HIGH RESOLUTION AEROMAGNETIC SURVEY

KEEZHIK LAKE PROPERTY, ONTARIO

For:

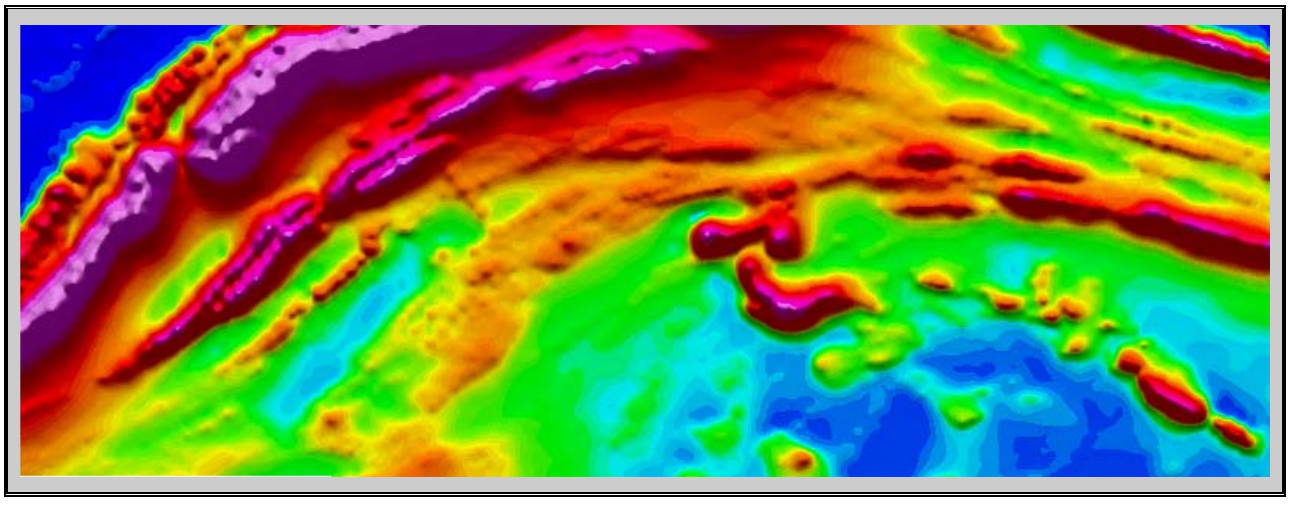
METALCORP LIMITED
309 South Court Street
Thunder Bay, ON
P7B 2Y1

By:

Geo Data Solutions GDS Inc.
1054 Des Pervenches
Laval, Quebec H7Y 2C7
Telephone : (514) 867-9990

Project Ref.: P08-006 **Final Technical Report**

April 2008



METALCORP LIMITED

HIGH RESOLUTION AEROMAGNETIC SURVEY

KEEZHIK LAKE PROPERTY, ONTARIO

Project Ref.: P08-006

FINAL TECHNICAL REPORT

April 2008

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDIXES

1.0 INTRODUCTION

On March 10th, 2008 **GEO DATA SOLUTIONS GDS INC. (GDS)** was awarded contract P08-006 by **METALCORP LIMITED (MetalCorp)**. The contract required **GDS** to carry out a high-resolution helicopter borne aeromagnetic survey on a single block located in the Pickle Lake Area, Ontario.

Traverse lines were flown with spacing of 100 metres while control-lines were flown with spacing of 900 metres (table 2). The helicopter nominal ground clearance was 45 metres. The block flown is shown on figures 1 and table 1 define its co-ordinates.

The field base of operation was located at Pickle Lake, which is located between 118 and 130 km to the West of the block. Excluding calibration and test flights, 5 flights were needed to cover the survey area. The first production flight began on March 25th, 2008 (flight 2) and the last flight ended on March 29th, 2008 (flight 9). Table 2 presents survey specifications and flight schedule.

This report describes the survey procedures and data verification, which were carried out in the field, and the data processing, which followed at the office.

Table 1: Block Co-ordinates (WGS84, zone 16N)			
BLOCK	**Vertex**	**X UTM (m)**	**Y UTM (m)**
KEEZHIK LAKE	1	390900	5740000
	2	403100	5740000
	3	403100	5735600
	4	390900	5735600

