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OPERATIONS REPORT

for



Horizontal Magnetic Gradient &
Matrix VLF-EM & Resistivity
Airborne Survey

Far Lake Project
Thunder Bay, ON

File: B501R

Mar 30, 2020
Revision-1 May 07, 2020

Requested by
Michael Stares
President & CEO
White Metal Resources

Prepared by:
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VP/Owner
Terraquest Ltd.

Table of Contents

1. INTRODUCTION.....	4
1.1. EXECUTIVE SUMMARY	4
1.2. LOCATION.....	5
2. SURVEY SPECIFICATIONS.....	7
2.1. LINES AND DATA	7
2.2. SURVEY KILOMETRAGE.....	8
2.3. SURVEY OUTLINE	8
2.4. NAVIGATION SPECIFICATIONS	8
2.5. TOLERANCES - REFLIGHT	9
1. <i>Traverse Line Interval</i>	9
2. <i>Terrain Clearance:</i>	9
3. <i>Diurnal Variation:</i>	9
4. <i>GPS Data:</i>	9
5. <i>Radio Transmission:</i>	9
6. <i>Sample Interval:</i>	9
3. AIRBORNE GEOPHYSICAL EQUIPMENT.....	10
3.1. SURVEY AIRCRAFT.....	10
3.2. EQUIPMENT OVERVIEW	10
3.3. EQUIPMENT SPECIFICATIONS.....	11
1. <i>Magnetics:</i>	11
2. <i>Data Acquisition & Magnetic Compensation System</i>	11
3. <i>Navigation System</i>	12
4. <i>Real-Time Correction GPS Receiver</i>	12
5. <i>Magenta Digital, Frequency Specific VLF-EM System</i>	12
6. <i>Tri-Axial Fluxgate Magnetic Sensor</i>	13
7. <i>Radar Altimeter</i>	13
8. <i>Barometric Altimeter</i>	13
4. BASE STATION EQUIPMENT	14
4.1. BASE STATION MAGNETOMETER / GPS RECEIVER.....	14
5. TESTS AND CALIBRATIONS	15
5.1. MAGNETIC FIGURE OF MERIT	15
5.2. MAGNETIC LAG	15
5.3. RADAR CALIBRATION	16
6. LOGISTICS	17
6.1. PERSONNEL	17
6.2. FLIGHT REPORTING.....	17
6.3. BASE OF OPERATIONS	18
7. DATA PROCESSING	19
7.1. DATA QUALITY CONTROL / PRELIMINARY PLOTS	19
7.2. DIGITAL TERRAIN MODEL.....	19
7.3. FINAL MAGNETIC DATA PROCESSING.....	19
1. <i>Lag Correction of Total Magnetic Field</i>	19
2. <i>Diurnal Data and Diurnal Corrections of the Total Magnetic Field</i>	19
3. <i>Total Magnetic Field Tie-Traverse Line Intersection Levelling</i>	19
4. <i>The Magnetic Field Micro-Levelling</i>	20

