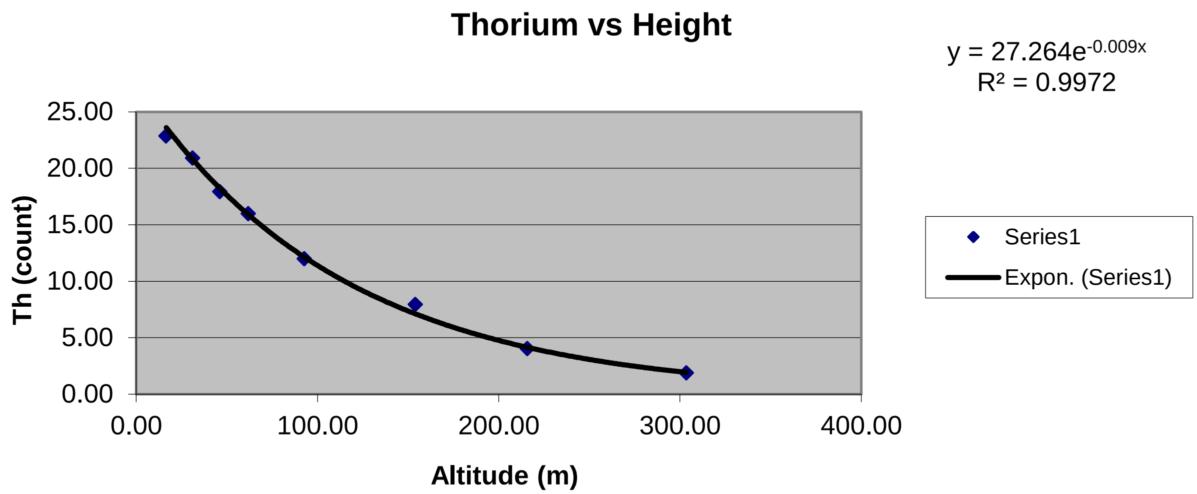

TC vs Cosmic
y = 1.1587x + 65.06
R² = 0.998
500
450
400
350
300
250
200
150
100
50
0
TC counts
0
100
200
300
400
Cosmic counts
Series1
Linear (Series1)

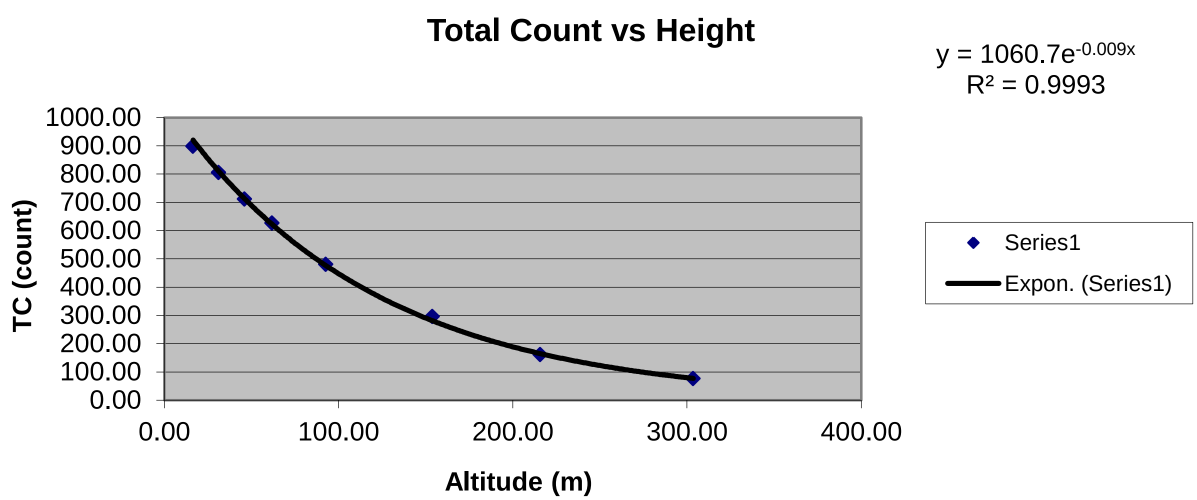

UU vs Cosmic
y = 0.0168x + 0.0828
R² = 0.911
7
6
5
4
3
2
1
0
UU counts
0
100
200
300
400
Cosmic counts
Series1
Linear (Series1)

Altitude Attenuation Test



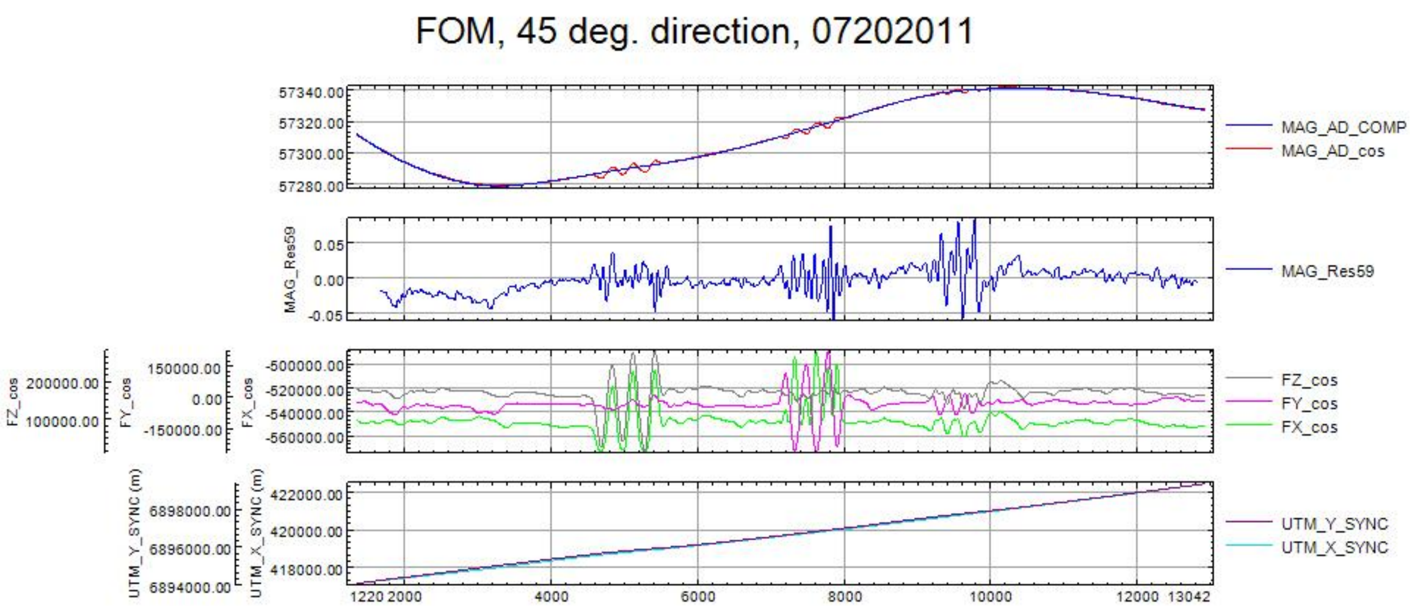



Thorium vs Height
y = 27.264e-0.009x
R² = 0.9972
25.00
20.00
15.00
10.00
5.00
0.00
Th (count)
0.00
100.00
200.00
300.00
400.00
Altitude (m)
Series1
Expon. (Series1)

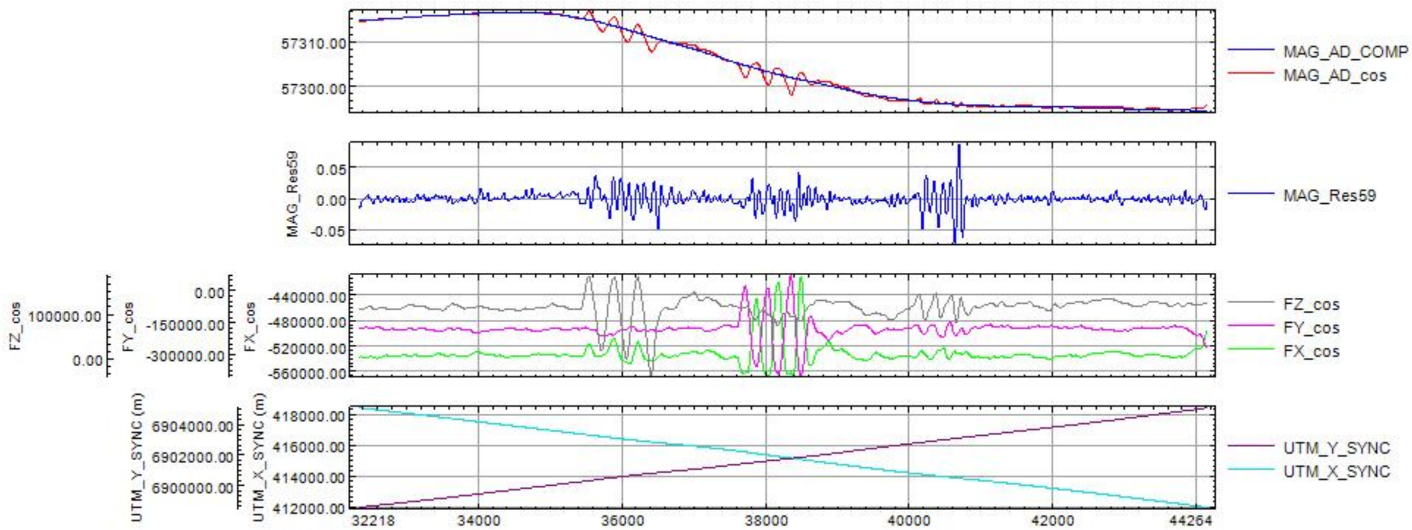

Total Count vs Height
y = 1060.7e-0.009x
R² = 0.9993
1000.00
900.00
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
TC (count)
0.00
100.00
200.00
300.00
400.00
Altitude (m)
Series1
Expon. (Series1)

APPENDIX B: FOM RESULTS

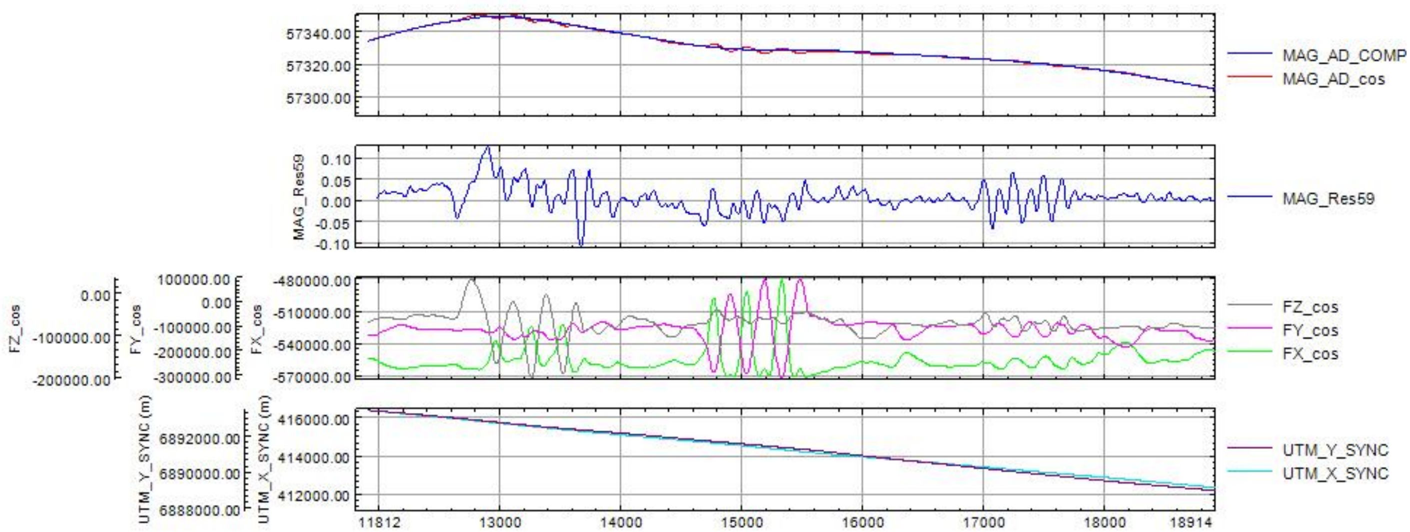
FOM July 20, 2011					
line	**direction**	**pitch**	**roll**	**yaw**	**total**
31	**315**	0.08	0.08	0.16	0.31
32	**135**	0.05	0.05	0.10	0.20
41	**225**	0.18	0.09	0.12	0.38
42	**45**	0.08	0.14	0.15	0.37
	total	0.38	0.36	0.53	**1.26**



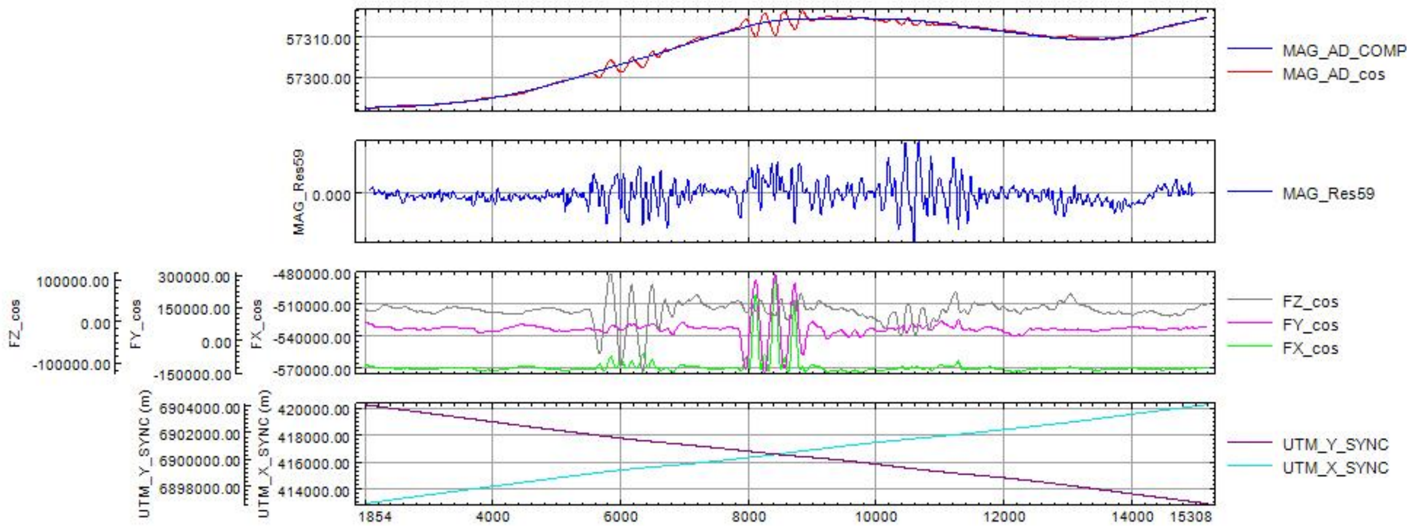
FOM, 315 deg. direction, 07202011



FOM, 225 deg. direction, 07202011



FOM, 135 deg. direction, 07202011



APPENDIX C: DATABASE DESCRIPTIONS

Magnetic Databases for BBB and Dade Blocks

Database Name: MAGNETIC_*blockname*_BK.gdb
Format: Geosoft .gdb
Number of Channels: 28

Note: If the database is opened in Oasis montaj, please load included "*Magnetic Database Channel Display.dbview*" file to insure that ALL the channels are displayed in the same order as listed below (Database menu -> Get Saved View).

Channel Name	Units	Description
LINE	number	Line number
DATE	date	Date flown (YYMMDD)
FLIGHT	number	Flight number
FIDUCIAL	number	Fiducial count (flight specific)
SYSTEM_CLOCK	milsec	KANA8 (A/D converter) counter
UTM_X_NAD83	meters	NAD83 easting, North America, UTM Zone 8N
UTM_Y_NAD83	meters	NAD83 northing, North America, UTM Zone 8N
LATITUDE_WGS84	degrees	GPS latitude, WGS 84, World
LONGITUDE_WGS84	degrees	GPS longitude, WGS 84, World
GPS_HEIGHT_WGS84	meters	GPS height (orthometric) above MSL, WGS 84, World
UTC_DAYSEC	decimal seconds	UTC daily second counter (0-86399)
FLUX_X	volts	Fluxgate x-axis
FLUX_Y	volts	Fluxgate y-axis
FLUX_Z	volts	Fluxgate z-axis
RAD_ALT_feet	feet	Radar altimeter, height above ground
MAG_RAW	nT	Raw magnetometer data
MAG_FILT	nT	Filtered raw magnetometer data
MAG_COMP	nT	Compensated magnetometer data
DIURNAL	nT	Base station magnetometer data
MAG_DIURNAL_CORR	nT	Base station (diurnal) corrected magnetometer data
MAG_HEADING_CORR	nT	Heading corrected magnetometer data
MAG_LAG_CORR	nT	Lag corrected magnetometer data
IGRF	nT	Calculated IGRF, using 2010 model
MAG_IGRF_CORR	nT	IGRF corrected magnetometer data
MAG_SMPL_LVL	nT	Conventionally (simple) leveled magnetometer data
TMI_FINAL	nT	Microleveled MAG_SMPL_LVL data
VDV	nT/m	1st order Vertical Derivative (VDV)
DTM	m	Digital Terrain Model

Radiometric Databases for BBB and Dade Blocks

Database Name: RADIOMETRIC_*blockname*_BK.gdb
Format: Geosoft .gdb
Number of Channels: 35

Note: If the database is opened in Oasis montaj, please load included "*Radiometric Database Channel Display.dbview*" file to insure that ALL the channels are displayed in the same order as listed below (Database menu -> Get Saved View).