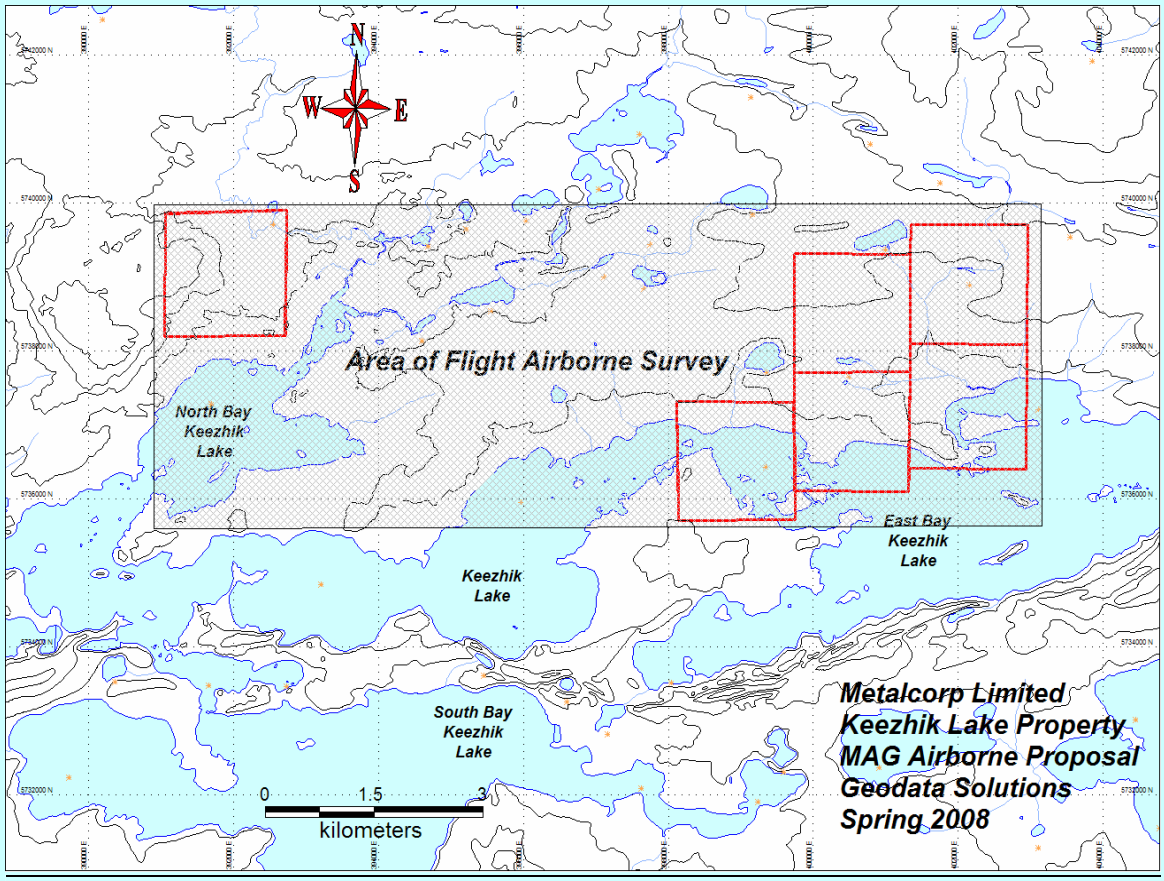


Figure 1: Block Location

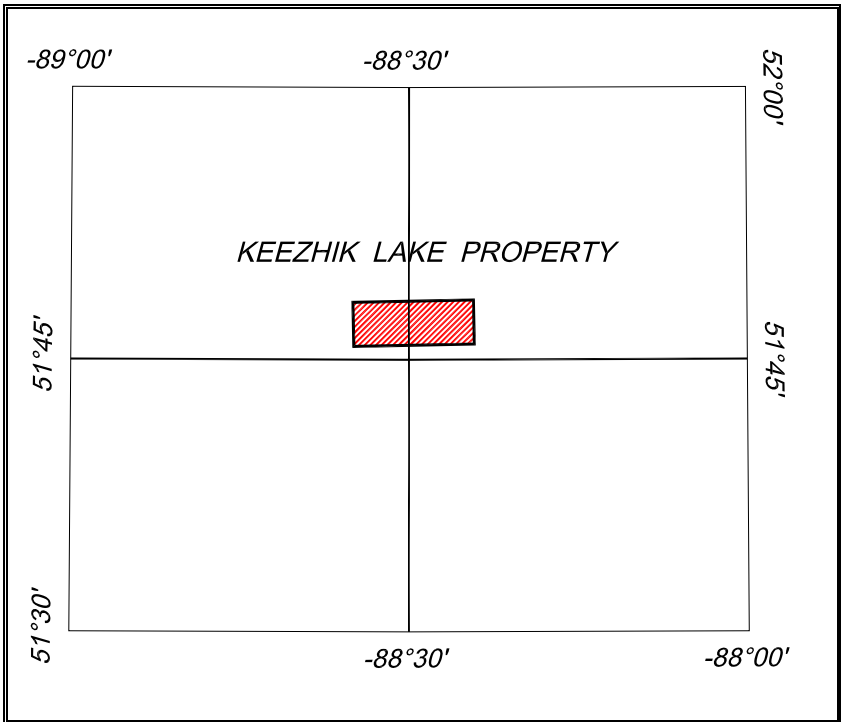


Figure 2: The Keezhik Lake Block

Table 2: Survey Specifications and Schedule

Block	Traverse Spacing (m)	Traverse orientation	Tie-Line Spacing (m)	Tie-Line orientation	Flying Dates	Flight Numbers	Line-Km
KEEZHIK LAKE	100	180°	900	270°	March 25th	002	176
					March 26th	003	176
					March 26th	004	171
					March 27th	005	104
					March 29th	009	Reflight
					TOTAL		**627**