5.	Calculated Vertical Derivative.....	20
6.	Analytic Signal.....	20
7.	Horizontal Gradients.....	20
8.	Reconstructed Total Field (RTF).....	20
9.	Grids.....	21
7.4.	MAGNETIC DATA MAPS.....	22
1.	Total Magnetic Intensity.....	22
2.	Calculated Vertical Derivative.....	23
3.	Analytic Signal.....	24
4.	Measured Horizontal East-West Gradient	25
5.	Measured Horizontal North-South Gradient.....	26
6.	Reconstructed Total Field	27
7.5.	ELECTROMAGNETIC TOTAL FIELD DATA PROCESSING.....	28
1.	Matrix VLF-EM Monitoring.....	28
2.	Matrix VLF-EM Processing Total Field.....	28
7.6.	MATRIX VLF-EM TOTAL FIELD MAPS	30
1.	Amplitude of the Secondary Total Field Strength (NAA, Cutler, ME).....	30
2.	Amplitude of the Secondary Total Field Strength (NML, La Moure, ND).....	31
3.	Amplitude of the Secondary Total Field Strength (NLK, Jim Creek, WA).....	32
7.7.	MATRIX VLF-EM OPTIONAL INVERSION MODELLING.....	33
1.	Introduction	33
2.	Inversion Processing	33
7.8.	MATRIX VLF-EM RESISTIVITY MAPS	35
1.	MATRIX VLF-EM Resistivity Depth Slices from Station NAA, Cutler, ME	35
2.	MATRIX VLF-EM Resistivity Depth Slices from Station NML, La Moure, ND	36
7.9.	LIST OF FINAL PRODUCTS.....	37
8.	SUMMARY	38
9.	APPENDICES.....	39
9.1.	APPENDIX I - CERTIFICATE OF QUALIFICATION	39
9.2.	APPENDIX II - MAGNETIC FIGURE OF MERIT (FOM).....	40
9.3.	APPENDIX III – README	41
1.	README for Aeromagnetic Gradient and Total Field VLF-EM Survey.....	41
2.	README for VLF-EM Resistivity 3-D Data Modelling Interpretation	44

1. INTRODUCTION

1.1. EXECUTIVE SUMMARY

This report describes the specifications and parameters of an airborne geophysical survey carried out for:

WHITE METAL RESOURCES

684 Squire Street
Thunder Bay, ON
P7B 4A8

Attention: Michael Stares, President & CEO
Phone: 807-628-7836
Email: starcon@tbaytel.net

The survey was performed by:

TERRAQUEST LTD.,

301-2900 John Street
Markham ON, Canada
L3R 5G3

Phone: 905-477-2800 ext. 31
Email: cb@terraquest.ca

The purpose of this survey is to collect geophysical data that can be used to prospect directly for economic minerals that are characterized by anomalous magnetic or conductive responses. Secondly, the geophysical patterns can be used indirectly for exploration by mapping the geology in detail, including faults, shear zones, folding, alteration zones and other structures. The data are carefully processed and contoured to produce grid files and maps that show distinctive patterns of the geophysical parameters.

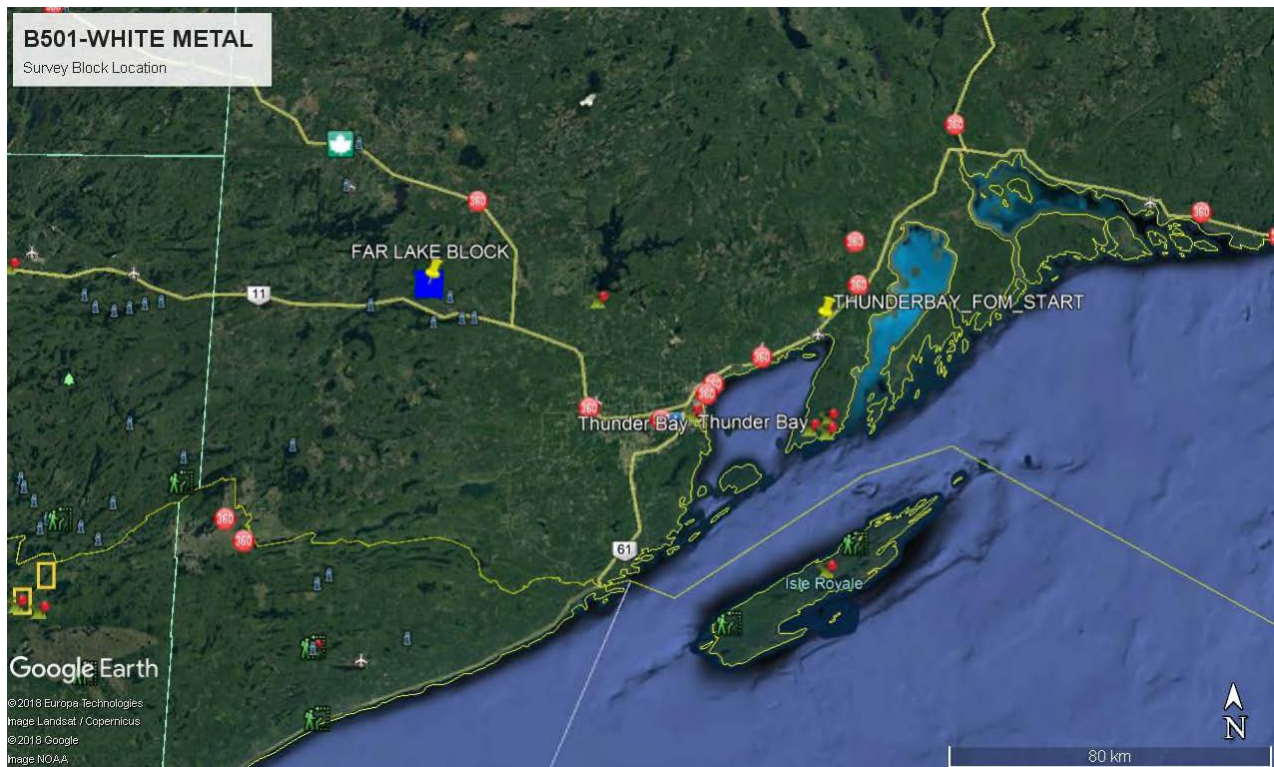
To obtain this data, the area was systematically traversed by aircraft carrying geophysical equipment along parallel flight lines. The lines are oriented to intersect the geology and structure so as to provide optimum contour patterns of the geophysical data.