Channel Name	Units	Description
LINE	number	Line Number
FLIGHT	number	Flight Number
DATE	date	Date flown (YYMMDD)
FIDUCIAL	number	Fiducial count (line specific)
UTM_X_NAD83	meters	NAD83 easting, North America, UTM Zone 8N
UTM_Y_NAD83	meters	NAD83 northing, North America, UTM Zone 8N
LATITUDE_WGS84	degrees	GPS latitude, WGS 84, World
LONGITUDE_WGS84	degrees	GPS longitude, WGS 84, World
GPS_HEIGHT_WGS84	meters	GPS height (orthometric) above MSL, WGS 84, World
UTC_DAYSEC	seconds	UTC daily second counter (0-86399)
RAD_ALT_feet	feet	Radar altimeter, height above ground
PRESSURE	mbar	Ambient pressure output
TEMPERATURE	degrees C	Ambient temperature output
DOWN_LIVE_TIME	seconds	Live time channel
RAW_Potassium	counts/sec	Raw Potassium channel
RAW_Thorium	counts/sec	Raw Thorium channel
RAW_Uranium	counts/sec	Raw Uranium channel
RAW_TotCount	counts/sec	Raw Total Count channel
RAW_UpDet	counts/sec	Raw upward looking crystal Uranium channel
DOWN_COSMIC	counts/sec	Raw Cosmic channel from downward looking crystals
DOWN_SPECTRUM	counts/sec	1024 channel down spectrum
UP_SPECTRUM	counts/sec	1024 channel up spectrum
EQUIVALENT_HEIGHT_m	meters	Equivalent height above ground at STP
K_CORR	counts/sec	Live Time, Background, Cosmic, Compton Scattering and Altitude Attenuation corrected Potassium counts
Th_CORR	counts/sec	Live Time, Background, Cosmic, Compton Scattering and Altitude Attenuation corrected Thorium counts
U_CORR	counts/sec	Live Time, Background, Cosmic, Compton Scattering and Altitude Attenuation corrected Uranium counts
TC_CORR	counts/sec	Live Time, Background, Cosmic, Compton Scattering and Altitude Attenuation corrected Total Count counts
K_FINAL	counts/sec	Final Potassium counts; microleveled K_CORR

Th_FINAL	counts/sec	Final Thorium counts; microleveled Th_CORR
U_FINAL	counts/sec	Final Uranium counts; microleveled U_CORR
TC_FINAL	counts/sec	Final Total Count counts; microleveled TC_CORR
K_Percent	%	Estimated concentrations of Potassium
eTh	ppm	Estimated equivalent concentrations of Thorium
eU	ppm	Estimated equivalent concentrations of Uranium
E	nGy/h	Natural air absorption Dose Rate

APPENDIX D: RSX-5 SPECTROMETER (SN 5516): DAILY RESOLUTION TESTS RESULTS

Executed 2011-07-13 RSI System Test Report RSX-5 SN5516_1.csv

Detector	Det 1 - SN:00086	Det 2 - SN:00128	Det 3 - SN:00071	Det 4 - SN:00081	Det 5 - SN:00125	Det 1 + 2 + 3 + 4
Status	Done	Done	Done	Done	Done	Done
Counts	2002	2004	2003	2010	2004	8019
LiveTime [s]	146.88	164.859	162.891	138.862	421.772	613.492
Gain	0.969482	0.986928	0.978896	0.94458	1.119781	-
Peak	870.53 (+/- 0.633)	872.28 (+/- 0.530)	870.54 (+/- 0.586)	869.45 (+/- 0.609)	868.92 (+/- 1.149)	870.94 (+/- 0.286)
FWHM	4.73 (+/- 1.761)	4.12 (+/- 1.390)	4.94 (+/- 1.503)	4.86 (+/- 1.631)	6.99 (+/- 3.371)	4.53 (+/- 0.755)

Executed 2011-07-13 RSI System Test Report RSX-5 SN5516_2.csv

Detector	Det 1 - SN:00086	Det 2 - SN:00128	Det 3 - SN:00071	Det 4 - SN:00081	Det 5 - SN:00125	Det 1 + 2 + 3 + 4
Status	Done	Done	Done	Done	Done	Done
Counts	2001	2005	2009	2006	2004	8021
LiveTime [s]	141.873	160.863	167.882	136.866	413.773	607.485
Gain	0.990274	1.01062	1.00541	0.969899	1.150168	-
Peak	873.00 (+/- 0.528)	872.92 (+/- 0.519)	871.69 (+/- 0.504)	872.00 (+/- 0.686)	869.83 (+/- 1.169)	872.49 (+/- 0.243)
FWHM	4.74 (+/- 1.408)	4.40 (+/- 1.387)	4.22 (+/- 1.365)	5.42 (+/- 1.802)	5.45 (+/- 3.821)	4.51 (+/- 0.618)

Executed 2011-07-14 RSI System Test Report RSX-5 SN5516_1.csv

Detector	Det 1 - SN:00086	Det 2 - SN:00128	Det 3 - SN:00071	Det 4 - SN:00081	Det 5 - SN:00125	Det 1 + 2 + 3 + 4
Status	Done	Done	Done	Done	Done	Done
Counts	2012	2012	2005	2009	2006	8038
LiveTime [s]	146.872	168.862	165.886	139.874	451.753	621.495
Gain	1900-01-00	0.989696	0.974921	0.948716	1.125017	-
Peak	871.69 (+/- 0.697)	871.23 (+/- 0.523)	870.61 (+/- 0.561)	871.47 (+/- 0.608)	870.97 (+/- 1.420)	871.43 (+/- 0.262)
FWHM	4.43 (+/- 1.922)	4.61 (+/- 1.328)	4.32 (+/- 1.473)	5.17 (+/- 1.589)	7.87 (+/- 4.428)	4.57 (+/- 0.665)

Executed 2011-07-14 RSI System Test Report RSX-5 SN5516_2.csv

Detector	Det 1 - SN:00086	Det 2 - SN:00128	Det 3 - SN:00071	Det 4 - SN:00081	Det 5 - SN:00125	Det 1 + 2 + 3 + 4
Status	Done	Done	Done	Done	Done	Done
Counts	1905-07-02	2006	2001	2013	2002	8030
LiveTime [s]	150.858	162.856	167.881	143.866	403.781	625.461
Gain	1.003892	1.025439	1.013167	0.983445	1.167202	-
Peak	871.66 (+/- 0.700)	871.59 (+/- 0.549)	871.48 (+/- 0.585)	871.66 (+/- 0.649)	873.25 (+/- 1.187)	871.75 (+/- 0.317)

FWHM	4.43 (+/- 1.848)	4.12 (+/- 1.449)	4.41 (+/- 1.594)	5.07 (+/- 1.692)	6.20 (+/- 3.762)	4.42 (+/- 0.828)

Executed 2011-07-15 RSI System Test Report RSX-5 SN5516_1.csv

Detector	Det 1 - SN:00086	Det 2 - SN:00128	Det 3 - SN:00071	Det 4 - SN:00081	Det 5 - SN:00125	Det 1 + 2 + 3 + 4
Status	Done	Done	Done	Done	Done	Done
Counts	2009	2003	2015	2019	2002	8046
LiveTime [s]	155.861	163.867	162.881	146.863	389.77	629.471
Gain	0.974606	0.994804	0.976137	0.948134	1.137513	-
Peak	871.96 (+/- 0.566)	870.54 (+/- 0.506)	869.91 (+/- 0.689)	869.36 (+/- 0.625)	870.73 (+/- 1.115)	870.68 (+/- 0.278)
FWHM	4.65 (+/- 1.478)	4.07 (+/- 1.314)	4.89 (+/- 1.807)	5.03 (+/- 1.580)	5.45 (+/- 3.524)	4.56 (+/- 0.709)

Executed 2011-07-15 RSI System Test Report RSX-5 SN5516_2.csv

Detector	Det 1 - SN:00086	Det 2 - SN:00128	Det 3 - SN:00071	Det 4 - SN:00081	Det 5 - SN:00125	Det 1 + 2 + 3 + 4
Status	Done	Done	Done	Done	Done	Done
Counts	2001	2007	2014	2012	2002	8034
LiveTime [s]	146.87	157.864	169.877	142.863	406.758	617.474
Gain	1.010765	1.035621	1.015185	0.988438	1.177745	-
Peak	871.87 (+/- 0.525)	871.00 (+/- 0.591)	870.56 (+/- 0.620)	870.76 (+/- 0.716)	871.21 (+/- 1.094)	871.29 (+/- 0.293)
FWHM	4.90 (+/- 1.384)	4.26 (+/- 1.595)	4.45 (+/- 1.676)	5.48 (+/- 1.976)	6.84 (+/- 3.135)	4.68 (+/- 0.769)

Executed 2011-07-16 RSI System Test Report RSX-5 SN5516_2.csv

Detector	Det 1 - SN:00086	Det 2 - SN:00128	Det 3 - SN:00071	Det 4 - SN:00081	Det 5 - SN:00125	Det 1 + 2 + 3 + 4
Status	Done	Done	Done	Done	Done	Done
Counts	2002	2002	2007	2008	2008	8019
LiveTime [s]	144.865	161.858	156.885	145.865	410.767	609.474
Gain	1.015347	1.040305	1.02567	0.995223	1.1941	-
Peak	871.66 (+/- 0.575)	871.36 (+/- 0.567)	869.77 (+/- 0.514)	871.00 (+/- 0.683)	871.87 (+/- 1.093)	871.36 (+/- 0.328)
FWHM	4.52 (+/- 1.534)	4.68 (+/- 1.535)	3.96 (+/- 1.357)	5.18 (+/- 1.851)	6.55 (+/- 3.182)	4.60 (+/- 0.853)

Executed 2011-07-16 RSI System Test Report RSX-5 SN5516_3.csv

Detector	Det 1 - SN:00086	Det 2 - SN:00128	Det 3 - SN:00071	Det 4 - SN:00081	Det 5 - SN:00125	Det 1 + 2 + 3 + 4
Status	Done	Done	Done	Done	Done	Done
Counts	2003	2005	2004	2001	2004	8013
LiveTime [s]	141.872	159.863	163.887	145.869	426.761	611.491
Gain	1.012286	1.035618	1.024112	0.991209	1.193651	-

Peak	871.42 (+/- 0.624)	872.22 (+/- 0.556)	871.52 (+/- 0.465)	869.98 (+/- 0.729)	874.19 (+/- 1.177)	871.58 (+/- 0.273)
FWHM	4.78 (+/- 1.662)	4.51 (+/- 1.490)	4.68 (+/- 1.246)	5.46 (+/- 2.028)	6.11 (+/- 3.543)	4.74 (+/- 0.721)

Executed 2011-07-17 RSI System Test Report RSX-5 SN5516_1.csv

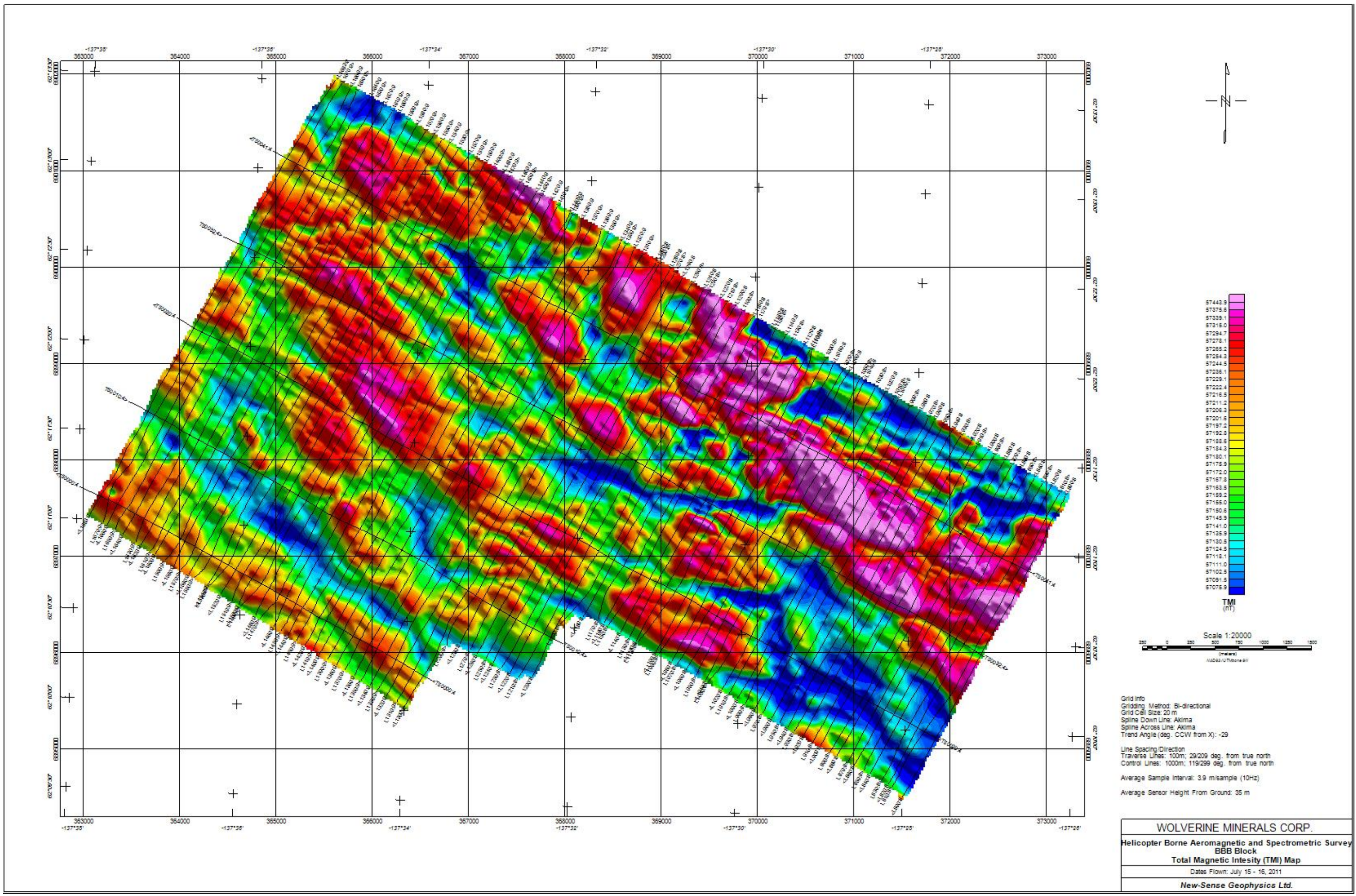
Detector	Det 1 - SN:00086	Det 2 - SN:00128	Det 3 - SN:00071	Det 4 - SN:00081	Det 5 - SN:00125	Det 1 + 2 + 3 + 4
Status	Done	Done	Done	Done	Done	Done
Counts	2011	2005	2003	2007	2002	8026
LiveTime [s]	151.868	160.867	165.885	146.861	406.772	625.481
Gain	0.987332	1.009434	0.989901	0.964836	1.162557	-
Peak	871.70 (+/- 0.605)	871.66 (+/- 0.538)	869.74 (+/- 0.490)	871.15 (+/- 0.639)	872.10 (+/- 1.047)	871.09 (+/- 0.312)
FWHM	4.45 (+/- 1.675)	4.36 (+/- 1.411)	4.58 (+/- 1.275)	4.74 (+/- 1.665)	6.21 (+/- 2.924)	4.47 (+/- 0.800)