2.0 SURVEY SPECIFICATIONS

Airborne survey and noise specifications for the **MetalCorp** survey are as follows:

a) traverse line spacing and direction
   - flight line spacing 100 metres
   - flight line direction: Az. 180°

b) control line spacing and direction
   - control line spacing: 900 metres
   - control line direction: Az. 270°

c) Number of line-km flown: 627 km

d) terrain clearance
   - helicopter nominal terrain clearances: 43.9 metres
   - magnetometer nominal terrain clearances: 43.9 metres

e) magnetic diurnal variation
   - A maximum tolerance of 3.0 nT (peak to peak) deviation from a long chord equivalent to a period of one minute for the magnetometer base station

f) magnetometer noise envelope
   - in-flight noise envelope could not exceed 0.5 nT, for straight and level flight
   - base station noise envelope could not exceed 0.1 nT

g) Re-flights and turns
   - all reflights of line segments intersected at least two control lines

3.0 AIRCRAFT, EQUIPMENT AND PERSONNEL

3.1 Aircraft and Geophysical On-Board Equipment

Aircraft:	Astar 350 B2 (Figure 3) Mean Survey Speed: 35 m/sec Nominal Ground Clearance: 45 metres
Magnetometer:	Geometrics cesium vapour sensor, stinger installation, sensitivity of 0.001 nT, sampling rate of 0.1 sec., ambient range 20,000 to 100,000 nT. The general noise level was kept below 0.01 nT. Nominal sensor height of 45 metres above ground.
Digital Acquisition System:	RMS Data Acquisition System
Radar Altimeter:	TRA-3000, accuracy 5%, sensitivity one foot, range 0 to 2,500 feet, 1 sec. recording interval
Electronic Navigation:	Real-Time Differentially Corrected Omnistar System, 1.0 sec. recording interval, accuracy of ±5 metres.

3.2 Ground Equipment

Magnetometer: One GEM GSM-19 Overhauser magnetometer base station was mounted in a magnetically quiet area. The base station measures the total intensity of the earth's magnetic field in units of 0.01 nT at intervals of 1 second, within a noise envelope of 0.10 nT. The base station magnetometer was located near the base of operation at the following coordinates:

Longitude: -90.206920°
Latitude: 51.450040°

Ancillary Equipment: Computer workstation, complement of spare parts and test equipment

Figure 3: Stinger Installation of the Magnetometer

3.3 Personnel

The general management of the project was monitored offsite by Mr. Mouhamed Moussaoui, **GDS**'s President. Mr. Saleh Elmoussaoui was responsible for the field data processing to ensure that the work was carried out according to contractual specifications. The final data evaluation and processing was carried out at the Laval **GDS** office by Mr. Elmoussaoui and Mr. François Caty.

Survey crew and office personnel are listed in table 3.

Table 3: Field and Office Crew

Position	Name
Project Manager	Mr. Mouhamed Moussaoui, P.Eng.
Data quality control	Mr. Saleh Elmoussaoui
Field Operator	Mr. Pierre Filion
Pilot	Mr. Julien Tramont
Final Processing	Mr. Saleh Elmoussaoui Mr. François Caty
Survey Report	Mr. Camille St-Hilaire, P.Geo

4.0 SURVEY SCHEDULE

The survey was made of a single block with flight line bearing selected to run perpendicular to the average trend of the local geological structures. The field base of operation was located at Pickle Lake. Distance from the field base to the block varied in the range of 118 to 130 km.

Mobilisation:	March 22nd, 2008
Survey:	March 25th to 29th, 2008
Demobilisation:	March 30th, 2008
Flights:	002, 003, 004, 005 and 009

Preliminary results were sent to **MetalCorp** one week after the survey completion while final maps, data and report were sent in April 2008.

5.0 DATA ACQUISITION

The following test and calibration were performed prior to the commencement and during the survey flying:

- Magnetometer FOM test
- Altimeter calibration

These calibration and test were flown over the Pickle Lake airport as part of the start-up and monitoring procedures. Results are given in Appendix A.

After each day, profiles were examined as a preliminary assessment of the noise level on the recorded data. Altimeter deviations from the prescribed flying altitudes were also closely examined as well as the magnetic diurnal activity, as recorded on the base station.

All digital data were verified for validity and continuity. The data from the helicopter and base station were transferred to the PC's hard disk. Basic statistics were generated for each parameter recorded. These included the minimum, maximum and mean values, the standard deviation and any null values located. Editing of all recorded parameters for spikes or datum shifts was done, followed by final data verification via an interactive graphic screen with on-screen editing and interpolation routines.

The quality of the GPS navigation was controlled on a daily basis by recovering the flight path of the helicopter.

Checking all data for adherence to specifications was carried out before crew and aircraft demobilisation by **GDS**'s geophysicist.

6.0 DATA COMPILATION AND PROCESSING

6.1 Base maps

Base maps of the survey areas were plotted from topographic maps of the Department of Natural Resources Canada at a scale of 1:50 000.

Projection description

Datum:	WGS84
Projection:	Universal Transverse Mercador, UTM Zone 16N
False Easting:	500 000
False Northing:	0
Scale Factor:	0.9996

6.2 Processing of Base Station data

Recorded magnetic diurnal data from the magnetometer base station were reformatted and loaded into the OASIS database. After initial verification of the integrity of the data from statistical analysis, the appropriate portion of the data was selected to correspond to the exact start and end time of the flight. The data were then checked and corrected for spikes using a fourth difference editing routine. Following this, interactive editing of the data was done, via a graphic editing tool, to remove events caused by man-made disturbances. A small low pass noise filter (30 seconds) was then applied. The final processing step consisted of subtracting result from the airborne magnetic data as a pre-levelling step. The average of the Total Field Magnetic Intensity measured at the Base Station was 57 870.52 nT.