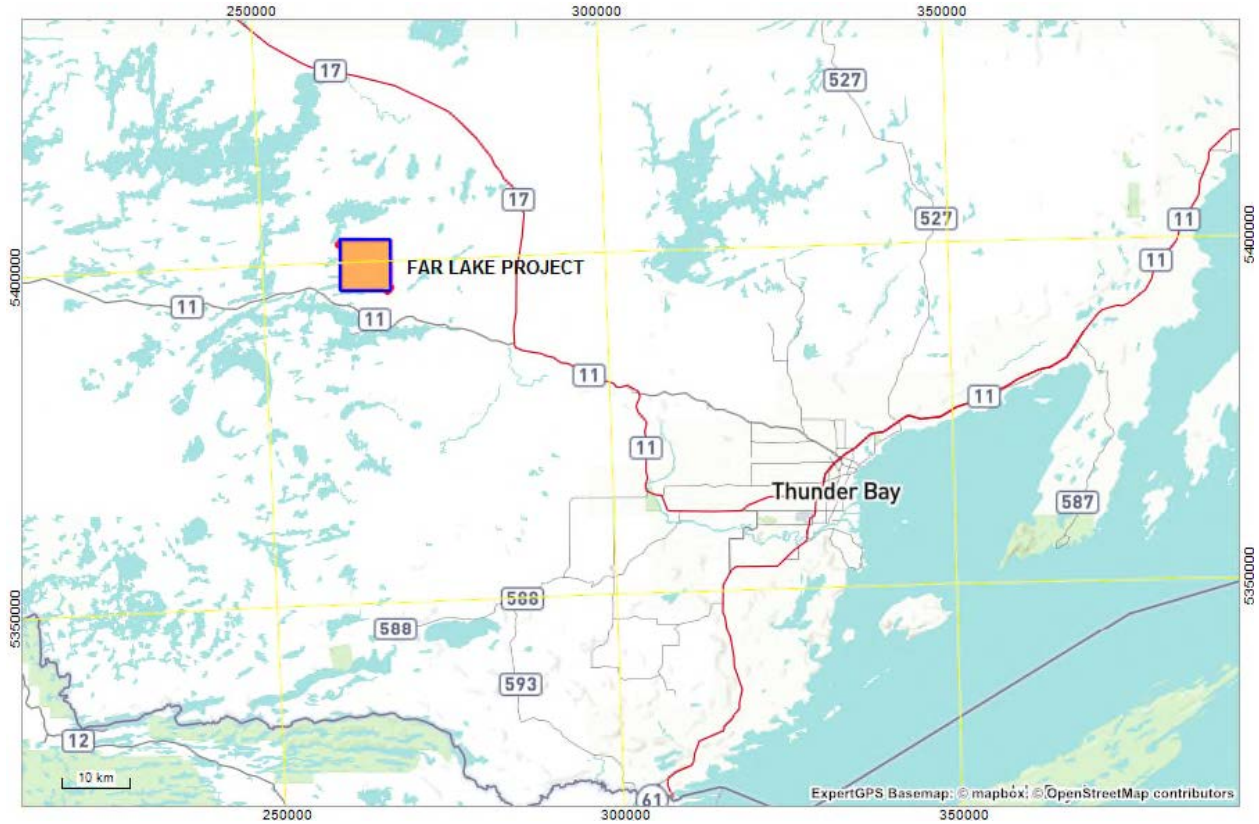
Revision-1 of this report includes a description of the data processing, inversion and resistivity products generated from the optional, newly developed inversion modelling technique applied to the Matrix VLF-EM data.