Executed 2011-07-18 RSI System Test Report RSX-5 SN5516_3.csv

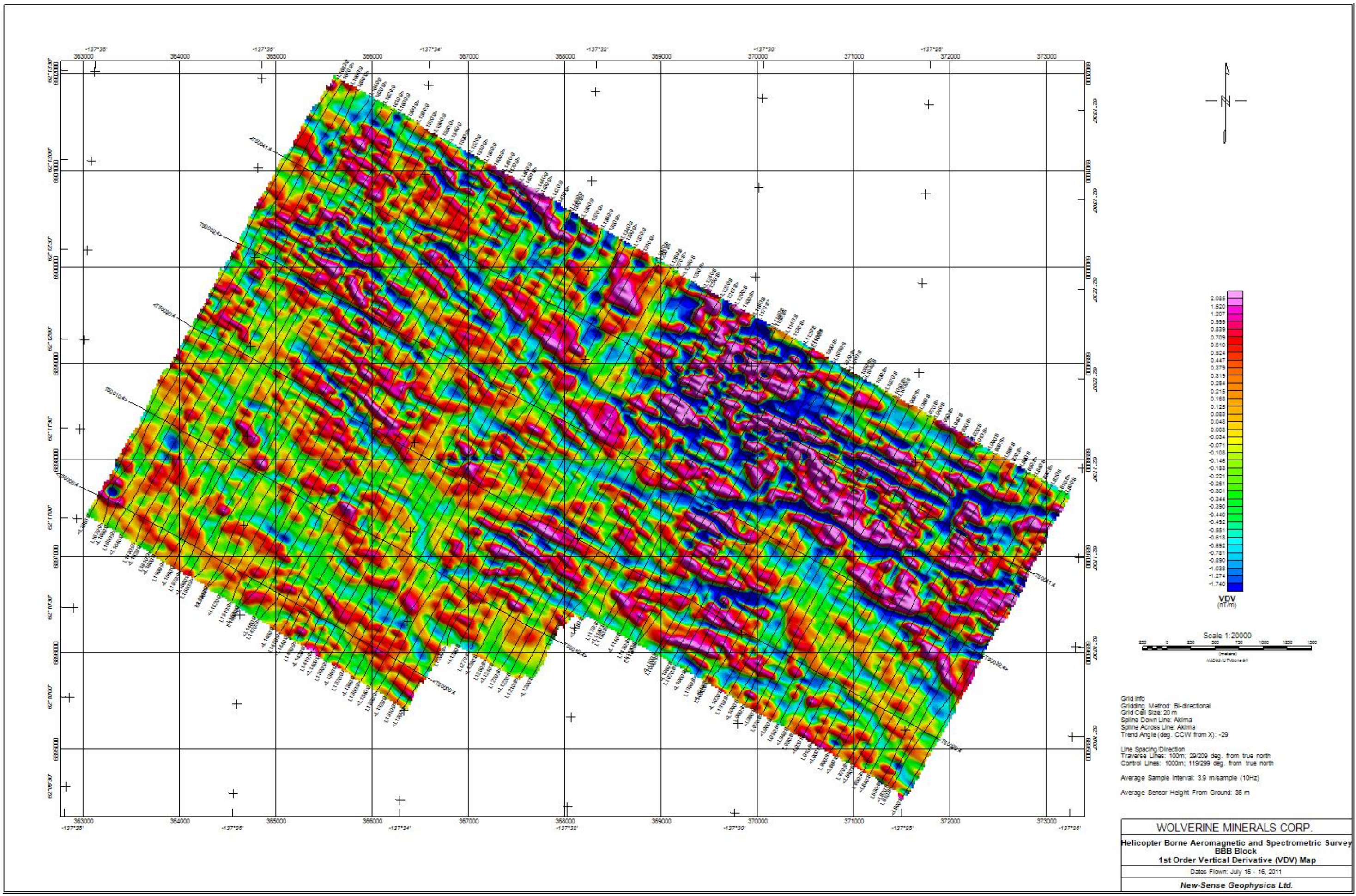
Detector	Det 1 - SN:00086	Det 2 - SN:00128	Det 3 - SN:00071	Det 4 - SN:00081	Det 5 - SN:00125	Det 1 + 2 + 3 + 4
Status	Done	Done	Done	Done	Done	Done
Counts	2001	2001	2005	2004	2002	8011
LiveTime [s]	295.811	337.806	346.831	307.8	702.672	1288.248
Gain	1.010211	1.034742	1.020914	0.990377	1.196657	-
Peak	871.74 (+/- 0.717)	872.38 (+/- 0.575)	868.78 (+/- 0.748)	870.61 (+/- 0.741)	869.79 (+/- 0.974)	871.33 (+/- 0.325)
FWHM	4.94 (+/- 1.928)	4.26 (+/- 1.548)	4.55 (+/- 2.041)	5.31 (+/- 2.052)	5.68 (+/- 3.067)	4.56 (+/- 0.847)