6.3 Processing of the Positioning Data (GPS)

The raw GPS data were recovered and corrected from spikes. The resulting corrected latitudes and longitudes were then converted to the local map projection and datum (WGS84). A point-to-point speed calculation was then done from the final X, Y coordinates and reviewed as part of the quality control. The flight data were then cut back to the proper survey line limits and a preliminary plot of the flight path was done and compared to the planned flight path to verify the navigation. The positioning data were then exported to the other processing files.

6.4 Processing of the Altimeter data

The altimeter data, which includes the radar altimeter and the GPS elevation values were checked and corrected for spikes using a fourth difference editing routine. A small low pass filter of 2 seconds was then applied to the data. Following this, a digital terrain trace was computed by subtracting the radar altimeter values from the corrected GPS elevation values. All resulting parameters were then checked, in profile form, for integrity and consistency, using a graphic viewing editor.

Aircraft ground clearance was well maintained during this survey with an average of 43.9 metres. Figure 4 shows a histogram of the ground clearances obtained from the radar altimeter.

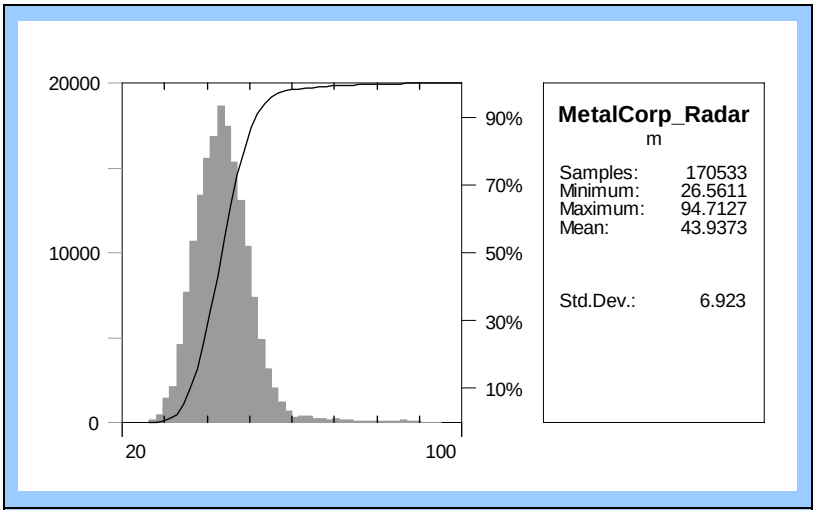


Figure 4: Helicopter and Mag. Ground Clearance

6.5 Processing of Magnetic data

The airborne magnetic data were reformatted and loaded into the OASIS database. After initial verification of the data by statistical analysis, the values were adjusted for system lag. The data were then checked and corrected for any spikes using a fourth difference editing routine and inspected on the screen using a graphic profile display. Interactive editing, if necessary, was done at this stage. Following this, the long wavelength component of the diurnal was subtracted from the data as a pre-levelling step. A preliminary grid of the values was then created and verified for obvious problems, such as errors in positioning or bad diurnal. Appropriate corrections were then applied to the data, as required.

Following this, the final levelling process was undertaken. This consisted of calculating the positions of the control points (intersections of lines and tie lines), calculating the magnetic differences at the control points and applying a series of levelling corrections to reduce the misclosures to zero. A new grid of the values was then created and checked for residual errors. Any gross errors detected were corrected in the profile database and the levelling process repeated. Finally, a micro levelling routine was applied to the magnetic data.

6.6 Total Magnetic field and First Vertical Derivative Grids

The reprocessed total field magnetic grid was calculated from the final reprocessed profiles by a minimum curvature algorithm. The accuracy standard for gridding was that the grid values fit the profile data to within 0.01 nT for 99.99% of the profile data points. The grid cell size was 25 metres.

Minimum curvature gridding provides the smoothest possible grid surface that also honours the profile line data. However, sometimes this can cause narrow linear anomalies cutting across flight lines to appear as a series of isolated spots.

The first vertical derivative of the residual total magnetic field was computed to enhance small and weak near-surface anomalies and as an aid to delineate the geologic contacts having contrasting susceptibilities. The calculation was done in the frequency domain, using Win-Trans FFT algorithms.

7.0 FINAL PRODUCTS

7.1 Maps:

GDS made base maps from information present on published topographic maps. Each map was produce at a scale of 1:20,000 and displaying base-map features, flight path and UTM co-ordinates. One paper copy of the following final maps was delivered to **MetalCorp**:

(a) Shaded Magnetic Total Field (colour interval)
(b) Shaded Magnetic First Vertical Derivative (colour interval)

7.2 Final digital archive of line data:

GDS produced three copies of a CD-ROM containing digital archives and maps (PDF, Map format). Digital archives, described in Appendix B, contain Geosoft databases of all survey data. Databases are referenced to the standard UTM co-ordinates for the area.

GDS will store a copy of the digital archive for one year after the production of the final products. On request by **MetalCorp**, **GDS** will supply the raw data from the survey with the survey products. Otherwise, **GDS** will store the raw data with the copy of the digital archive.