1.2. LOCATION

The Far Lake Project is located approximately 80 kilometres northwest of Thunder Bay, Ontario, 8 kilometres northwest of the town of Shebandowan and 2 kilometres north of Highway #11. The property can be readily accessed by bush roads from the southwest.

The survey area is generally rectangular in shape with 10 corners with small extensions in the northwest and southeast corners to ensure proper data coverage in areas with short lines. The main dimensions are approximately 7.2 kilometres east-west dimension and 8.6 kilometres north-south. The centre of the survey is approximately 48°42'12" N and 90°11'42" W.

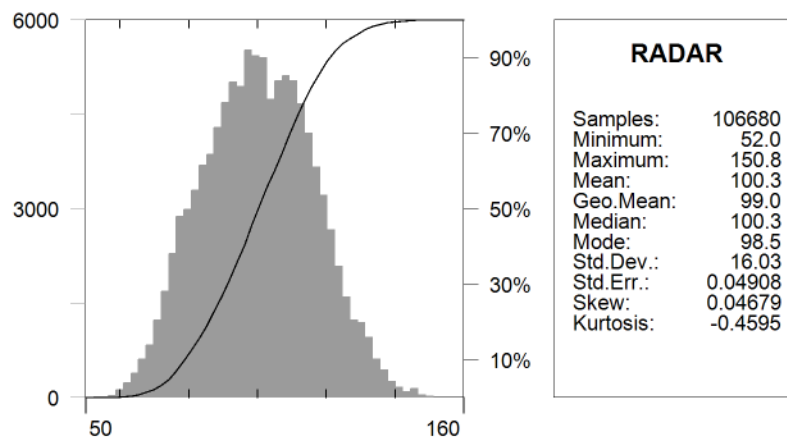
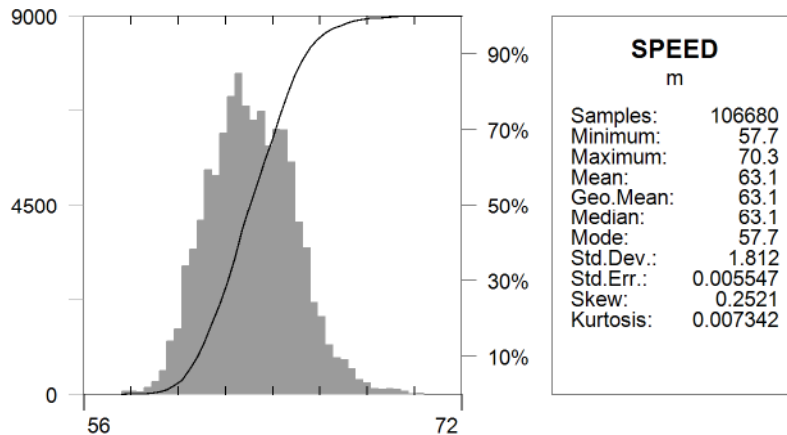