APPENDIX E: IMAGES OF FINAL MAPS

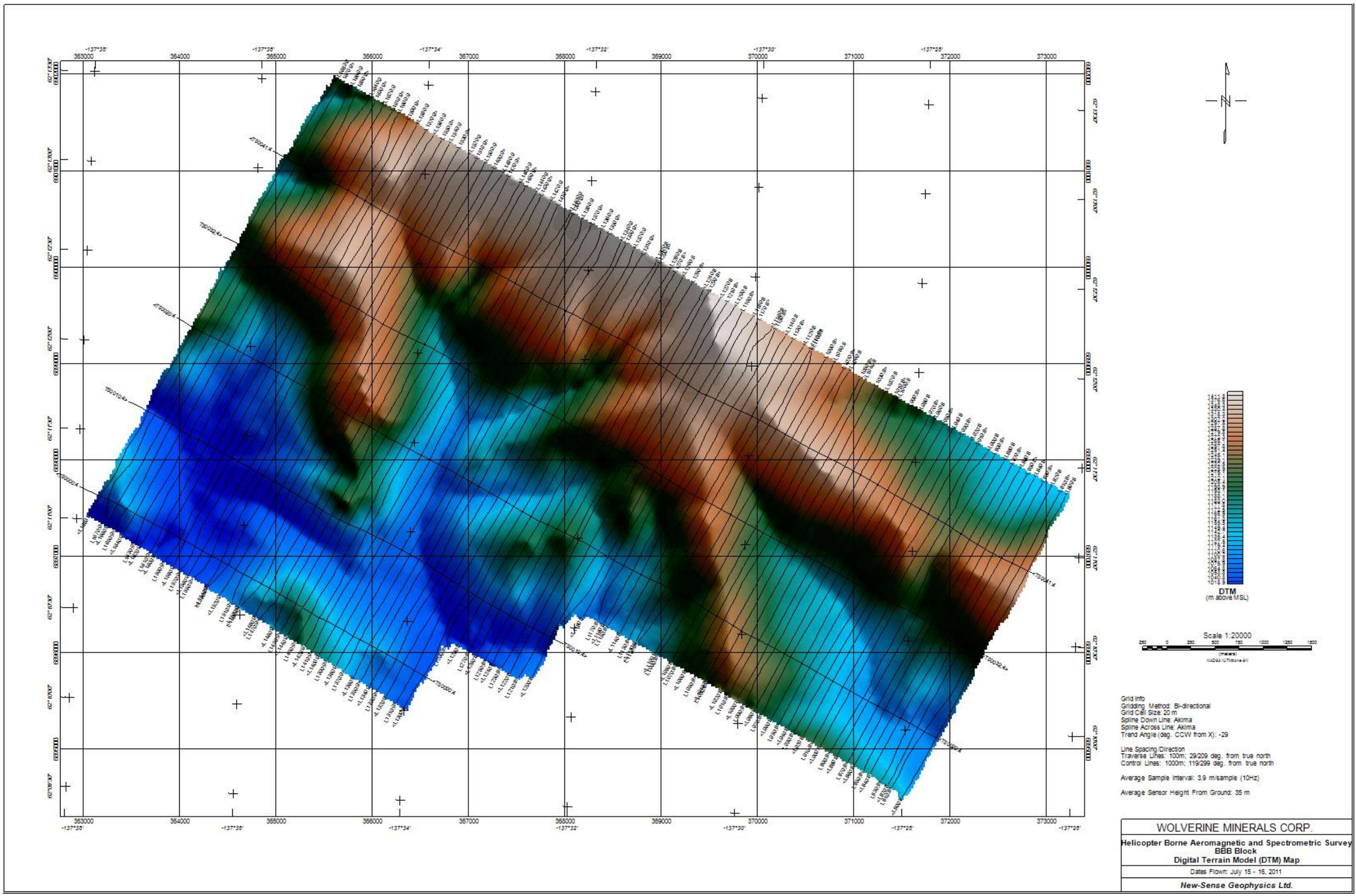
BBB Block Image of TMI FINAL Map



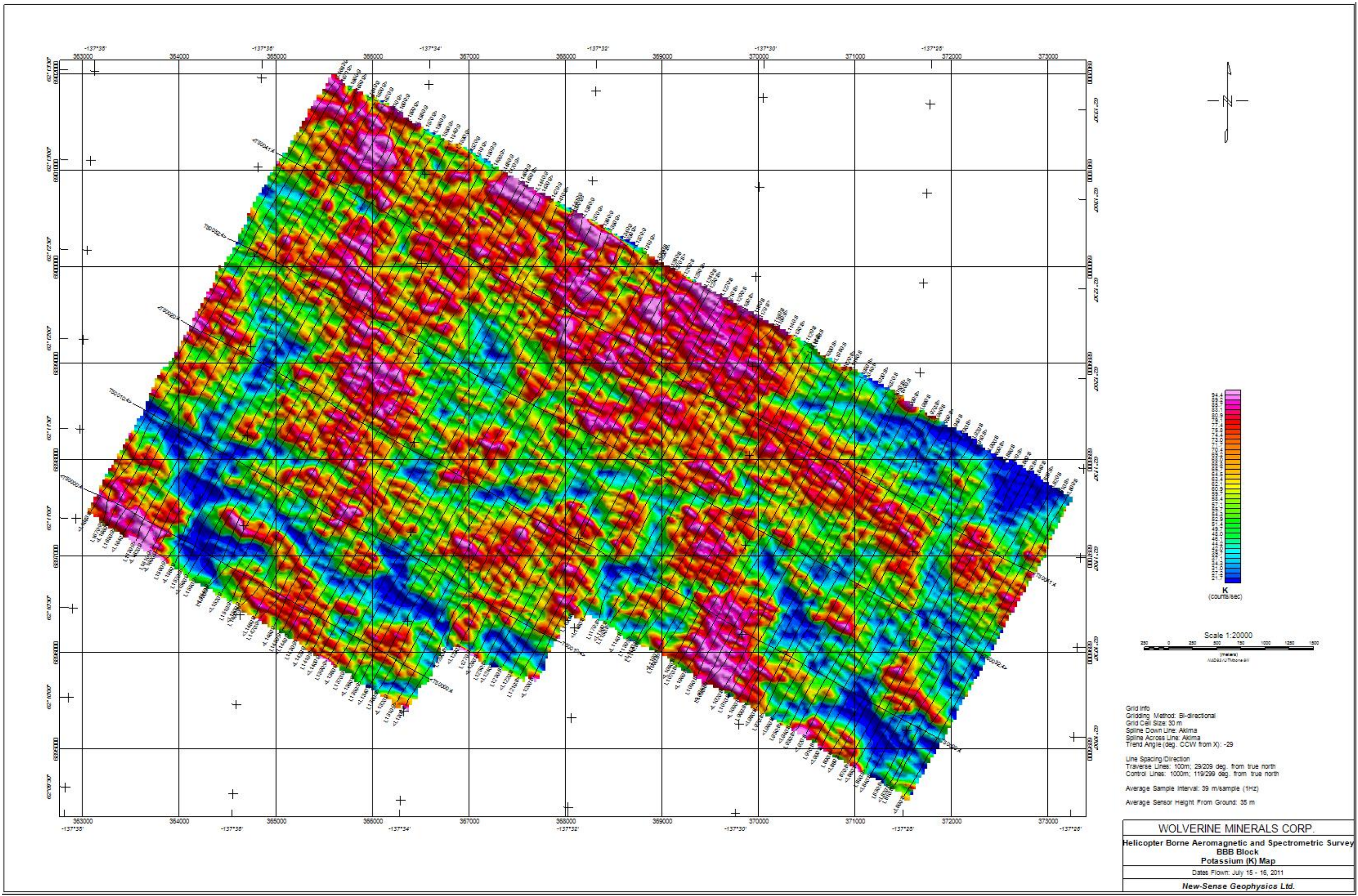
BBB Block Image of VDV Map



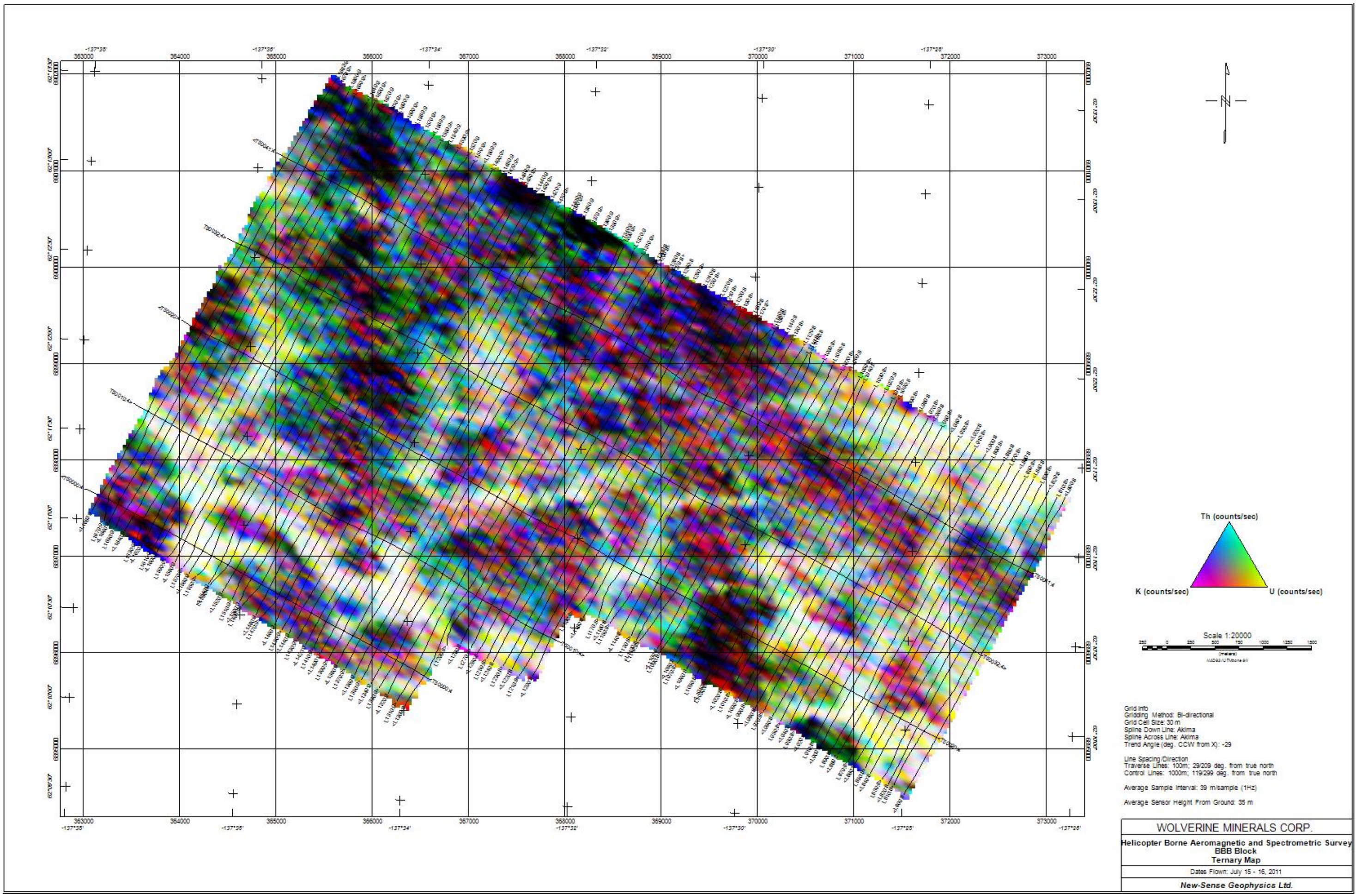
BBB Extension Block Image of DTM Map



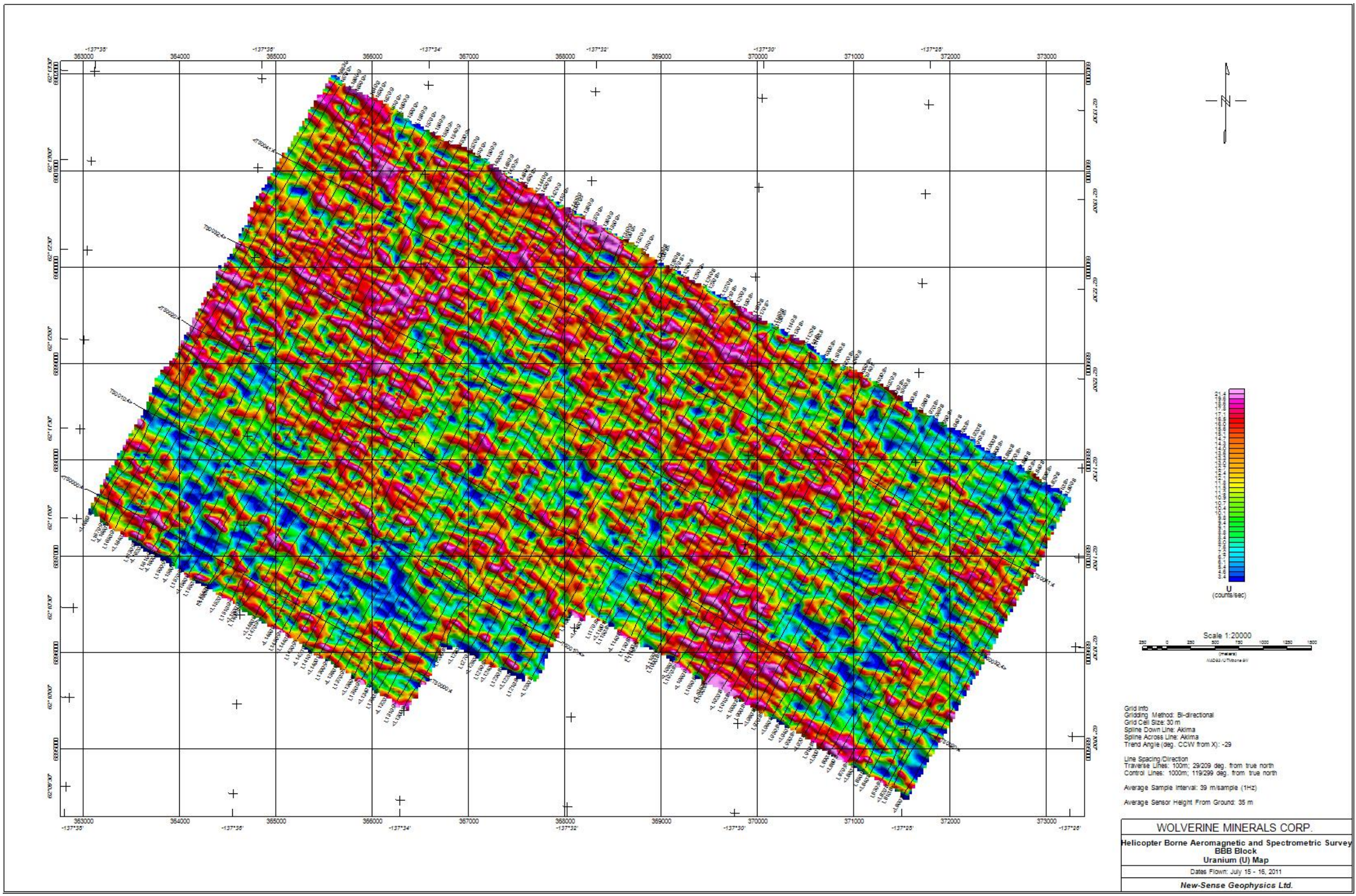
BBB Block Image of Potassium Map



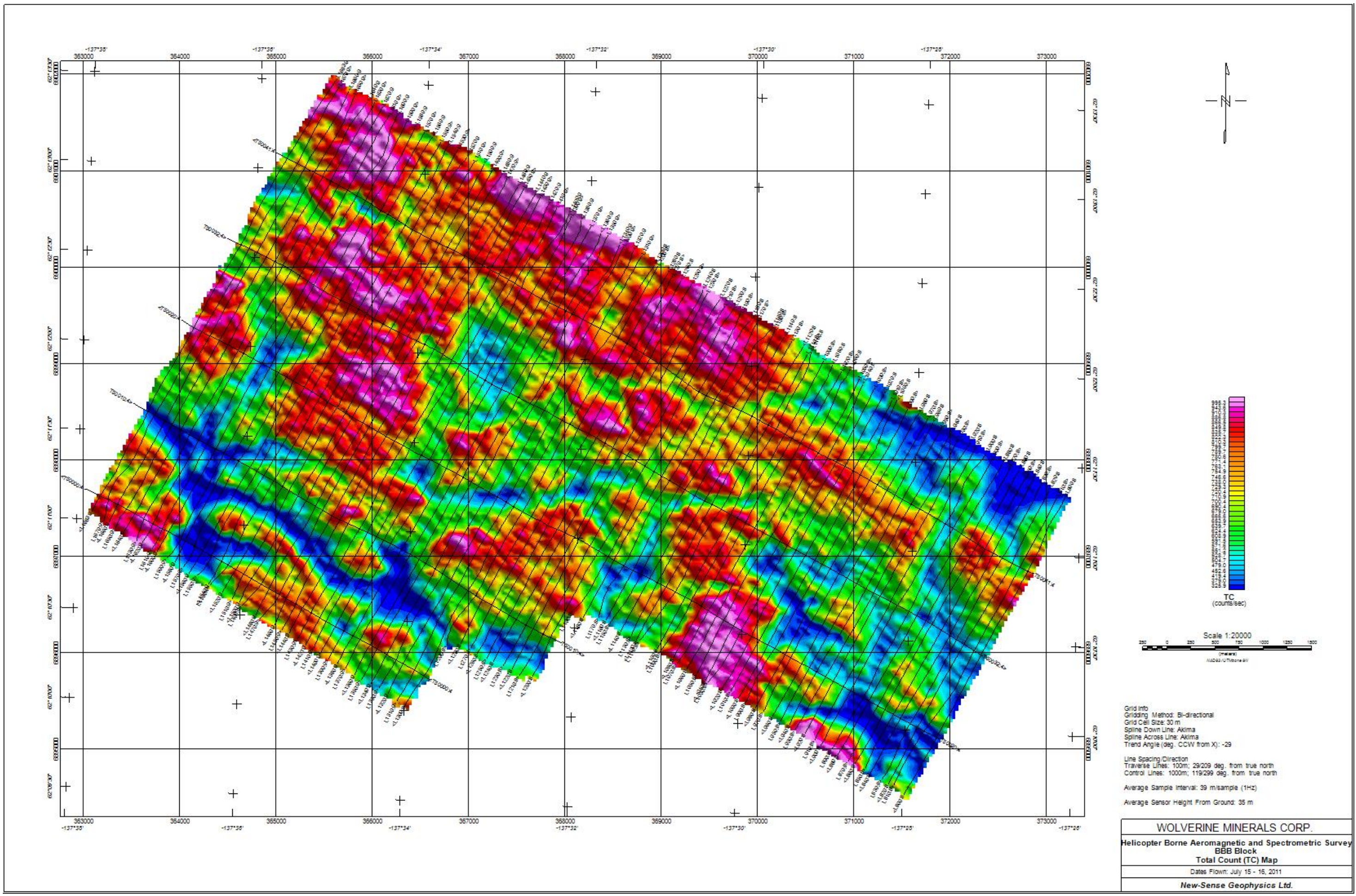
BBB Block Image of Thorium Map



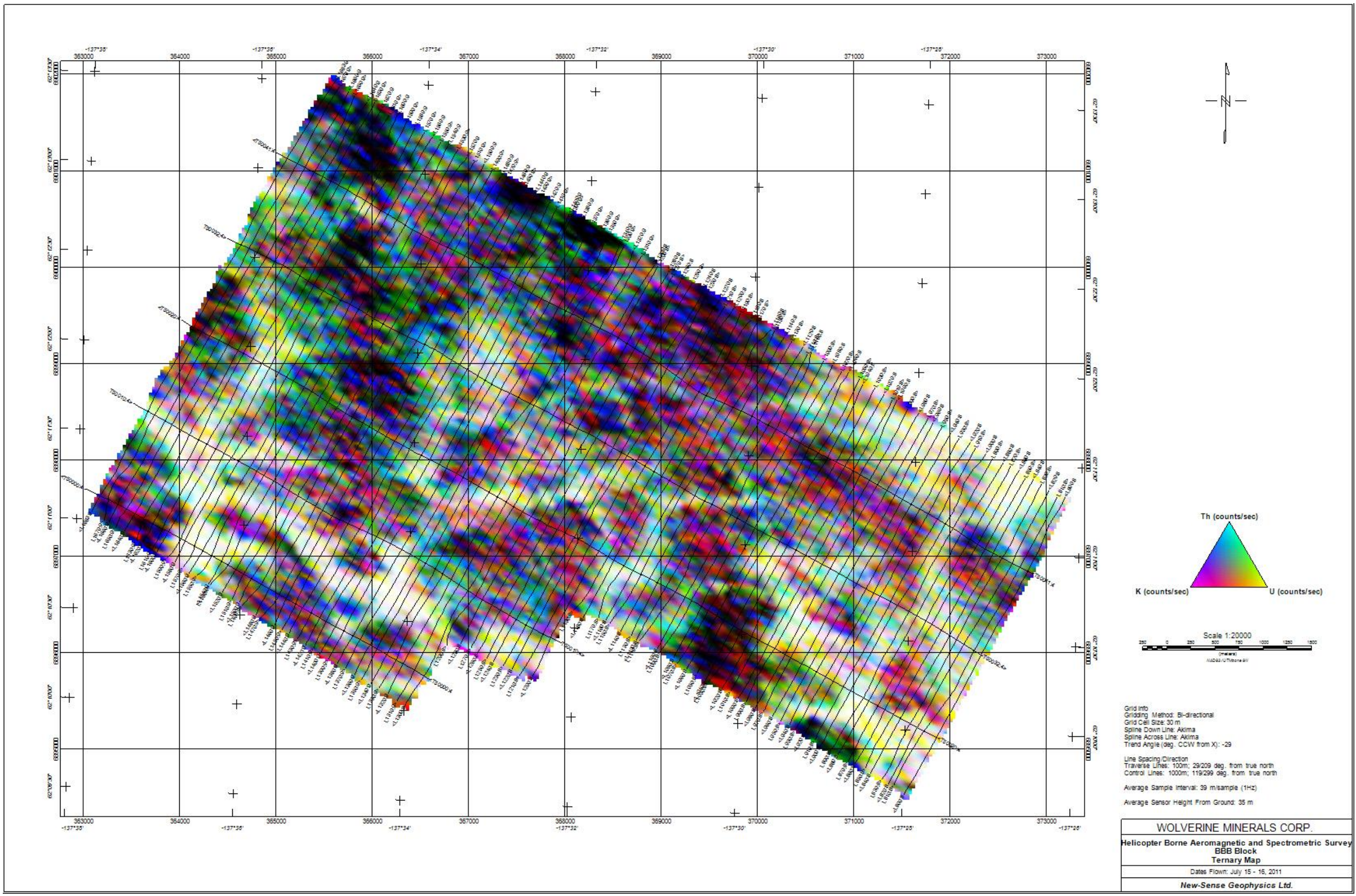
BBB Block Image of Uranium Map



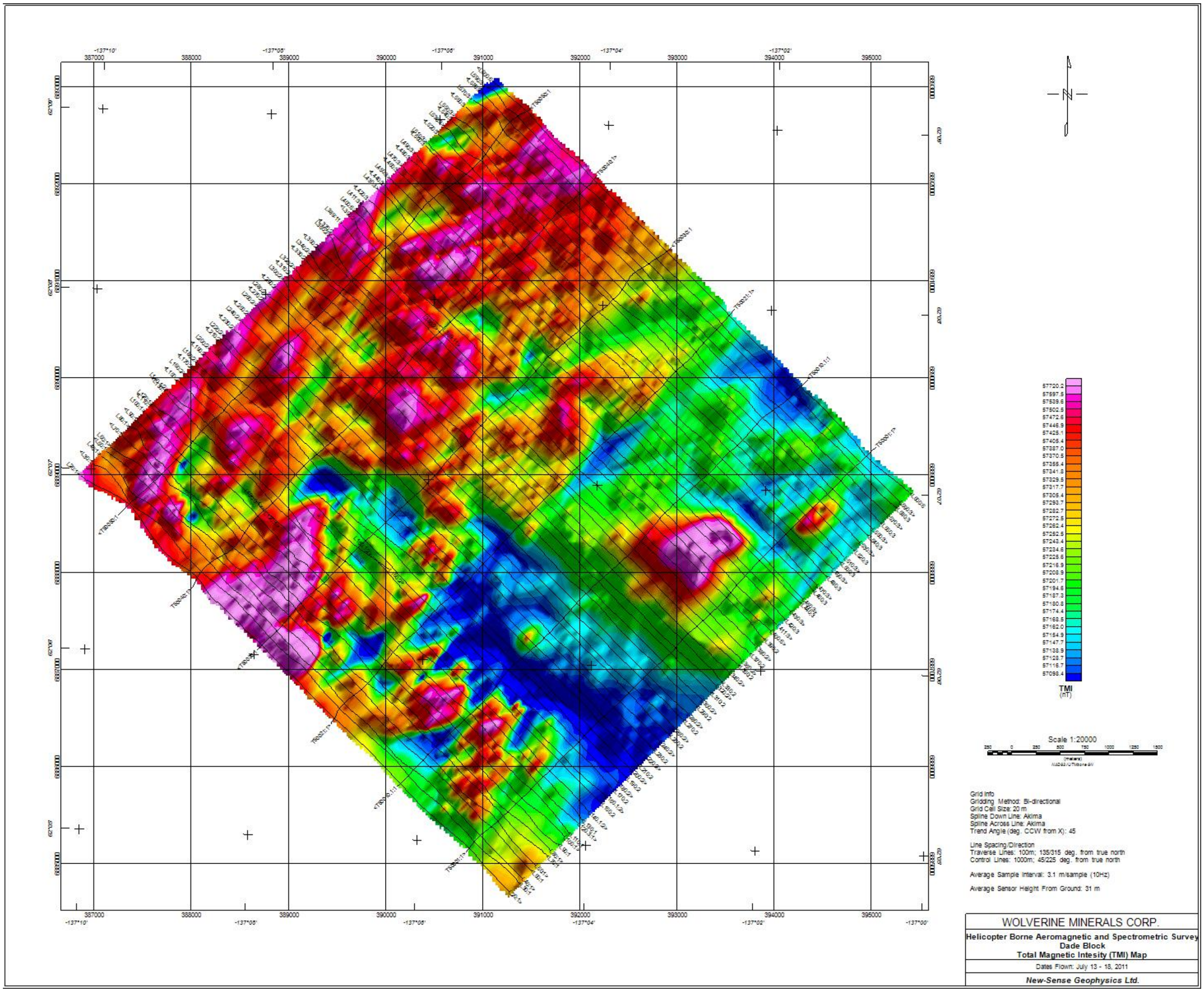
BBB Block Image of Total Count Map



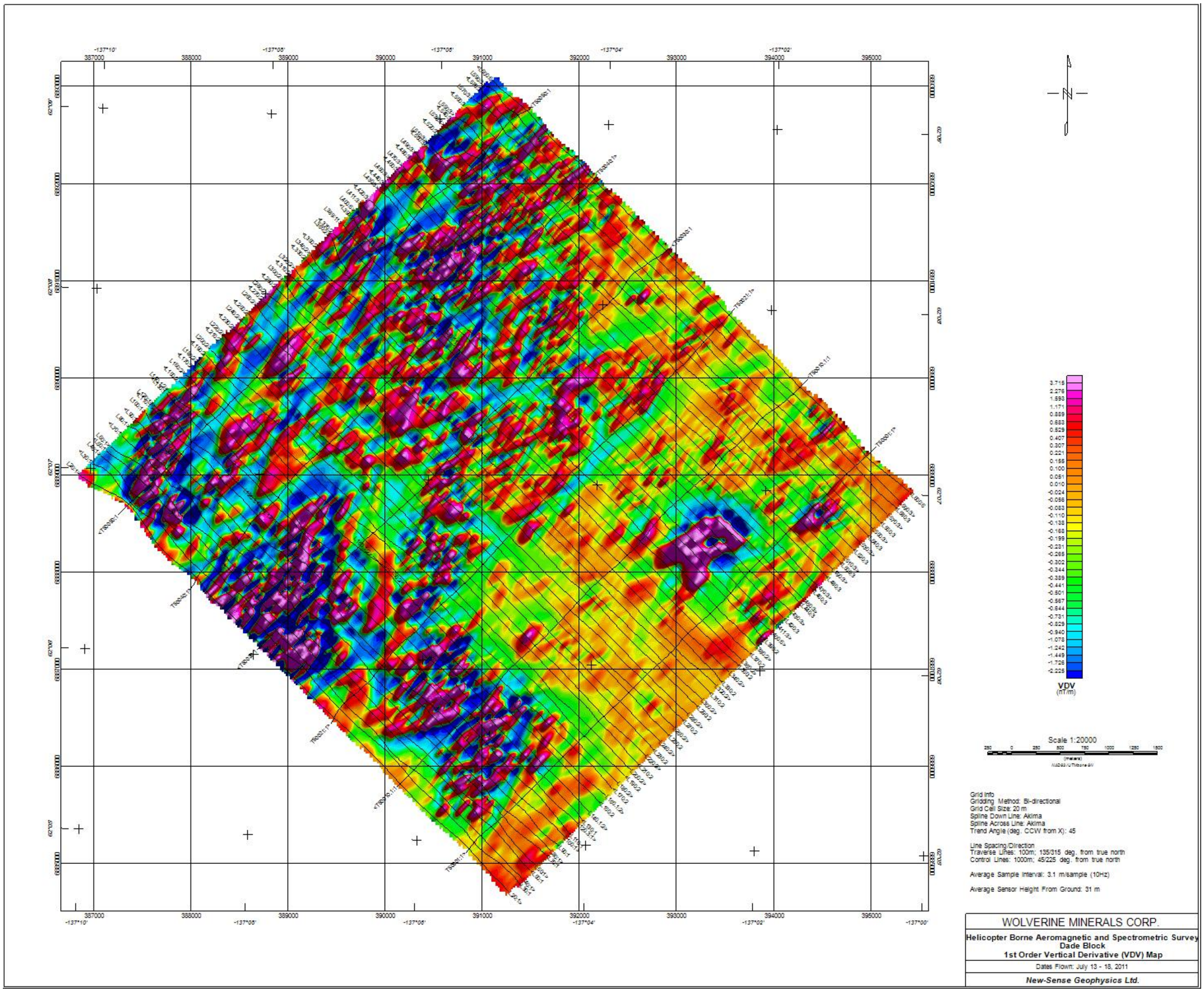
BBB Block Image of Ternary Map



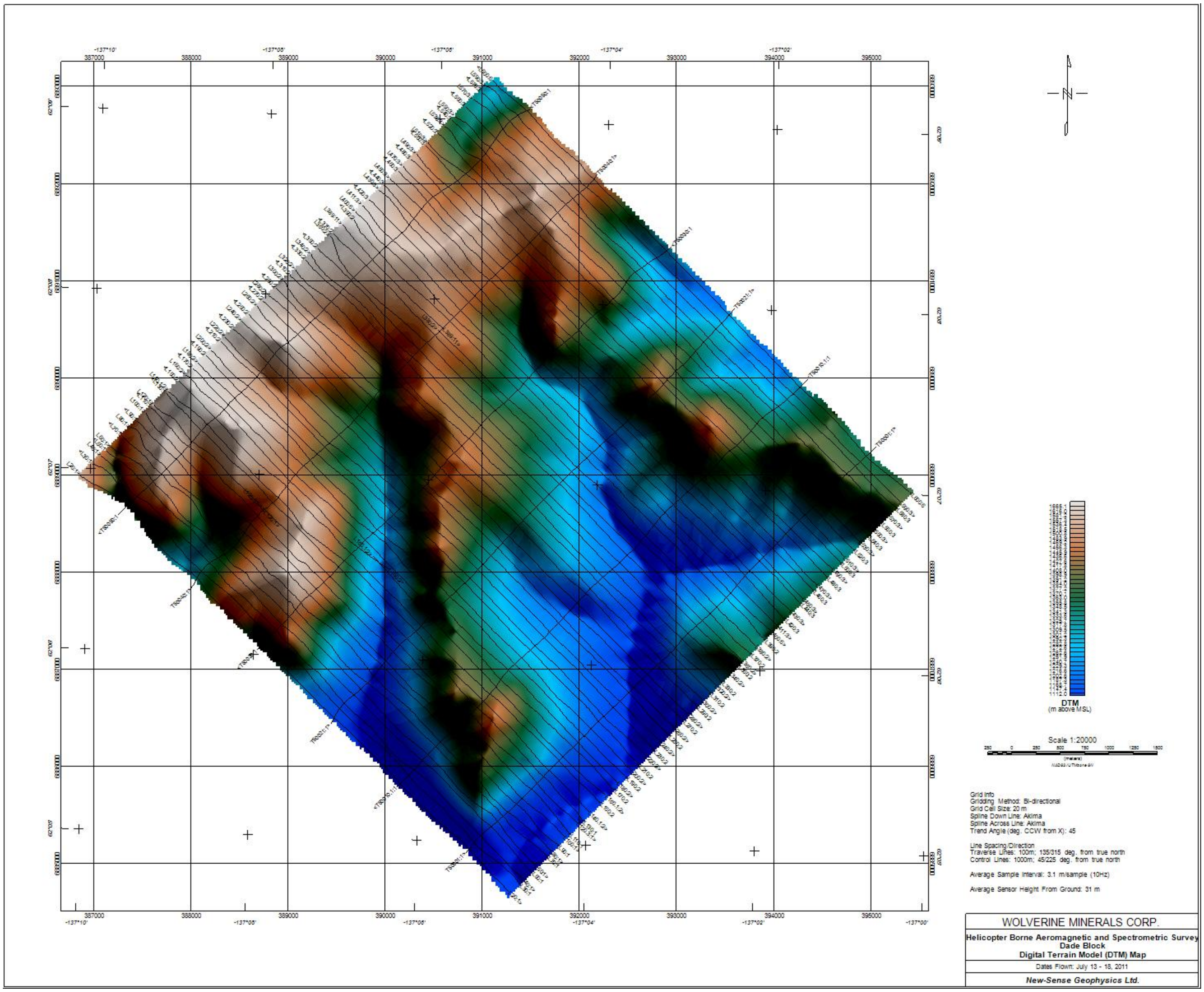
Dade Block Image of TMI FINAL Map



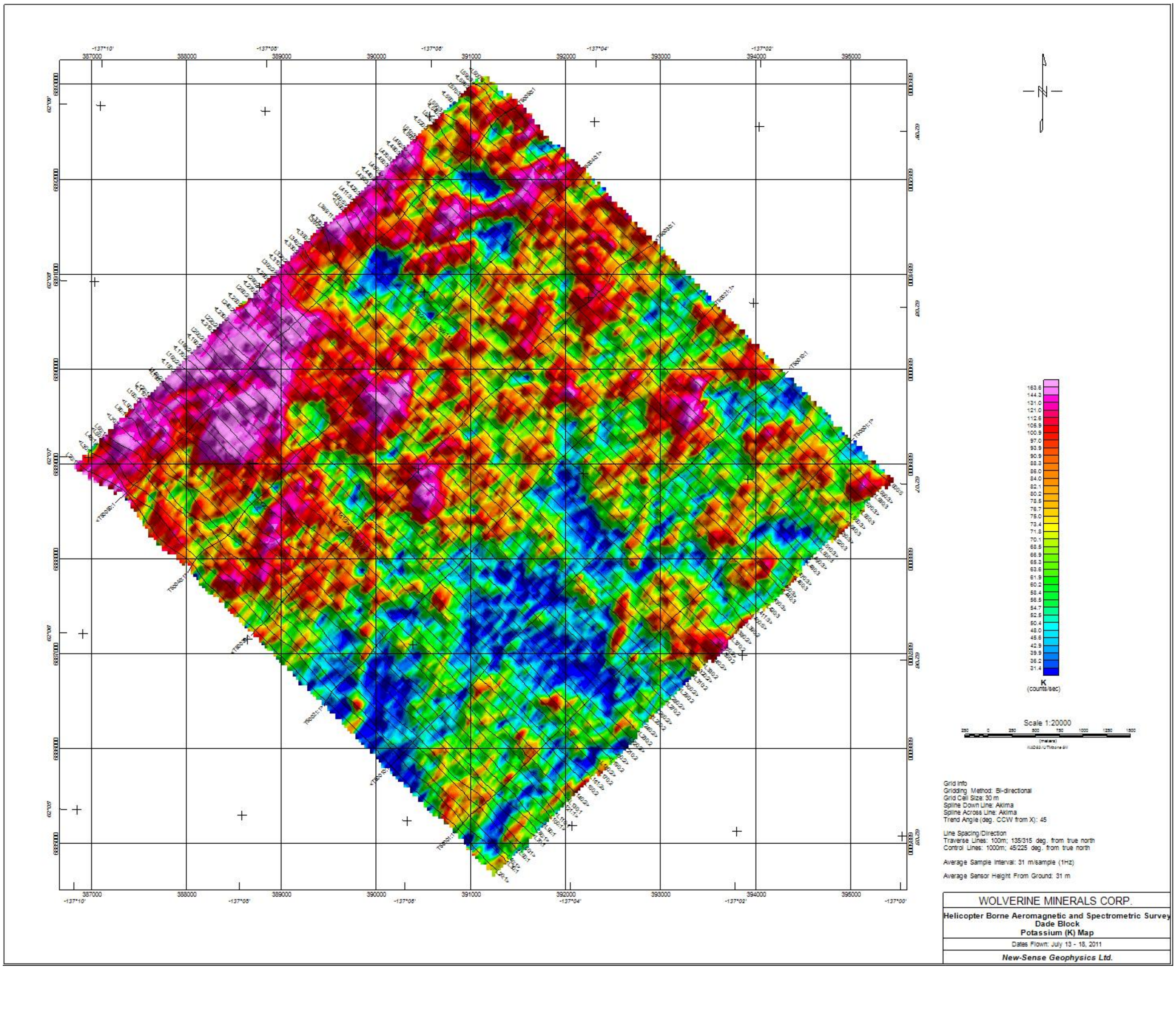
Dade Block Image of VDV Map



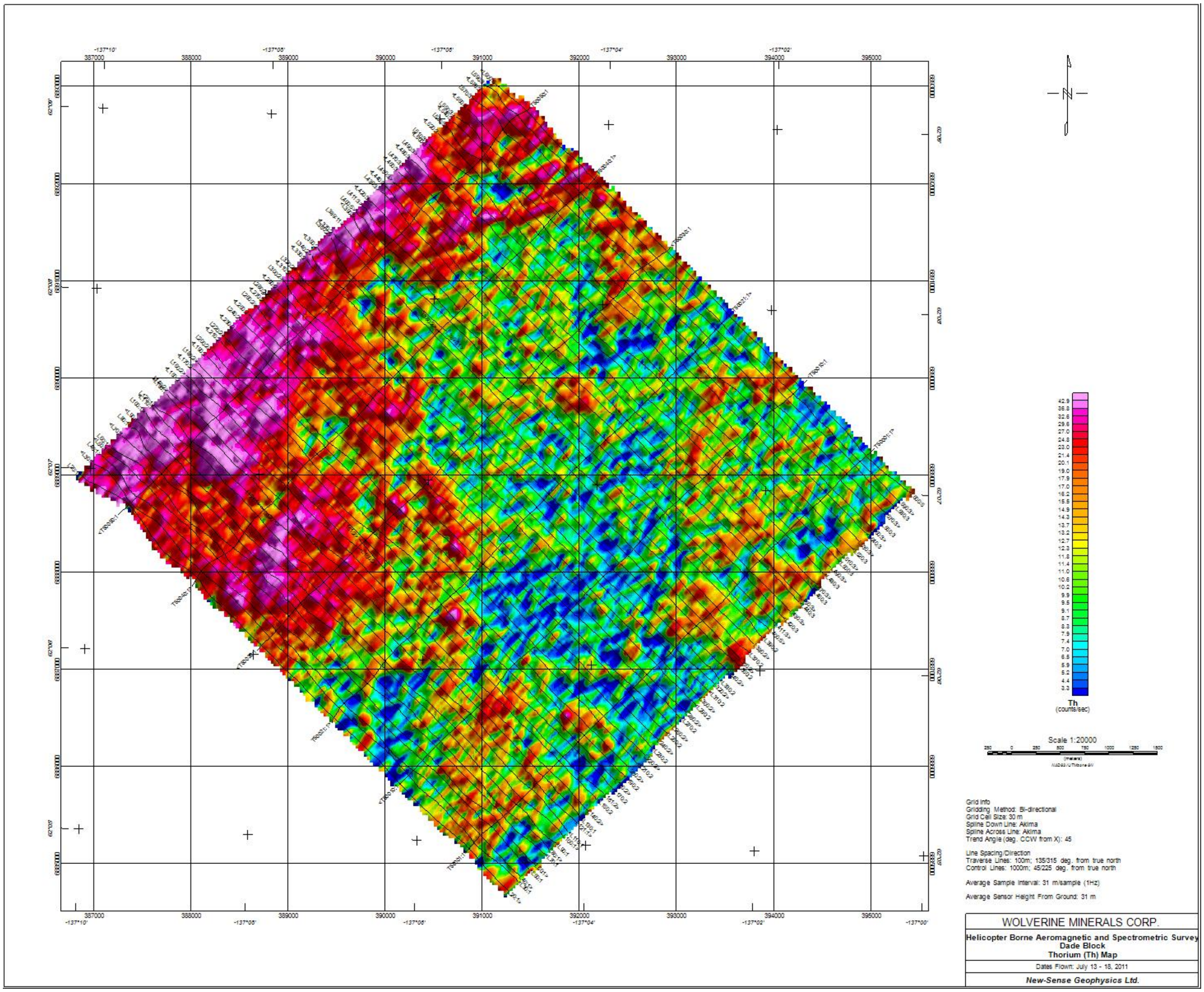
Dade Extension Block Image of DTM Map



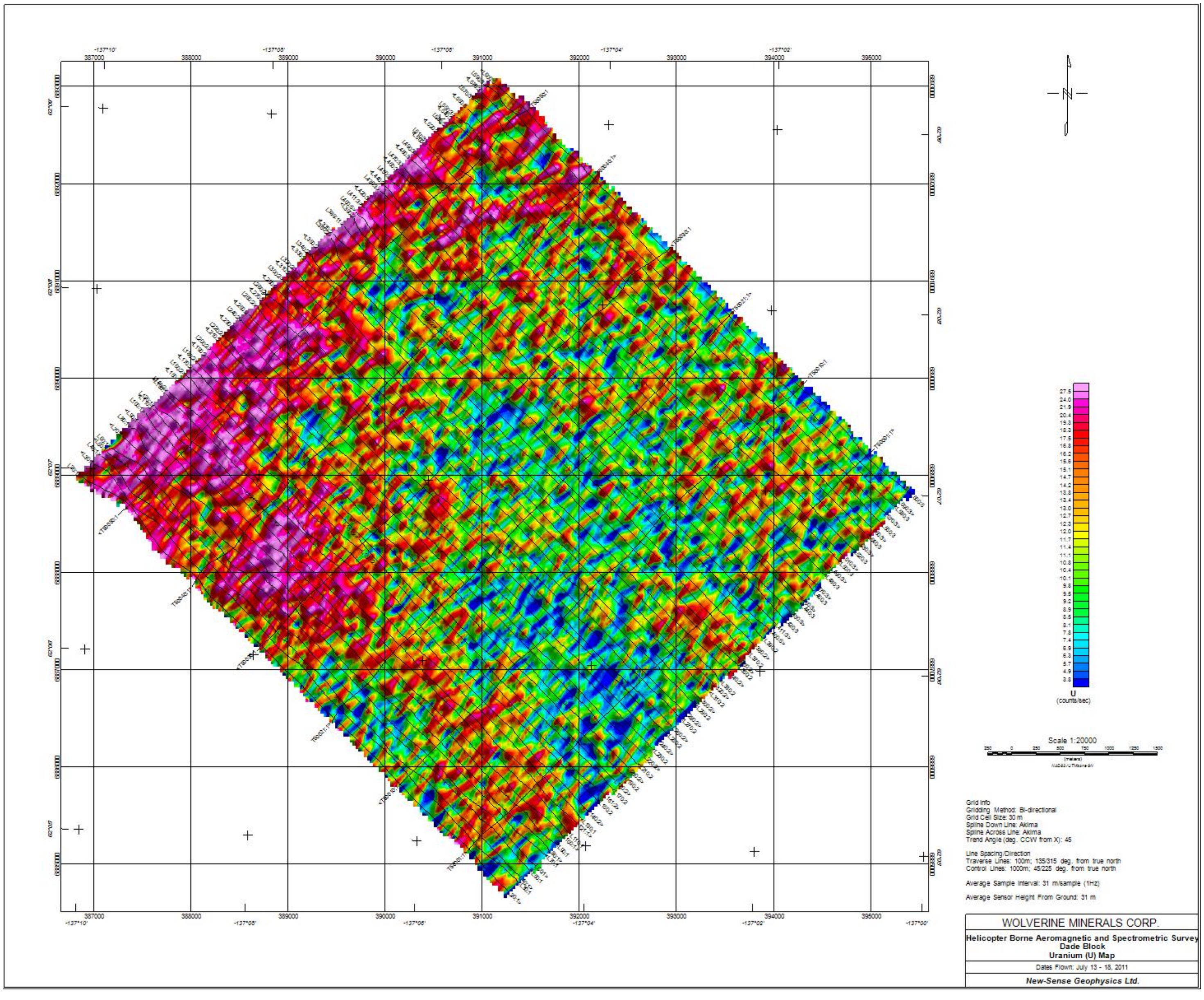
Dade Block Image of Potassium Map



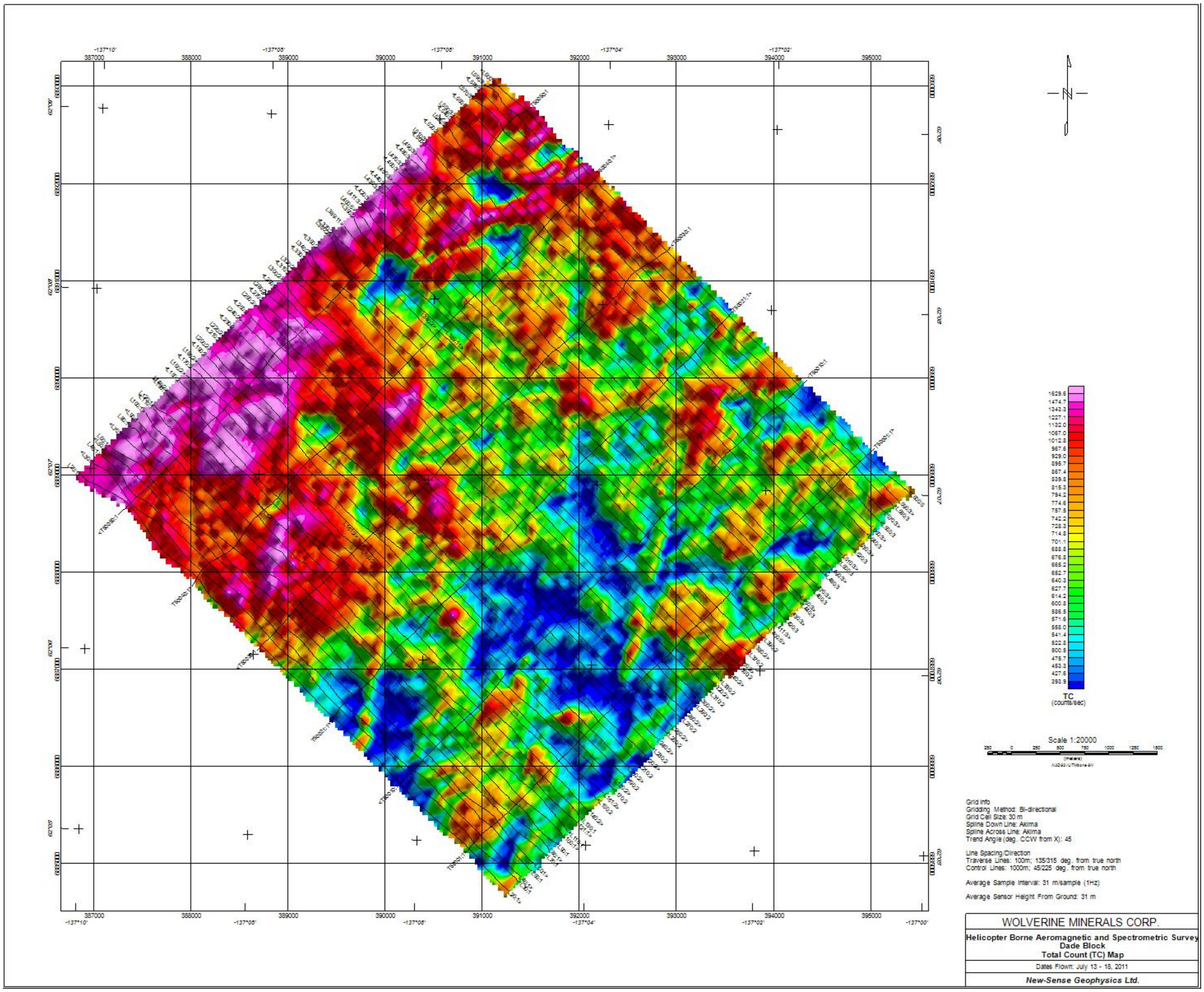
Dade Block Image of Thorium Map



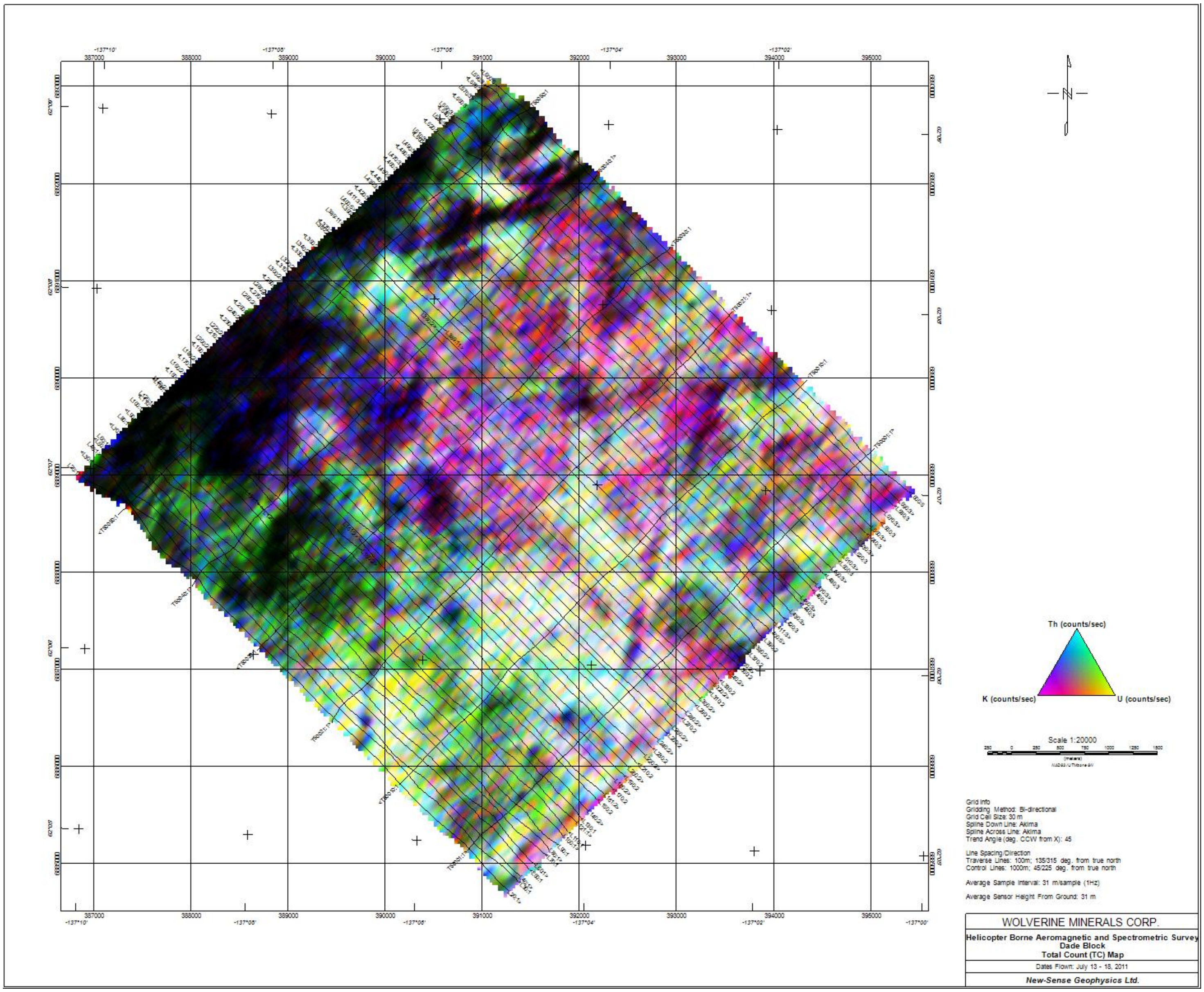
Dade Block Image of Uranium Map



Dade Block Image of Total Count Map



Dade Block Image of Ternary Map



APPENDIX F: MICROLEVELLING DESCRIPTION

As per PGW Microlevelling GX help file available through Geosoft Oasis montaj 7.2

```
DECORR.GX               Version 3.0
                        Paterson, Grant & Watson Limited
                        March 2003

PARAMETERS: (miclev group parameters are used, so that values set will be
             passed to MICLEV.GX)

   miclev.Xchan = x channel (default "x")
         .Ychan = y channel (default "y")
         .Ochan = original data channel (no default)
         .Nchan = decorrugation noise channel (default "dcor_noise")
         .Space = flight line spacing
         .Dir   = flight line direction in degrees azimuth (clockwise
                  from North)
         .Cell  = cell size to use for gridding (default = line spacing/5)
         .Wlen  = decorrugation high-pass wavelength (default = 4 * line
                  spacing)
         .Ogrid = original output grid, new or existing
         .Nnoise= decorrugation noise grid
         .XY    = Xmin,Ymin,Xmax,Ymax             (optional)
         .LOGOPT= Log option                      (optional)
         .LOGMIN= Log minimum                     (optional)
         .DSF   = Low-pass desampling factor      (optional)
         .BKD   = Blanking distance               (optional)
         .TOL   = Tolerance                       (optional)
         .PASTOL= % pass tolerance                (optional)
         .ITRMAX= Max. iterations                 (optional)
         .ICGR  = Starting coarse grid            (optional)
         .SRD   = Starting search radius          (optional)
         .TENS  = Internal tension (0-1)          (optional)
         .EDGCLP= Cells to extend beyond data     (optional)
```

DESCRIPTION:

decorr.gx and miclev.gx implement a procedure called micro-levelling which removes any low-amplitude component of flight line noise still remaining in airborne survey data after tie line levelling. Micro-levelling calculates a correction channel and adds it to the profile database. This correction is subtracted from the original data to give a set of levelled profiles, from which a final levelled grid may then be generated. Microlevelling has the advantage over standard methods of decorrugation that it better distinguishes flight line noise from geological signal, and thus can remove the noise without causing a loss in resolution of the data.

To microlevel data, first run decorr.gx, then miclev.gx. decorr.gx offers two options for the grid of the channel to be microlevelled. If a grid prepared from this channel already exists, it may be specified, and when prompted to overwrite, the user should answer no. If the user wishes to prepare a new grid of the channel to be microlevelled, the minimum curvature gridding algorithm (rangrid.gx) is applied. The advanced button provides access to the standard minimum curvature gridding parameters. Once the gridding is completed, decorr.gx applies a directional high-pass filter (see end note) perpendicular to the flight line direction, in order to produce a decorrugation noise grid. (The default grid cell size is 1/5 of the line spacing. The user may specify a different cell size if desired. A smaller cell size will give a more accurate result, but a larger cell size will make the gx run faster and use less disk space.) The noise grid is then extracted as a new channel in the database (default name is "dcor_noise"). This channel contains the line level drift component of the data, but it also contains some residual high-frequency components of the geological signal. miclev.gx applies amplitude limiting and low-pass filtering to the noise channel in order to remove this residual geological signal and leave only the component of line level drift, which is then subtracted from the original data to produce a levelled output channel named "miclev".