7.3 Miscellaneous

Three paper copies of this technical report, with the corresponding digital PDF file, have been produced and delivered to **MetalCorp**.

8.0 CONCLUSION

Flown from March 25th to 29th, 2008 the helicopter borne aeromagnetic survey was completed inside the estimated time frame. No down time was needed during the survey period, weather being favourable.

All airborne and ground-based records were of excellent quality. Data acquisition was done in good diurnal conditions. It was found that even though diurnal was within specifications, diurnal subtraction was not good enough to level the data and, in fact, good intersections were required to produce a reliable final data set.

The noise level for the measured Total Magnetic Field was well within the accepted limits, determined from the fourth difference of the lagged, edited airborne magnetic data.

GPS results proved to be of high quality. The flight path was surveyed accurately and the speed checks showed no abnormal jumps in the data.

It is hoped that the information presented in this report, and on the accompanying products, will be useful both in planning subsequent exploration efforts and in the interpretation of related exploration data.

Respectfully Submitted,

Camille St-Hilaire, M.Sc.A.
P.Geo.

REFERENCES

Briggs, Ian, 1974, Machine contouring using minimum curvature, Geophysics, v.39, pp.39-48.

Minty, B.R.S., 1991, Simple micro-levelling for aeromagnetic data, Exploration Geophysics, v. 22, pp. 591-592.

Naudy, H. and Dreyer, H., 1968, Essai de filtrage nonlinéaire appliqué aux profiles aeromagnétiques, Geophysical Prospecting, v. 16, pp.171-178.

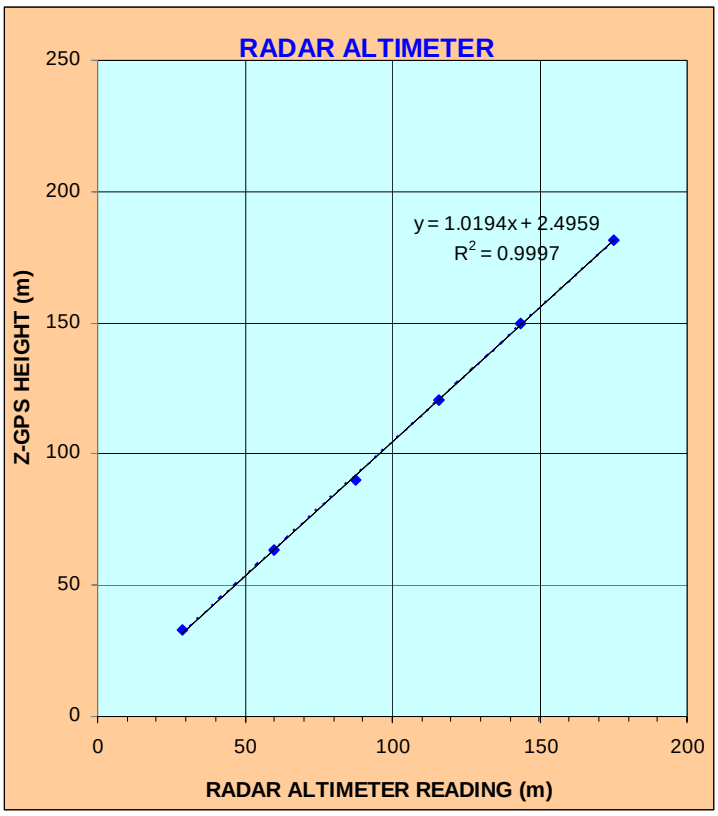
APPENDIX A

TESTING AND CALIBRATION

RADAR ALTIMETER CALIBRATION

Project #:	P08-006	**Date**:	March 24th, 2008
Client:	MetalCorp	**Location**:	Pickle Lake, ON
Radar	TRA-3000	**Helicopter**:	Astar-350 B2
Compiled By:	Saleh Elmoussaoui	**Configuration**:	Stinger mag

Planned Radar Altitude (feet)	Radar Altitude (m)	GPS Height (m)	Z-GPS Values (m)
0	**0**	0.000	386
100	28.880	33.103	419.103
150	59.9072	63.193	449.193
200	87.394	90.017	476.017
300	115.915	120.360	506.360
400	143.703	149.873	535.873
500	175.268	181.356	567.356



F. O. M. TEST

Project #:	P08-006	**Date**:	March 24th, 2008
Client:	MetalCorp	**Location**:	Pickle Lake, ON
Operator:	Pierre Filion	**Helicopter**:	Astar-350 B2
Compiled By:	Saleh Elmoussaoui	**Configuration**:	Stinger mag

MAGRAW = UNCOMPENSATED MAG SENSOR
MAGCOMP = COMPENSATED MAG SENSOR
VALUES DETERMINED USING 6 SECONDS (6 FIDUCIALS) HIGH PASS FILTER
VALUES DETERMINED USING MAXIMUM PEAK TO PEAK OF EACH MANEUVER

NORTH (360°)	Pick_1	Pick2	magraw	Pick_1	Pick_2	magcomp
PITCH	3.563	-1.7205	5.284	0.037	-0.055	0.092
ROLL	6.8979	-4.62741	11.525	0.047	-0.056	0.103
YAW	1.948	-1.6767	3.625	0.037	-0.057	0.094
TOTAL			**20.434**			**0.289**