2. SURVEY SPECIFICATIONS

2.1. LINES AND DATA

Parameter	Specification
Aircraft Speed	mean 63.1 m/sec 277.2 km/hr
Magnetic & VLF Sampling Interval	6.3 m (10Hz)
Flight-line Interval	100 metres
Flight-line Direction	103/283 degrees
Control-line Interval	1000 metres
Control-line Direction	013/193 degrees
Mean Terrain Clearance	100.3 metres



2.2. SURVEY KILOMETRAGE

B501: FAR LAKE PROJECT						
	LINE	LINE	TIE	TIE	Total	Total
	NLIN	KM	NLIN	KM	NLIN	KM
	77	405.2	8	40.6	85	445.8

2.3. SURVEY OUTLINE

The corner coordinates were supplied by the client and used to create the navigation files.

2.4. NAVIGATION SPECIFICATIONS

The satellite navigation system was used to ferry to the survey and to survey along each line. The survey coordinates were supplied by the client and were used to establish the survey boundaries and flight lines. The flight path guidance accuracy is variable depending upon the number and condition (health) of the satellites employed. With WAAS real time correction the accuracy was for the most part better than 3 metres.

The following are the navigation files used for the Far Lake Project, B501. These files include survey corner coordinates in WGS84 projection Zone 16N, line spacing, line direction, master line and other navigational parameters:

```

0 B501
1 Z 15
2 702637 5401973 AREA CORNER 1
2 709954 5402216 AREA CORNER 2
2 710233 5395611 AREA CORNER 3
2 710652 5395287 AREA CORNER 4
2 710274 5394800 AREA CORNER 5
2 709876 5394288 AREA CORNER 6
2 709267 5394759 AREA CORNER 7
2 702917 5394530 AREA CORNER 8
2 702686 5400618 AREA CORNER 9
2 702036 5401097 AREA CORNER 10
2 702637 5401973 AREA CORNER 11
3 702637 5401973 COR1 WAYPOINT 1
4 103 NUMBER OF LINES
5 100.0 SPACING, m
8 100 MAX CROSS TRACK, m
9 0 0 0 DELTA X/Y/Z
10 1 LOG FPR EVERY 1 SECS
11 0.9996000000 0.0 0.0 K0, X/Y SHIFT
14 0 LINES EXTENDED BEYOND AREA
16 10 FIRST LINE NUMBER
    
```

17	702637.0	5401973.0	35.0	MASTER POINT, HEADING	
18	702637.0	5401973.0	125.0	TIE LINE MASTER POINT, HEADING	
19	1000.0	0		TIE LINE SPACING, LINE EXTENSION, m	
20	WGS-84	6378137.0	298.257223563	22	ELLIPSOID
21	1			UTM VALUES RELATIVE TO N HEMISPHERE	
30	20	9600	N	1	8
31	20	9600	N	1	8
38	0			METRIC SYSTEM	
41	0.00			SYSTEM LAG, Secs.	
80	0.00			PLANNED ALTITUDE, m	
83	0			GPS ALTITUDE FOR VERTICAL BAR	
84	1.00	0.00		ALTITUDE COEFFICIENT, OFFSET	
85	100			MAX VERTICAL BAR SCALE	
102	UTM			UTM X/Y SCALE	

2.5. TOLERANCES - REFLIGHT

1. Traverse Line Interval

Re-flights would take place if the cross-track deviation of the final differentially corrected flight path from the preplanned flight path is greater than 25 metres over a distance greater than 1 kilometre.

2. Terrain Clearance:

The contract called for a terrain clearance of 50-70 metres where safely possible. A computer-generated drape surface was planned to guide the terrain clearance setting the target clearance of 60 metres. Once the terrain factor is included with climb and descent rate of the aircraft, the resulting survey terrain clearances varied from 50 to 150 metres with a mean of 100.3 metres.

3. Diurnal Variation:

Diurnal activity during survey data acquisition was limited to less than 3 nT non-linear deviations from a 1-minute chord.