decorr.gx calculates default amplitude limit and filter length values for use in miclev.gx, but the skilled user may be able to set better values for these parameters based on an inspection of the noise grid. (The micro-levelling process is broken up into two separate GXes in order to allow the user to do this.) Flight line noise should appear in the decorrugation noise grid as long stripes in the flight-line direction, wheras geological anomalies should appear as small spots and cross-cutting lineaments, generally with a higher amplitude than the flight line noise, but with a shorter wavelength in the flight-line direction. The user can estimate the maximum amplitude of the flight line noise, and set the noise amplitude limit value accordingly. Similarly the user can estimate the minimum wavelength of the level drift along the flight lines, and set the low-pass Naudy filter width to half this wavelength. The defaults are to set the amplitude limit equal to the standard deviation of the noise grid, and to set the filter width equal to five times the flight line spacing.

There is an option of using either of two kinds of amplitude limiting. In "clip" mode any value outside the limit is set equal to the limit value. In "zero" mode any value outside the limit is set equal to zero. The clip mode makes more sense intuitively, but it has been found in practise that the zero mode may reject geologic signal better, depending on the particular data set. As a rule the zero mode works better on datasets in which the noise grid contains a lot of high-amplitude geological signals (e.g. shallow basement areas). For datasets in which the noise grid contains mainly flight line noise (e.g. sedimentary basins), the clip mode works better.

Microlevelling applies a level correction to the traverse lines only. If it is desired to grid the tie lines together with the micro-levelled traverse lines, then it may be necessary to also apply a level correction to the tie lines so that their values agree with the micro-levelled traverse lines at the intersections. This may be done as follows:

1) Copy the tie line values to the microlevelled channel.

2) Use intersct.gx to find cross-difference values for the microlevelled data.

3) Use xlevel.gx to load these cross-difference values to the tie lines.

4) Apply fulllev.gx to the tie lines. The output will be a set of tie

lines that matches the microlevelled traverse lines at all intersections.

5) Copy the microlevelled traverse line values into the same channel as the corrected tie line values.

Decorrugation Filter:

The decorrugation noise filter is a sixth-order high-pass Butterworth filter with a default cutoff wavelength of four times the flight line spacing, combined with a directional filter. The directional filter coefficient as a function of angle is F=(sin(a))^2, where a is the angle between the direction of propagation of a wave and the flight line direction,i.e. F=0 for a wave travelling along the flight lines, and F=1 for a wave travelling perpendicular to them. (Note this is the exact opposite of what is usually called a decorrugation filter, since the intention here is to pass the noise only, rather than reject it.)

The default cutoff wavelength (4 * line spacing) gives good results if the data is already fairly well levelled to start with. In cases where many lines are badly mis-levelled, it may be necessary to set a longer cutoff wavelength, at the risk of removing more geological signal.

APPENDIX G: COPY OF THE CONTRACT

New-Sense
Geophysics Limited

CONTRACT
FOR
A HELICOPTERBORNE AEROMAGNETIC AND SPECTROMETRIC SURVEY FOR WOLVERINE MINERALS CORP. OVER BBB AND DADE BLOCKS, YUKON, CANADA.

NEW-SENSE GEOPHYSICS LTD. ("NSG"), with its corporate offices at

195 Clayton Drive, Unit 11
Markham, ON, Canada
L3R 7P3

Telephone: (905) 480-1107/ (905) 480-9989
Fax: (905) 480-1207

Offers to carry out airborne geophysical services on behalf of

WOLVERINE MINERALS CORP. ("Client"), with its offices at:

Suite 3023, Bentall Three Building
595 Burrard Street
Vancouver, BC
Canada V7X 1K8

Telephone: (604) 689-5722
Fax: (604) 685-9182

Contact: Heather Smith. P.Geo
Email: hsmith@archercathro.com

in accordance with the following description, terms and conditions.

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1. COMPANY DESCRIPTION

New-Sense Geophysics (NSG) traces its history through its current founder and president Dr. W.E.S. (Ted) Urquhart. First as Urquhart-Dvorak, which specialized in processing airborne geophysical data, to High-Sense Geophysics, which became one of the largest airborne survey companies in the world, until it was purchased by Fugro of Holland in 2000, and then to Geoexplo Limitada., which specialized in airborne geophysical consulting and quality control. This sequence spans over 30 years and leads us to NSG, continuing on in the tradition of airborne survey innovation and quality airborne data acquisition.

NSG has established its HQ office in Markham, Ontario where it operates out of a new purpose-designed and constructed 3000 square foot facility. Here it designs and manufactures its own operator-less systems made ‘field-bullet-proof’ by engineer Glenn Slover.

The facility itself is more advanced than what may be found in leading high tech companies anywhere. It is completely wired for production with any processing station able to share information on the internal network and processors and field people in direct voice and data communication anywhere in the world. Highly secure firewall features prevent unauthorized access and fail-safe systems prevent any potential data loss through accident, intent or act of God. Clients with authorization can view the progress of their survey on a 24/7 basis.