EAST (90°)	Pick_1	Pick2	magraw	Pick_1	Pick_2	magcomp
PITCH	2.29389	-1.718	4.012	0.062	-0.095	0.157
ROLL	7.9622	-6.9993	14.962	0.087	-0.102	0.189
YAW	2.0315	-2.39311	4.425	0.065	-0.078	0.143
TOTAL			**23.398**			**0.489**

SOUTH (180°)			magraw			magcomp
PITCH	1.0597	-1.1183	2.178	0.085	-0.040	0.125
ROLL	5.127191	-3.86497	8.992	0.056	-0.078	0.133
YAW	2.08868	-2.3263	4.415	0.065	-0.082	0.147
TOTAL			**15.585**			**0.406**

WEST (270°)			magraw			magcomp
PITCH	2.6397	-2.327965	4.968	0.084	-0.101	0.185
ROLL	11.1788	-11.885	23.064	0.058	-0.110	0.168
YAW	3.321	-2.7638	6.085	0.060	-0.057	0.117
TOTAL			**34.116**			**0.470**

TOTAL FOM	Magraw	magcomp
VALUES	**93.533**	**1.653**
Improve Ratio	**56.6**	

APPENDIX B

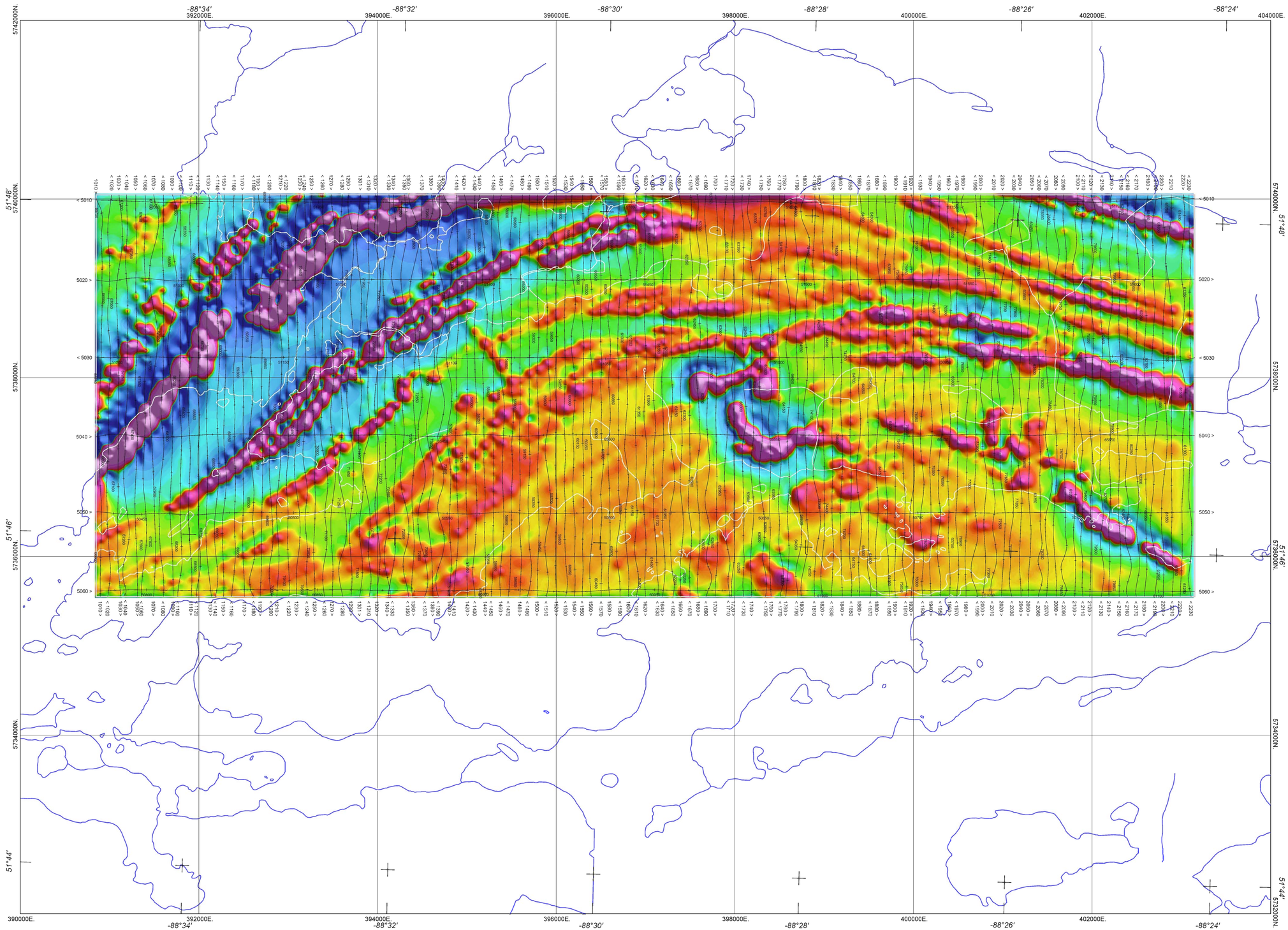
PROFILE DATABASE ARCHIVE CHANNEL DEFINITIONS AND GRID ARCHIVE DEFINITIONS

Mag: Channels
(Oasis Montaj GDB format)