4. GPS Data:

GPS data included at least 4 satellites for navigation and flight path recovery. There were no significant gaps in any of the digital data including GPS and magnetic data.

5. Radio Transmission:

The aircraft pilot makes no radio transmission that interferes with magnetic response.

6. Sample Interval:

A reflight is required if the sample interval along one or more of the survey lines exceeds 10 metres over a cumulative total of 1000 metres.

3. AIRBORNE GEOPHYSICAL EQUIPMENT

3.1. SURVEY AIRCRAFT

The Cessna U206, registration C-GGLS, owned and operated by Terraquest Ltd. was the survey aircraft for B501. This aircraft is approved by the Canadian Ministry of transport and has a certification for specialty flying that includes airborne geophysical surveys. This aircraft is maintained by a regulatory AMO facility, Enterprise Air Ltd. in Oshawa, ON.

The aircraft has been specifically modified with long-range fuel cells to provide up to 7 hours of range, outboard tanks, tundra tires, cargo door, and avionics as well as an array of sensors to carry out airborne geophysical surveys.



3.2. EQUIPMENT OVERVIEW

The primary airborne geophysical equipment includes three high sensitivity cesium vapour magnetometers and a Matrix Total Field frequency specific VLF-EM system. Ancillary support equipment includes a tri-axial fluxgate magnetometer, radar altimeter, barometric altimeter, GPS receiver with a real-time correction service, and a navigation system. The navigation system comprises a left/right indicator for the pilot and a screen showing the survey area, planned flight

lines, and the real time flight path. All data were collected and stored by the data acquisition system. The following is a summary of the equipment specifications:

Aircraft	Cessna U206 / C-GGLS
Equipment:	
Magnetometers	Scintrex CS-2&3 Cesium Vapour
3-axis Fluxgate Magnetometer	Billingsley TFM100-LN
VLF-EM (proprietary)	Magenta Matrix Frequency Specific VLF-EM
GPS Receiver	Hemisphere R230 with WAAS real time correction
Radar Altimeter	King KRA 10A
Barometric Altimeter	Sensym LX18001AN
Acquisition	RMS Instruments DAARC 500
Navigation	AgNav Inc. P151 Linav system
Specifications:	
Lateral Sensor separation	13.21 metres
Longitudinal Sensor separation	8.87 metres
FOM	<1.5 nT
Sensitivity	0.001 nT

The 13.75 volts aircraft power is converted to 27.5 volts DC for the geophysical equipment by an ABS power supply.

3.3. EQUIPMENT SPECIFICATIONS

1. Magnetics:

Three high-resolution cesium vapour magnetometers, manufactured by Scintrex, were installed in the tail stinger and two wing tips extensions; the transverse separation was 13.21 metres and the longitudinal separation was 8.87 metres.

Cesium Vapour Magnetometer	(mounted in tail stinger and wing tip extensions)
Manufacturer	Scintrex
Models	CS-2, CS-3
Resolution	0.001 nT counting at 0.1 per second
Sensitivity	+/- 0.005 nT
Dynamic Range	15,000 to 100,000 nT
Fourth Difference	0.02 nT

2. Data Acquisition & Magnetic Compensation System

DAS & Compensation	Combined; real time compensation
Model	DAARC 500
Manufacturer	RMS Instruments
Operating System	QNX 6.3 or greater
Time	104 MHz temperature compensated crystal clock
Front End Magnetic Processing	Resolution 0.32pT; system noise <0.1pT; sample rate 160,

	640, 800m or 1280 Hz
Front End - Fluxgate	I/F module; oversampling, self-calibrating 16 bit A/D converter
Compensation	Improvement Ratio (total field) 10-20 typical
Input Serial	8 isolated RS232 channels; ASCII & Binary formats
Input Analog	16 bit, self-calibrating A/D conv.
Input Events	Four latched event inputs
Raw Data Logging	At front end sampling rate, 1 MB buffer
Output/Recording	Rate 10, 20 or 40 Hz; Serial up to 115.2 kbps; Recording media 1 GB Flash; 80 GB Hard Drive; Flash disk via USB; Display
Front Panel Indicators	8 LEDs for mag input; 2 LEDs for Front End status