The company has five data processing workstations with capacity to expand to twice that. A large inventory of systems and components provides for rapid remediation of field problems with the hardware should any occur. All this equipment is rigorously tested, using the built-in network and permanently installed sensors including GPS antenna signals available to each workbench.

The company works world-wide and presently has a second office of operation in Santiago Chile where equipment is maintained and processing takes place.

The company and its personnel through its many years in airborne surveying, airborne software and hardware development, and airborne survey data processing, has dealt with literally millions of kilometres of airborne data acquired in perhaps 80 countries. NSG itself has flown, processed and interpreted more than three quarters of a million line kilometres since 2005. These have been for multi-national companies (like Rio Tinto, Barrick, Teck, and BHP), to junior mining exploration companies, to governments. All have received their data on time and to their satisfaction. And in all of its history dating back 30 years, the companies owned and run by Dr. Urquhart, who developed the concept and practice of operatorless surveying, have not had a single accident …a perfect safety record.

2. SURVEY AREA

A helicopter borne magnetic and spectrometric survey is to be carried out on the Client's project areas known as BBB and Dade blocks located approximately 50Km west of Carmacks, Yukon, Canada.

The block is to be flown from Carmacks with refueling in between the flights at Klaza camp site. See Tables 2.1-2.2 and Figure 2.1 below.

Table 2.1 BBB block outline coordinates

UTM Zone 8N			
NAD83_X	**NAD83_Y**	**WGS84_X**	**WGS84_Y**
365438	6902072	365438	6902072
373282	6897592	373282	6897592
371473	6894543	371473	6894543
368259	6896403	368259	6896403
367652	6895669	367652	6895669
366893	6896087	366893	6896087
366412	6895416	366412	6895416
362831	6897580	362831	6897580
365438	6902084	365438	6902084

Table 2.2 Dade block outline coordinates

UTM Zone 8N			
NAD83_X	**NAD83_Y**	**WGS84_X**	**WGS84_Y**
391140	6893040	391140	6893040
386855	6888934	386855	6888934
391261	6884750	391261	6884750
395425	6888891	395425	6888891

Note: the survey will be flown in WGS84, World, UTM Zone 8N and delivered to the client in NAD83, North America, UTM Zone 8N.

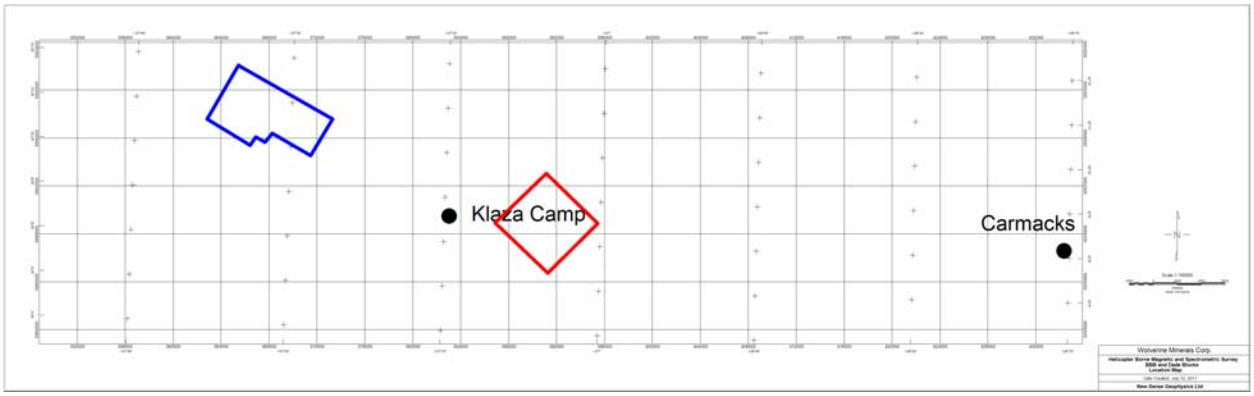


Figure 2.1 Map depicting outlines of the BBB block (blue) and Dade block (red). Coordinate system, WGS84, World, UTM Z8N. UTM grid cell size 4km.

3. *TECHNICAL SPECIFICATIONS FOR AIRBORNE SURVEY*

3.1 Traverse and Control Lines Statistics: BBB Block

Traverse Line Direction:	29/209 degrees from true North
Traverse Line Interval:	100m
Control Line Direction:	119/299 degrees from true North
Control Line Interval:	1000 m
Estimated Line KM:	390 L/KM (Traverse)
	45 L/KM (Control)
	435 L/KM (Total)
Mean Terrain Clearance:	35m* nominal
Sampling Interval:	Magnetics 50 Hz/10Hz; Radiometric 1 Hz second
Minimum Line Length:	2 Km

3.2 Traverse and Control Lines Statistics: Dade Block

Traverse Line Direction:	135/315 degrees from true North
Traverse Line Interval:	100m
Control Line Direction:	45/225 degrees from true North
Control Line Interval:	1000 m
Estimated Line KM:	360 L/KM (Traverse)
	35 L/KM (Control)
	395 L/KM (Total)
Mean Terrain Clearance:	35m* nominal
Sampling Interval:	Magnetics 50 Hz/10Hz; Radiometric 1 Hz second
Minimum Line Length:	2 Km

*Note: The 35 meter flight height will be subject to an on-sight safety audit. In any event, the flight height will be subject to pilot safety concerns.

Actual number of survey line kilometers will be those flown and delivered that fall inside the survey boundaries as listed above.

3.3 Tolerances

3.3.1 Traverse line separation

The pilot will fly to the best of his ability to stay within no more the 50% on either side of the theoretical flight path for a distance of 1000 meters unless obstructions or topography require greater deviations for reasons of safety.

There will be no crossing flight lines unless physical obstructions or topography require such deviation for reasons of safety. Such instances will be communicated and discussed with the client representative in writing.

However, if flight-line path deviations are the result of safety concerns, local aviation authority regulations, or military requirements, NSG will not be required to fly fill-in lines.

3.3.2 Control line spacing

Control lines will be surveyed at an average interval as specified, but may be located to avoid, where possible, areas of strong magnetic gradient.

3.3.3 Flight Height

The terrain clearance will be maintained at the planned altitude of 35 meters, subject to topography constrains, safety requirements, local aviation authority regulations, and/or military requirements.

3.3.4 Missing or Substandard Data

Data will be recorded digitally in the aircraft and at the ground station. Isolated errors, spikes, and short non-sequential gaps consisting of a few points, will be corrected by interpolation.

3.3.5 GPS

GPS will be used for navigation.

3.3.6 Diurnal

Magnetic diurnal activity will be monitored at the base station. If the magnetic activity exceeds 20 nT per 2 minute period, a flight will not depart until the activity has returned to levels below this rate. Once a flight has started it will not be aborted due to diurnal activity.