General line information:		
Line	Unit	Line number
Flt		Flight number
Date		Flight date (yyyy/mm/dd)
Clocks and system synchronization:		
Fiducial	Sec	Fiducial
TimeGPS	Sec	Edited GPS time (second after midnight)
Edited GPS channels		
X_84	Metre	Easting, WGS-84 UTM Z16N
Y_84	Metre	Northing, WGS-84 UTM Z16N
Zgps	Metre	MSL GPS altitude
Longitude	Deg	Original Longitude, WGS-84
Latitude	Deg	Original Latitude, WGS-84
Radar altimeter		
Radar	Metre	Radar Altimeter
DTM	Metre	Digital Terrain Model
Ground Mag base station data		
Base	nT	Original, (in Block area) unedited primary mag base station
Basef	nT	Filtered Base
Mag TMF data		
Magc	nT	Mag despiked
MagL	nT	Lagged magc
Drift	nT	Diurnal correction removed
Magbc	nT	Diurnal corrected Mag (magl-drift)
Corlev	nT	Tie line leveling correction
Maglev	nT	Tie line leveled Mag
Cormicro	nT	Microleveling correction
Magmicro	nT	Micro leveled Mag

Keezhik_Mag.grd	Total Magnetic Field grid
Keezhik_Grad.grd	Total Magnetic Field first vertical derivative grid
Keezhik_MetalCorp_final.gdb	Magnetics Geosoft database

All grids have a grid cell size of 25 m



metal CORP

Specification, Notes and Legends

Line Survey Specifications

Total line Kilometres	621
Line Azimuth	N 0° E
Line Spacing	100 m.
Tie Azimuth	N 90° E
Tie Spacing	1000 m.

Geodetic Specifications

Map Projection	UTM
UTM zone	16 North
Central Meridian	87° West
Datum	WGS84
False Easting	500 000
False Northing	0
Scale Factor	0.9996

Helicopter-Borne Specifications

Helicopter :	Astar-B2
Average Speed :	130 Km/h

Magnetometer Specifications

Magnetometer :	Scintrex
Magnetometer Installation :	Stinger
Sample Rate :	0.1 s
Base Station Magnetometer :	GEM GSM-19, Overhauser

Data Acquisition System

(RMS-DAARC500 DAS & Adaptive Aeromagnetic Real-Time Compensator)

Radar Altimeter :	TRA-3000
GPS Receiver :	Novatel DL-V3
GPS Differential Correction :	Omnistar
GPS Sample Rate :	0.5 s

Flight path

GPS data recorded during the flight was realtime and transformed to the UTM coordinate system

< 1575 — Flight Line Number — Fiducial Number
Flight Line Direction — 6500

Maps : Hydrographic Information, 1:50K scale.

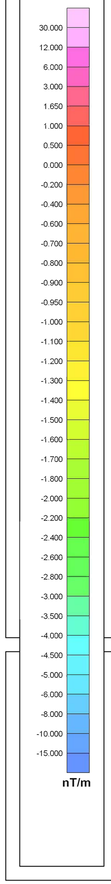
Data Gridding Cell Size ..... 25 m

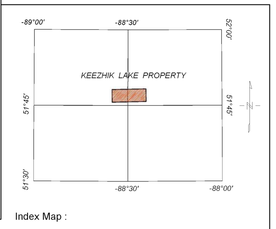
Map Contours Are In NanoTesla

10 nT	
50 nT	
250 nT	
1000 nT	

Notes :

Magnetic data were corrected for diurnal drift. Tie line levelling and micro levelling were then applied to the magnetic data.





Index Map :

METALCORP LIMITED

Client :