3. Navigation System

Navigation System	
Model	P151
Manufacturer	AgNav Inc.
Operating System	Linex
Microprocessor	CPU Pentium based
Ports	RS232 for all devices
Graphic Display	Colour Screen
Pilot Display	P202: position, left/right, navigational info

4. Real-Time Correction GPS Receiver

GPS Differential Receiver	
Model	R120
Manufacturer	Hemisphere
Output	NMEA string, PPS
Channels	12 Channel DGPS, internal L-band
Position Update	0.5 second for navigation
Correction Service	Real time correction service WAAS
Sample Rate	Up to 10hz, set at 5 hz

5. Magenta Digital, Frequency Specific VLF-EM System

The Matrix VLF-EM System by Magenta is a newly developed digital, frequency specific VLF-EM system. The sensor consists of 3 orthogonal coils mounted in the tail stinger which are coupled with a receiver-console. The Matrix VLF-EM System measures the total field (the vector sum of all coils). The data are recorded on three VLF frequencies: Cutler Maine NAA frequency 24.0 kHz, La Moure North Dakota NML frequency 25.2 kHz and Seattle, WA NLK frequency 24.8 kHz, which yield outputs of Total Field, Vertical and Planar Ellipticities, azimuth to transmitter and Tilt Angle.

VLF – EM	Source field
Model	Matrix
Manufacturer	Magenta Ltd.
Primary Source	Magnetic field component radiated from government VLF radio transmitters
Output Parameters	Total Field, Vertical and Planar Ellipticities, Azimuth to Transmitter and Tilt Angle
Frequency Range	Cutler (24.0 kHz), La Moure (25.2 kHz) and Seattle (24.8 kHz)
Gain	Constant gain setting
Filtering	No filtering

6. Tri-Axial Fluxgate Magnetic Sensor

The fluxgate tri-axial magnetometer was mounted in the rear of the aircraft cabin to monitor aircraft manoeuver and magnetic interference. This was used to compensate the high sensitivity data in real time.

Tri-Axial Fluxgate Magnetic Sensor	(for compensation, mounted in mid-section of tail stinger)
Model	TFM100-LN
Manufacturer	Billingsley Magnetics
Description	Low noise miniature triaxial fluxgate magnetometer
Axial Alignment	> Orthogonality > +/- 0.5 degree
Accuracy	< +/- 0.75% of full scale (0.5% typical)
Field Measurement	+/- 100,000 nanotesla
Linearity	< +/- 0.0035% of full scale
Sensitivity	100 microvolt/nanotesla
Noise	< 14 picotesla RMS/-Hz @ 1 Hz

7. Radar Altimeter

Radar Altimeter	
Model	KRA-10A
Manufacturer	King
Serial Number	071-1114-00
Accuracy	5% up to 2,500 feet
Calibrate Accuracy	1%
Output	Analog for pilot, converted to digital for data acquisition

8. Barometric Altimeter

Barometric Altimeter	
Model	LX18001AN
Manufacturer	Sensym Inc.
Source	Coupled to aircraft barometric system

4. BASE STATION EQUIPMENT

4.1. BASE STATION MAGNETOMETER / GPS RECEIVER

The magnetometer was similar to the type used in the aircraft, a cesium magnetometer manufactured by Scintrex. The magnetometer processor was a KMAG manufactured by Kroum VS Instruments and the data logger was a PDA by Archer. The counter was powered by a 10VAC 50/60 Hz to 30VDC 3.0 amp power supply with an internal 12VDC fan. The logging software SDAS-1 was written by Kroum VS Instrument Ltd. specifically for handheld pc hardware. It supports real time graphics with selectable windows (uses two user selectable scales, coarse and fine). Time recorded was taken from the base GPS receiver. Magnetic data was logged at 1Hz. Data collection was by RS232 recording ASCII string and stored on flash card.