3.3.7 Re-flights

Any flight lines or parts of flight lines with data outside the above tolerances will be considered for re-flights. All re-flown lines or portions of lines will be tied to the closest control lines at both ends.

4. *PAST PERFORMANCE OR EXPERIENCE AND QUALIFICATIONS*

4.1 Organizational experience

NSG provides high quality airborne magnetic/gradiometer and spectrometer surveys using fixed-wing and helicopter platforms. The company is owned and operated by W. E. S (Ted) Urquhart Ph.D. who was the founder and President of High-Sense Geophysics Limited that was sold to Fugro in 2000. After a five-year non-compete period, NSG was inaugurated to re-enter the airborne survey industry to carry on the tradition of providing innovative technologies focusing on collecting the highest quality airborne geophysical data in the safest possible manner.

NSG operates from two offices, one in Markham, Canada where its equipment is manufactured, tested and dispatched throughout the world; the other is in Santiago, Chile where NSG offers airborne geophysical services in Spanish to its South American clients.

NSG has performed airborne geophysical surveys in Africa, North America, Europe, the Middle East and South America. NSG has flown in excess of 700,000 line km in the last 3 years for clients such as major companies like: USGS, BHP Billiton, PG&E, Kennecott, Teck Cominco, Barrick Gold, Kinross, Gold Field, etc.

4.2 References of previous surveys

Dr. V. J. S. (Tien) Grauch, Scientist in charge, *U.S. Geological Survey*
Phone: +1 (303) 236-1393
Email: tien@usgs.gov

Donald Hinks, Project Geophysicist, *Kennecott Exploration Company*
Tel +1 (801) 204 3404
Cell +1 (801) 638 8528
Email: donald.hinks@riotinto.com

Peter Mills, BHP Billiton Ltd.
Tel: + (976) 11 323033 x103
Email: peter.j.mills@bhpbilliton.com

4.3 Qualifications of the personnel and pilots

4.3.1 NSG representative

NSG conducts surveys with an operatorless system and as a result typically sends only one field geophysicist on the job site who possesses good knowledge in not only QC/QA, data processing but in the equipment maintenance as well. At this stage it is planed that NSG representative on the job site would be Mr. Sean Plener with Mr. Andrei Yakovenko being the general project manager under the oversight of Dr. William E. S. (Ted) Urquhart

Field:

Mr. Sean Plener is detail oriented specialist with international and domestic survey and mapping experience and a background in Physical Geography and Earth and Atmospheric Science. Sean has been working with New-Sense since 2007 on both airborne FW and Helicopter total field magnetic and radiometric surveys in different parts of North America and South America.

Geophysicist:

Mr. Yakovenko, Andrei, has been responsible for fixed wing and helicopter airborne operations including permanent, contract, and air crew supervision, logistics, data QA/QC, data processing, and reporting.

He is a tri-lingual, solutions oriented specialist with international and domestic survey and mapping experience, with a background in geology, underwater, land-based archaeology, and geophysics. Currently a Masters candidate in geophysics at McMaster University, Andrei obtained his B.Sc. (Honors) from the University of Toronto. He is skilled in geophysical data processing using Oasis Montaj and coordinating multiple airborne projects. Andrei has authored multiple scientific publications.

Office supervision:

Dr. Urquhart has over 40 years of experience in geophysics, during which time he has been involved in field surveys, operations, management, data quality, safety, data enhancement, compilation and interpretation for various projects throughout the world. Ted was an owner and president of High-Sense Geophysics Ltd. (the third largest geophysical airborne survey company in the world). He has participated in projects as diverse as oil basin studies, mineral and diamond exploration and radioactive satellite fragment recovery. Academically, Ted has conducted research (M.Sc., Ph.D., and professionally) into the correlation of magnetic anomalies with geological factors on both a large and small scale.

5. NSG'S QUALITY CONTROL

During data acquisition, the system will be monitored by the field QA/QC personnel to ensure that the equipment is secure and unchanged. If equipment has been noted to shift or a mechanical part of the aircraft has changed, another FOM will be flown.

Base station and survey flight data is collected immediately after each flight and duplicate copies made. Field staff verify completeness of flown lines, note and log any deviations from the flight path, identify (manual & 4th difference algorithm) and remove noise spikes (note: raw data is maintained), magnetic compensated channels created, daily progress report updated and posted for client, complete data set sent to NSG.

The iNAV V3 system, used for both flight and base station systems, store real time data on two independent storage media (hard disk, and a flash memory device). In the event that one of the devices fails or data were corrupted, a backup remains intact.

Post field production is done on a day-by-day basis. After the field data QA/QC process described in sections 7.4.1 and section 7.4.2, the data is sent to NSG's secure FTP. The post field QA/QC and leveling will be done by either Andrei Yakovenko or Dr. Ted Urquhart. The field staff is in contact with the in-house processor every evening to ensure data was received and to discuss previous flights. If there is an issue, the field staff can be reached by cell or satellite phone to make the necessary corrections before production continues. This immediate processing of the data to pre-final stages, benefits the client in three very important ways: First, there are multiple levels of personnel monitoring the survey data in a short period. If something is missed by the field staff, it will be caught by our in-house personnel before the survey progresses much further; second, we can update the client with current pre-final maps so areas of interest can be discussed and in-fills or re-flights can be planned before the survey lines are completed, thereby minimizing standby days; finally, the pre-final maps are ready the day after flying is completed and can be submitted for the clients approval.

The final products will be prepared as to the contract's obligations, section 8, and with Client's consent on all the data processing steps and procedures. A first version of the final products will be delivered to Client or other client representative for a review and approval.

For additional Data Processing and QA/QC information refer to the following sections regarding:

- Procedures including measures for aircraft's aeromagnetic system calibration (refer to sections 7.2.)
- Inflight data acquisition (sections 7.1 (except 7.1.4, 7.1.9, 7.1.10), 7.2, and 7.3)
- Flight path location (section 7.1.7)
- Ground magnetometer data acquisition (section 7.1.4)

- Data processing and map preparation (sections 7.4 and 8)

6. *EQUIPMENT SUITABILITY AND CONTINGENCY PLAN*

6.1 Availability and quality of proposed data acquisition and processing equipment

Aircraft:

A Bell 206B or similar helicopter provided by Northern Air Support (NAS) based in Kelowna, BC, will be used.

The aircraft with its field crew will operate from Carmacks, YT, and be using a certified fuel truck or fuel drums for refueling at those locations and/or designated fuel cash closer to the survey areas.

Client will be responsible for providing certified Jet fuel for the helicopter.

The aircraft will be limited to VFR flying conditions. All other conditions will be left to the discretion of the pilot in command.

Data Acquisition:

NSG builds and maintains its own proprietary data acquisition systems known as iDAS. The iDAS system features the KroumVS Instraments KMAG4 magnetometer counter and the KANA8 analog to digital converter. The systems are built with a wide range voltage input (9V to 36V) to accommodate a variety of aircraft power supplies.

The iDAS system uses sophisticated software to provide an autonomous "Operatorless" system resulting in a SAFER survey environments by removing the need for an operator on board the aircraft.

The systems will be available within two weeks of the signing of the contract.

For the data processing NSG is using Geosoft Oasis montaj with a number of build in GX scripts.

6.2 Electronic navigation

Pilot Friendly Navigation display (PI) delivers all the navigation and control features necessary for the pilot to safely maintain the highest quality flight line specifications without additional safety risk of having an operator on board the aircraft (see also section 7.1.7).

6.3 Safety Plan

Safety is the number one priority at NSG. NSG is an active member of the International Airborne Geophysics Safety Association (IAGSA)

Prior to mobilizing to the job site, IAGSA Risk Analysis and NSG Job Safety Plan will be prepared in the Markham office. There are areas of the report that require a physical presence on the job site (i.e. reconnaissance flight, identifying local hazards, etc.). At the job site, before each departure, the pilot will contact the local air traffic controller.

Prior to flying the first production line, a safety meeting is held by a NSG representative where each of the reports is explained to all members of the survey crew. A reconnaissance flight will then take place and the IAGSA Risk Analysis and NSG Job Safety Plan will be completed.

Every Sunday, a weekly safety meeting takes place where any and all the safety concerns and issues during the past week are brought to attention and logged to a weekly safety report.

Pilot safety is enhanced by the use of a flight following system that provides updates at 2-minute intervals on the GPS location of the aircraft. This information is monitored in real time on the internet by authorized personnel. In case of an emergency the pilot could press a “Panic Button” connected to the Flight Following and the signal will be transmitted at around 10 sec. intervals or less, which would drastically reduce the search area in a case of emergency landing.

The client will be provided with a login for real time monitoring of aircraft activities through this Flight Following System.

In addition, the Flight Following has an integrated satellite phone that is connected directly to the pilot’s headset. This minimizes any distraction to the pilot when sending or answering a call.

Prior to the flight’s departure, a NSG representative records all the information regarding the aircraft status, such as time of departure, endurance, fuel level, etc.

Once in the air, NSG representative monitors the aircraft at least once every half hour. In case of internet problems, a call will be given right away to the satellite phone integrated to the pilot’s headset and once every hour.

If the flight following signal is lost and the pilot cannot be reached by satellite phone, then NSG’s emergency response procedure is initiated (detailed in the NSG Job Safety Plan).

The aviation company will adhere to all the standards and requirements for local approved air operators.

In summary:

- NSG is active members of International Airborne Geophysics Safety association (IAGSA)
- On each job NSG completes both IAGSA Risk Analysis and NSGs Job Safety Plan forms.
- NSG conducts daily safety meetings with the crew before any flying takes place.

- A Flight Following system will accompany NSG iDAS system that provides updates on every 2 minute intervals, which could be monitored through internet access.
- In addition, the Flight Following has an integrated satellite phone that is connected directly to pilot’s headset. Thus minimizing any distraction if pilot decides to send or receive a call.
- The client will be provided with a login for real time monitoring of the helicopter activities through the flight following system.

6.6 Safety Record

No accidents or near accidents have ever occurred at NSG. Since its inception, the company has flown over 45 magnetic and/or radiometric surveys totaling well over half a million line kilometers without an accident.

In addition, High-Sense Geophysics formed in 1993, owned by NSG president Dr. Ted Urquhart, also had an accident-free history. High-Sense rose to become one of the world’s largest airborne survey contractors and had met and exceeded the rigorous safety standards of BHP, Shell, and Phillips, among others. It had performed surveys without incident or accident in difficult areas including Vietnam, China, Mongolia, Mauritania, Democratic Republic of the Congo, Brazil, and Sudan.

7. *TECHNICAL APPROACH*

7.1 AIRBORNE AND GROUND INSTRUMENTATION

7.1.1 Aircraft Type

The aircraft allocated to conduct this survey is a JetRanger 206B helicopter (or different see Section 6.1) with a fix mount stinger assembly with a Cesium magnetometer mounted in it.

7.1.2 Geophysical Flight Control System

A geophysical flight control system, designed and built by NSG will be provided. This system will control, monitor and record the operation of all the geophysical and ancillary sensors.

7.1.3 Airborne Magnetometer

The magnetometers will be cesium sensors, operated in strap down tail stinger mount. The orientation of the sensor is adjustable, to provide optimum coupling with the earth's field on reciprocal headings. The magnetometer has a sensitivity of better than 0.01 nT at a sampling interval of 0.1 s. The magnetometer has the capability to measure ambient magnetic fields in the range of about 100 to more than 100,000 nT.

The airborne magnetometer is supplemented with an 18-term digital compensation system that uses the input from a 3-axis fluxgate to determine the aircraft's attitude and rate of change with respect to the earth's magnetic field. The compensation system identifies the permanent, induced and eddy current magnetic contributions of the aircraft and provides a correction to be applied to the raw magnetic data to remove the maneuver noise.

A FOM will be calculated by summing the absolute errors of each of the 12 maneuvers and will be less than 3 nT.

7.1.4 Ground Magnetometer

Scintrex Cesium CS3 or GSM19 Proton magnetometers will be operated at the base of operations within or near the survey area in an area of low magnetic gradient and free from cultural noise. The sensitivity of the ground magnetometer will be equal to better than 0.1 nT. Data will be recorded continuously every 1 second (or a rate defined by the client) throughout the survey operations in digital form. Both the ground and airborne magnetic readings are automatically time stamped with GPS time to within 0.005 seconds ensuring a very high degree of correlation based on broadcast GPS satellite time.

7.1.5 Radar Altimeter

A Terra 3500 radar altimeter will be operated in the aircraft throughout the survey to provide ground clearance information. The altitude will be recorded every 0.1 second or better. This instrument has a linear performance over the range of 0 to 2500 feet.

7.1.6 Fluxgate Magnetometer

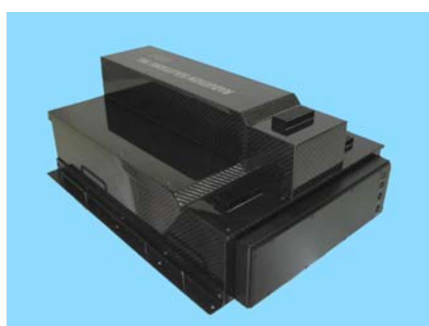
To achieve quality compensation NSG uses a Bartington Mag-03 Three Axis Magnetic Field Sensors. These compact, high performance fluxgate magnetometers with integral electronics provide reliable precision measurements of static and non-static magnetic fields in three orthogonal axes. The magnetometer is mounted inside the stinger assembly.

7.1.7 GPS Navigation

A 16-channel GPS navigation system will be used for navigation and flight path recovery. The Ublox RCB-LJ GPS receiver board is powered by the ANTARIS® positioning engine.

The leading ANTARIS® GPS Engine provides excellent navigation performance under dynamic conditions in areas with limited sky view like urban canyons, high sensitivity for weak signal operation without compromising accuracy, and support of DGPS and multiple SBAS systems like WAAS and EGNOS. The 16 parallel channels and 8192 search bins provide fast start-up times. The aiding functionality accelerates start-up times even further. The low power consumption and FixNow™ power saving mode make this product suitable for handheld and battery-operated devices.

7.1.8 Spectrometer



The RS-500 Airborne Spectrometer with RSX-5 detector pack, manufactured by Radiation Solutions Inc. (RSI), will be used for the survey. The RS-500 spectrometer has a multi-peak gain stabilization algorithm and is capable of recording 1024 channels with accuracy of 0.1 to 10 counts/second.

The RS-500 is connected to a crystal pack comprising four downward looking crystals (16 liters total) and one upward looking crystal (4 liters total). The downward crystals record the radiometric spectrum from 410 KeV to 2810 KeV over 1024 discrete energy windows, as well as from a cosmic ray channel that detects photons with energy levels above 3.0 MeV. From these 256 channels, the standard Total Count, Potassium, Uranium and Thorium channels are extracted. The upward crystal is used to measure and correct for atmospheric Radon interference. The shock-protected Sodium Iodide (Thallium) crystal package is unheated and automatically stabilizes with respect to the multiple peaks. The RS-500 provides raw data that has been automatically corrected for gain, base level, ADC offset, and dead time.

A resolution test will be performed before the first and after the last flight each day in order to monitor sensitivity and resolution of the crystal pack.

7.1.9 Field Data Verification System

NSG will provide a complete PC based magnetic map compilation facility, to serve as a field verification system The PC computer based system is equipped with all the software necessary to produce preliminary data images in the field. Data will be provided to the client in a Geosoft format.

The digital data records will be verified at the project site to confirm that data recording has taken place within specifications. All raw digital data recorded in flight and on the ground station magnetometer will be duplicated on site to prevent loss, and stored in separate locations.

In the base where there is e-mail connection, data will be sent on a daily basis for further examination in the head office where areas of infill will be chosen.

7.1.10 Flight Following System

NSG places the highest priority on safety and uses satellite tracking and communication technology to monitor all its survey flights. The aircraft will be equipped with Latitude Technologies Skynode S200, a system that includes satellite phone, flight tracking, and messaging transceiver. This system uses the Iridium satellite network, which provides both voice and data communications between the aircraft and ground stations.

The S200 system can be set up for different time frames; it now automatically updates its position at least once every 2 minutes allowing NSG's field or office staff to monitor the progress of the survey flights. All flight staff are trained in the use and the operation of the S200 system.

During the survey, if the pilot experiences any problems with operation of the survey equipment or encounters any other difficulties, he/she can call the field or office staff for support through the satellite phone, which is integrated into the pilots head set. In the event of flight operations problems, field staff can often troubleshoot and correct difficulties allowing survey flights to continue uninterrupted.

In the event of an emergency the pilot may press the "Panic Button" which will cause the system to immediately transmit the location and heading of the aircraft and will continue to transmit the current position of the aircraft continuously at around 10 sec. intervals until the emergency system is turned off.