Project : Helicopter-Borne Geophysical Survey

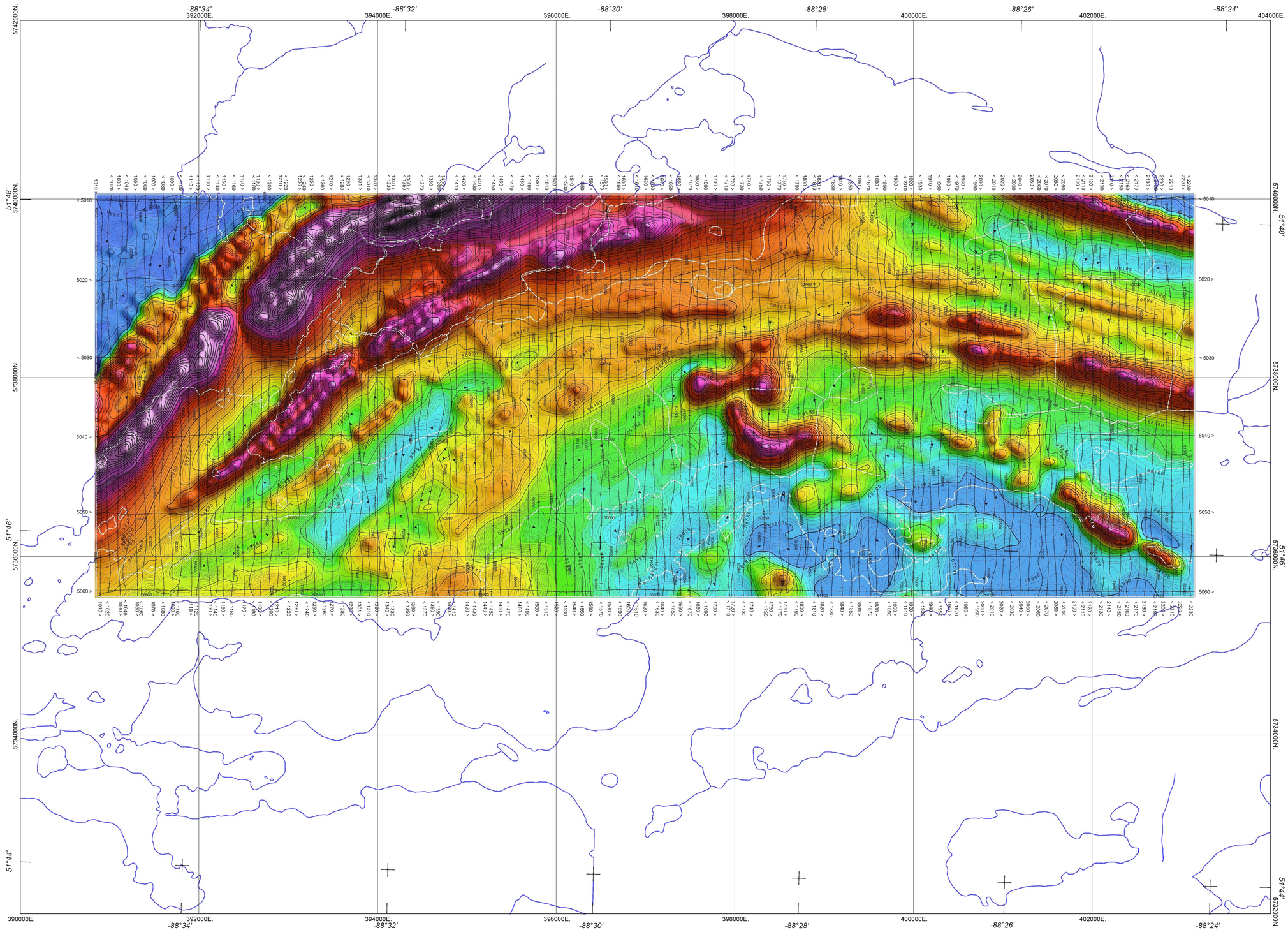
Area : Keezhik Lake Property, Ontario

Title : Shadow; Inc. 45° , Dec. N 45° E
First Vertical Derivative
nT/m

scale : 500 0 500 1000 1500 metres
1: 20 000

GDS GEO DATA SOLUTIONS GDS Inc.

Project # : P08006	Date : April 18, 2008	Ref # : FVDMET-KL20



metal CORP

Specification, Notes and Legends

Line Survey Specifications

Total line Kilometres	621
Line Azimuth	N 0° E
Line Spacing	100 m.
Tie Azimuth	N 90° E
Tie Spacing	1000 m.

Geodetic Specifications

Map Projection	UTM
UTM zone	16 North
Central Meridian	87° West
Datum	WGS84
False Easting	500 000
False Northing	0
Scale Factor	0.9996

Helicopter-Borne Specifications

Helicopter :	Astar-B2
Average Speed :	130 Km/h

Magnetometer Specifications

Magnetometer :	Scintrex
Magnetometer Installation :	Stinger
Sample Rate :	0.1 s
Base Station Magnetometer :	GEM GSM-19, Overhauser

Data Acquisition System

(RMS-DAARC500 DAS & Adaptive Aeromagnetic Real-Time Compensator)

Radar Altimeter :	TRA-3000
GPS Receiver :	Novatel DL-V3
GPS Differential Correction :	Omnistar
GPS Sample Rate :	0.5 s

Flight path

GPS data recorded during the flight was realtime and transformed to the UTM coordinate system

< 1575 — Flight Line Number — Fiducial Number
Flight Line Direction — 6500

Maps : Hydrographic Information, 1:50K scale.

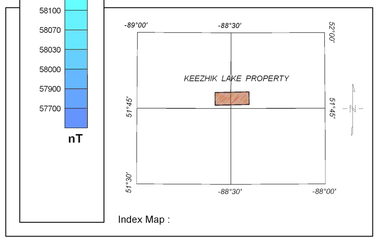
Data Gridding Cell Size ..... 25 m

Map Contours Are In NanoTesla

10 nT	
50 nT	
250 nT	
1000 nT	

Notes :

Magnetic data were corrected for diurnal drift. Tie line levelling and micro levelling were then applied to the magnetic data.



Index Map :

Client :	METALCORP LIMITED
Project :	Helicopter-Borne Geophysical Survey
Area :	Keezhik Lake Property, Ontario
Title :	Shadow: Inc. 45° , Dec. N 45° E Total Magnetic Field nT
scale :	500 0 500 1000 1500 metres 1: 20 000

GDS GEO DATA SOLUTIONS, Inc. — GEO DATA SOLUTIONS GDS Inc.

Project # : P08006	Date : April 18, 2008	Ref # : TMFMET-KL20