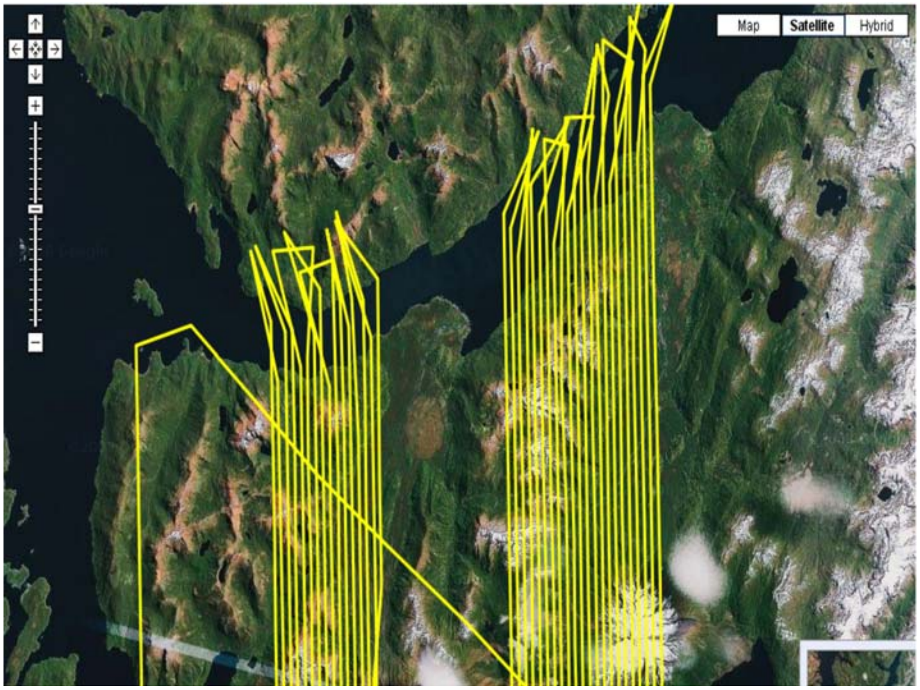


Figure 7.1 Screenshot of Flight Following Through Internet Web Browser

7.2 INSTRUMENT CHECKS AND CALIBRATIONS

Failure to meet the specifications in any check or calibration test will be cause for corrective action by NSG or approval of the Client before survey operations can be undertaken.

7.2.1 Magnetometer

Figure of Merit (FOM)

A test will be flown on-site prior to the survey to determine the FOM of the installed magnetometer. The system will be flown on the four cardinal headings doing a pitch, roll, and yaw, maneuver on each. The FOM will be calculated by summing the absolute errors of each of the 12 maneuvers and will be less than 3 nT.

7.2.2 Altimeter

Checks of the radar altimeter calibration will be undertaken above the base airstrip or some other suitable location with known elevation and flat terrain.

7.2.3 Radiometric

7.2.3.1 Pre-survey Spectrometer Calibrations and Tests

Calibration of the spectrometer system is a vital process to airborne radiometrics or airborne gamma-ray spectrometry. The calibration of the spectrometer system involved three tests:

- Calibration Pad measurements, which are used to determine the "spectral overlap" (Compton scattering) coefficients. The calibration test is performed within a 12 month period before and/or during the survey by the manufacturer, Radiation Solutions Inc., at its headquarters location in Mississauga, Ontario.

- Cosmic Flight Test, which is used to determine the aircraft background values and cosmic coefficients. A series of high altitude test lines (e.g., 8,000 ft, 9,000, ft, 10,000 ft, and 11,000ft (if capable) above sea level) will be flown in the vicinity of the survey areas.

- Height Attenuation Test, which determines the altitude attenuation coefficients. A series of test lines (e.g., 50 ft, 100, ft, 150 ft, 200, ft, 250 ft, 300 ft, 400, 600 ft, 800 ft, and 1000 ft above ground) over dry and flat ground, will be flown in the vicinity of the survey areas.

7.2.3.2 During-Survey Spectrometer Calibrations and Tests

7.2.3.2.1 Resolution Daily Tests

The usual measure of the energy-resolution of a spectrometer system uses the “full width at half maximum (FWHM)” of a photo-peak. This is the width of the peak at half the maximum amplitude divided by the energy of the photo-peak.

The overall system resolution based on the Th photo-peak at 2.61 MeV should always be better than 7% on all downward looking crystals. If the resolution changes by more than 1% (eg, 4% to more than 5%) from that measured at the start of the survey, flying operations will be ceased until the source of the problem is found and rectified.

This test is not required with the RS-500 system and will only be performed at the Clients request and upon availability of Th source material.

7.3 DATA RECORDS

7.3.1 Digital Records

The airborne data acquisition system will record the following information digitally in a format that enables the recording of each variable over its full dynamic range:

Fiducial count
GPS UTC time
GPS latitude, longitude, UTM easting, northing and elevation above ellipsoid
Raw magnetic total field
Calibrated radar altimeter output
Three Fluxgate channels
Raw Potassium counts
Raw Thorium counts
Raw Uranium counts
Raw upward-looking Uranium counts

Raw Total Count
Raw Cosmic counts
Live Time
Downward Spectrum

The base station will record the following information digitally in a format that enables the recording of each variable over its full dynamic range.

GPS time (used as fiducial number)
GPS raw satellite range information
Raw magnetic total field

All survey parameters including raw magnetic total field, electronic positioning, radar altimeter, and time and fiducial markers will be recorded digitally during data acquisition in flight. The magnetic base station will record total magnetic field and GPS time.

The data acquisition system organizes the data in a form directly suited to building the processing database. This digital file structure has for each traverse and control line a unique line number and segment number. The base station magnetic profile and GPS coordinates are added to the database using GPS time for alignment.

7.4 DATA COMPILATION AND MAP PRESENTATIONS

The NSG Field-Mapper PC based computer compilation system will be used to process the collected geophysical data on-site as the survey progresses. The 'on-site' processing will enable the Client to review the magnetic data to evaluate targets to make a qualified decision regarding any changes to the survey quantity and size. This will allow the selection of “in-fill” or area extensions. The preliminary data will be sent via FTP site (assuming reasonable speed internet connection is available) for the client’s review at least once a week (more often should the client require).

7.4.1 Magnetic

7.4.1.1 Field Data Processing

After collecting flight and base station data, flight data will be imported to Oasis montaj using a NSG template that includes all project data channels. Next flight data will be windowed to only include flight path data within the survey block using custom NSG script that will be developed for the survey areas.

Magnetic flight data from the tail will then be duplicated to ensure original raw data is not modified in any way. Profiles for the duplicated channels are then checked for visible noise spikes. Any noise spikes are then cleaned manually and interpolated. From there, field staff will run an automated script that will look for any missed noise spikes. This automated script employs a 4th difference algorithm to identify noise spikes in magnetic data. After other channels (radio altimeter, flux gate profiles etc.) are inspected for normal behavior that database is prepared for magnetic compensation. Using QC Tools, compensation coefficients are applied to the cleaned magnetometer channel and the database is saved.

From here, NSG staff will import base station data into Oasis montaj using a NSG template. Base station data is duplicated to maintain a raw channel and then checked for visible noise spikes. After noise spikes have been removed and interpolated, a 101 (or other job specific) low pass filter is applied to base station magnetic channel and the database is saved.

Next, the flight and base station databases are merged, synchronized (using the GPS clock channel recorded by both systems), compressed, encrypted and sent to NSG's secure server in Toronto, for in-office QA/QC and processing procedure.

NSG field staff from there will updated and complete all daily logs (weekly progress report, daily procedures checklist, weekly summary meeting etc.).

7.4.1.2 Post-Field

As the data being received from the field on day-to-day basis it is reviewed for QA/QC once again to insure that nothing got missed in the field. The data is checked for quality of magnetic signal from all sensors, including the base station magnetometer, fluxgate magnetometer, radar altimeter, line deviations etc. The profiles of the above data are plotted and checked on line-by-line basis. Algorithms like 4th-difference are used to check the CS3 signal.

After the data has been QA/QC checked it is merged with an ongoing master database. Where the following data processing steps take place:

1) Diurnal correction - subtracted directly from the aeromagnetic measurements to provide a first order diurnal correction. The mean of base station readings is added back to the data.
2) Heading error correction - using pre-constructed heading table.

3) Lag correction – to correct for sensor-to-GPS offset.
4) Simple Leveling - a survey line/control line network will be created in order to determine differences in magnetic field at the line intercepts. The differences will be calculated and tabulated, then used to guide subsequent manual leveling on any lines or line segments which required adjustments. See image below for an example of contour Total Magnetic Intensity (TMI) map produced after Simple Leveling was applied.
5) Microleveling – depending on the Simple Leveling results a Microleveling might be needed in order to further correct the data for linear line-to-line noise. The technique used will be the one developed by Paterson, Grant & Watson Limited and available through Geosoft Oasis montaj with the mutually accepted parameters.
6) IGRF correction - The total field strength of the International Geomagnetic Reference Field (IGRF) 2005 model will be calculated for every data point, based on the spot values of latitude, longitude and GPS altitude, using the 2005 model. This IGRF will be removed from the measured survey data on a point-by-point basis. The mean of IGRF readings is added back to the data.

7.4.1.3 Magnetic data filtering and gridding

A cosine filter (e.g., 31-51 points) will be applied to 50Hz data before re-sampling the data to 10Hz.

The TMI grid will be produced using bi-directional gridding technique, with 20 m cell size (or other suitable size depending on liner spacing) and Akima spline across and down lines.

7.4.2 Radiometric

7.4.2.1 Field Data Processing

After collecting flight data, the radiometric data will be imported to Oasis montaj using a NSG template that includes all project data channels. Next flight data will be windowed to only include flight path data within the survey block. After, an in house-developed radiometric processing GX will be run on the database, which will apply the following corrections:

7.4.2.1.1 Pre-filtering

The cosmic and radar altimeter channels will be processed with a 10-20 point and 5 point low pass filter respectively to remove spikes.

7.4.2.1.2 Live Time correction

All the elements including upward looking Uranium and Total Count will be corrected for Live Time using the following formula:

$Clt = Craw \times (1000/LT)$

Where:

- Clt is the live time corrected channel
- Craw is the raw channel
- LT is the Live Time channel

7.4.2.1.3 Aircraft and Cosmic Background

Aircraft background and cosmic stripping corrections will be applied to the Total Count, Potassium, Uranium, Thorium and upward Uranium channels using the following formula:

$Cac = Clt - (ac + bc \times Cosf)$

Where:

- Cac is the background and cosmic corrected channel
- Clt is the live time corrected channel
- ac is the aircraft background for this channel
- bc is the cosmic stripping coefficient for this channel
- $Cosf$ is the filtered cosmic channel

All negative counts after this correction step will be replaced with zeroes.

7.4.2.1.4 Compton Stripping

Following the radon corrections for Uranium and Total Count, the potassium, uranium and thorium will be corrected for spectral overlap. First the stripping ratios α, β, and χ were modified according to altitude. Then an adjustment factor based on the reversed stripping ratio (a), uranium into thorium, was calculated.

$$\alpha h = \alpha + hef \times 0.00049$$
$$\beta h = \beta + hef \times 0.00065$$
$$\chi h = \chi + hef \times 0.00069$$

Where:

- α, β, χ are the Compton stripping coefficients
- $\alpha h, \beta h, \chi h$ are the height corrected Compton stripping coefficients
- hef is the height above ground in meters

The stripping corrections are then carried out using the following formulas:

$$ar = \frac{1}{1 - a\alpha h}$$

$$Th_c = (Th_{bc} - aU_{rc}) \times ar$$

$$U_c = (U_{rc} - Th_{bc}\alpha h) \times ar$$

$$K_c = K_{bc} - \beta h Th_c - \chi h U_c$$

Where:

- U_c, Th_c, and K_c are corrected Uranium, Thorium and Potassium
- $\alpha h, \beta h, \chi h$ are the height corrected Compton stripping coefficients
- U_{bc}, Th_{bc}, and K_{bc} are background and cosmic corrected Uranium, Thorium and Potassium
- ar is the backscatter correction
- a is the reverse stripping ratio U into Th

All negative counts after this correction step will be replaced with zeroes.

7.4.2.1.5 Attenuation Corrections

The Total Count, Potassium, Uranium and Thorium data will then be corrected to a nominal survey altitude according to the equation:

$$Ca = C \times e^{-\mu(h0-h)}$$

Where:

- Ca is the output altitude corrected channel
- C is the input channel
- μ is the attenuation correction for that channel
- h is the radar altimeter height, in metres
- $h0$ is the nominal survey altitude used as datum

All negative counts after this correction step will be replaced with zeroes.

7.4.2.2 Office Data Processing

All of the above calibration procedures, tests and corrections applied in the field will be reviewed for QA/QC by assigned office QA/QC and data processing person .

7.4.2.3 Radiometric grids

Grids of Potassium, Thorium, Uranium and Total Count will be produced using bi-directional gridding technique, with 25 m cell size (or other suitable size) and Akima spline across and down lines.

8. *FINAL PRODUCTS*

The following is the list of items that will be delivered to the Client:

Hard copies (2 copies):

- Ternary map of Th, U and K (1:20,000 scale)
- Map of Potassium (1:20,000 scale)
- Map of Thorium (1:20,000 scale)
- Map of Uranium (1:20,000 scale)
- Map of Total Count (1:20,000 scale)
- Map of Total magnetic Intensity (1:20,000 scale)
- 1^{st} order Vertical Derivative (1:20,000 scale)
- Digital Terrain Model (1:20,000 scale)
- Final Logistics Report

Soft copies (2 copies):

- Ternary map of Th, U and K at 1:20,000 scale
- Grid and map of Total Magnetic Intensity at 1:20,000 scale
- Grid and map of Potassium counts at 1:20,000 scale
- Grid and map of Thorium counts at 1:20,000 scale
- Grid and map of Uranium counts at 1:20,000 scale
- Grid and map of Total Count at 1:20,000 scale
- Grid and map of 1^{st} order Vertical Derivative at 1:20,000 scale
- Grid and Map of Digital Terrain Model at 1:20,000 scale
- Final Logistics Report
- Radiometric data database in Geosoft gdb format including all raw data and height corrected Potassium, Thorium, Uranium, and Total Count
- Magnetics data database in Geosoft gdb format including raw data, base station, compensated, base station corrected, IGRF corrected, heading corrected, lag corrected, simple leveled, and microleveled (optional) total field.
- Database and channel descriptions file in Excel format
- Weekly and Line Progress report

9. TIME SCHEDULE

The project will start on July 13, 2011.

10. TERMINATION

In the event that the geophysical platform or equipment becomes inoperable, NSG will proceed with diligence to rectify the problem within a reasonable period of time. If within the aforementioned period of time NSG fails to rectify the problem, the Client may, at their discretion, terminate the work under this Proposal in full or in part. In the event of such termination, the Client shall be obliged to pay NSG for services rendered only up to the date of receipt of a written notice of such termination and for documented expenses incurred by NSG prior to the date of receipt of termination notice, and for reasonable cancellation and demobilization costs.

11. LOCAL LICENSES, PERMITS AND CUSTOMS

Client will take the responsibility for obtaining all local licenses and permits required to perform the services. Out of pocket costs for permitting will be reimbursed by the client.

12. GENERAL CONDITIONS

NSG will carry out the agreed services in a proper and workmanlike manner with a high standard of safety and in accordance with the laws, rules and regulations applicable to the project location.

At all times during the term of this Proposal, the NSG or its subcontractors shall carry and maintain at its own expense, work insurance protection of the kinds and in the minimum amounts set forth below:

12.1 NSG Liability Insurance

- Employer's Liability and Workmen's Compensation insurance to cover employees furnished by NSG including:

  (a) Statutory Workmen's Compensation benefits in compliance with the laws of the state, province or country in which the aircraft operations under this Proposal will be performed;

  (b) Employer's Liability to have limits of not less than $5,000,000 per person, and $5,000,000 per accident;

  (c) Employer's Liability applicable to all provisions outlined above with limits not less than $5,000,000 each person, $5,000,000 each occurrence.

- Comprehensive General Liability Insurance. Such insurance shall cover all operations in all provinces, states and countries in which the aircraft operation or services may be performed by NSG hereunder and shall include the following:

  (a) Limits of liability: not less than $5,000,000 for death or injury of any one person, $5,000,000 in the aggregate for all persons injured or killed as the result of any one accident, and $5,000,000 for loss of or damage to property resulting from any one accident.

  (b) Contractual liability coverage for NSG's obligations hereunder;

13. CHARGES AND PAYMENT TERMS

Total estimated cost for Survey and Map Production

Block Names	Line Spacing (Traverse/Control)	Estimated Total Line Km	Price per Line Km ($CAD)*/**	Mob/Demob ($CAD)*	Estimated Total***/****
BBB	100m/1000m	435	$92.31	$4,800	**$ 83,171.10**
Dade	100m/1000m	395	$96.75		

Stand-by of CAD $1,430.00/day will be charged on those days where flying is not possible due to inclement weather, atmospheric conditions, labor unrest, government intervention or other stoppages beyond the control of the contractor.

*Note: The line Km and mobilization/demobilization rates are based on condition that the an additional block (known as Klaza Extension, as per the contract with Rockhaven Resources Ltd.) will be flown during the same period as BBB and Dade blocks. The total estimated survey line Km will be 1,295.

**Note: The line Km rate is based on condition that client provides sufficient amount of Jet fuel for the helicopter at the following sites: Klaza camp, Carmacks.

***Note: The estimated total will depend on the final number of line Km to be flown. The actual line Km distances may be slightly less or more than estimated.

****Note: These prices are net of all local taxes.

Payment Schedule

An initial payment, due on signing and mobilization: 50% of selected survey Plan price

Second payment, due on completion of flying: 40% of selected survey Plan price

On delivery of final maps and reports: Balance

All invoices are due and payable upon submission at the Client's address indicated in Section 1 of this Survey Agreement. A service charge of 0.4 % per week on unpaid balance is payable on all overdue accounts.

The payment schedule is subject to negotiation should the proposed schedule not conform to the client's norms and regulations.

Funds will be paid by wire transfer to:

In CAD Funds

Beneficiary:	New-Sense Geophysics Limited
Bank:	The Bank of Nova Scotia
Account #:	02011
Transit #:	11452
Institution Code:	002
Swift:	NOSCCATT
ABA Routing:	026002532
Address:	880 Eglinton Avenue E. at Laird Drive Toronto, Ontario, M4G 2L2, Canada

NEW-SENSE GEOPHYSICS	WOLVERINE MINERALS CORP..
Name (print): Andrei Yakovenko	Name (print): Heather Smith
Title: V.P. Operations	Title: Project Geologist /Supervisor
Date: July 13, 2011	Date: July 13, 2011
Signature:	Signature: Heather Smith