Magnetometer Type	Cesium Vapour
Model	CS-3
Manufacturer	Scintrex Ltd.
Sensitivity	0.022 nT / vHz@1Hz
Resolution	0.001 nT
Dynamic Range	15,000 – 120,000 nT
GPS model	GPS 18
GPS manufacturer	Garmin

5. TESTS AND CALIBRATIONS

5.1. MAGNETIC FIGURE OF MERIT

Compensation calibration tests were performed to determine the magnetic influence of aircraft maneuvers and the effectiveness of the aircraft compensation method. The aircraft flew a square pattern in the four survey directions at a high altitude over a magnetically quiet area and performed pitches ($\pm 5^\circ$), rolls ($\pm 10^\circ$) and yaws ($\pm 5^\circ$). The sum of the maximum peak-to-peak residual noise amplitudes in the total compensated signal resulting from the twelve maneuvers is referred to as the FOM. The FOM was flown on February 7, 2019 and the values for this survey were 1.01 nT, 1.27 nT and 0.66 nT for the Left, Right and Tail sensors respectively (see Appendix II).

5.2. MAGNETIC LAG

Evaluation of the magnetic lag factor was accomplished by comparing survey data flown over a series of distinct magnetic anomalies in opposing directions. The measured lag was 0.5 seconds for the wingtip sensors and 0.70 seconds for the tail sensor. The results are presented in the following table:

C-GGLS : LAG EVALUATION										
Flown: 13 September, 2019 (Flight GLS1864)										
WINGTIP SENSORS (TF1, TF2)										
LINE	DIR		Reference Anomaly							
			A	B	C	D	E	F		
L3502:1864	135°	FIDUCIAL	74879.9	74866.9	74850.3	74826.9	74817.4	74794.3		
		X	300990.6	300483.4	299803.4	298835.3	298448.9	297521.7		
		Y	4854472.2	4854973.9	4855654.5	4856628.2	4857009.2	4857946.3		
		SPEED (S ₁)	54.6	55.8	58.7	58.1	57.1	57.3		
L3503:1864	315°	FIDUCIAL	74996.9	75008.3	75023.8	75046.1	75055.1	75077.5		
		X	300951.4	300448.4	299759.3	298793.2	298413.3	297487.4		
		Y	4854515.4	4855016.2	4855702.1	4856668.9	4857053.4	4857978.3		
		SPEED (S ₂)	62.8	62.3	62.1	60.3	59.3	57.4		
		DELTA (apparent directional separation, metres)	58.3	54.9	64.8	58.5	56.8	46.9		
		LAG (secs) *	0.5	0.5	0.5	0.5	0.5	0.4	AVG LAG 0.5	
TAIL SENSOR (TF3)										
LINE	DIR		Reference Anomaly							
			A	B	C	D	E	F		
L3502:1864	135°	FIDUCIAL	74880.1	74867.1	74850.5	74827.1	74817.6	74794.5		
		X	300998.6	300491.2	299811.7	298843.5	298457.1	297529.8		
		Y	4854464.8	4854965.9	4855646.2	4856620.0	4857001.3	4857938.3		
		SPEED (S ₁)	54.7	55.8	58.7	58.2	57.1	57.3		
L3503:1864	315°	FIDUCIAL	74997.0	75008.4	75023.9	75046.3	75055.4	75077.7		
		X	300946.8	300444.0	299755.0	298784.7	298400.7	297479.4		
		Y	4854519.7	4855020.6	4855706.5	4856677.5	4857066.0	4857986.5		
		SPEED (S ₂)	62.8	62.3	62.1	60.3	59.3	57.4		
		DELTA (apparent directional separation, metres)	75.5	72.3	82.8	82.2	85.9	69.8		
		LAG (secs) *	0.6	0.6	0.7	0.7	0.7	0.6	AVG LAG 0.7	
* Lag factor calculated as LAG = DELTA/(S1+S2)										

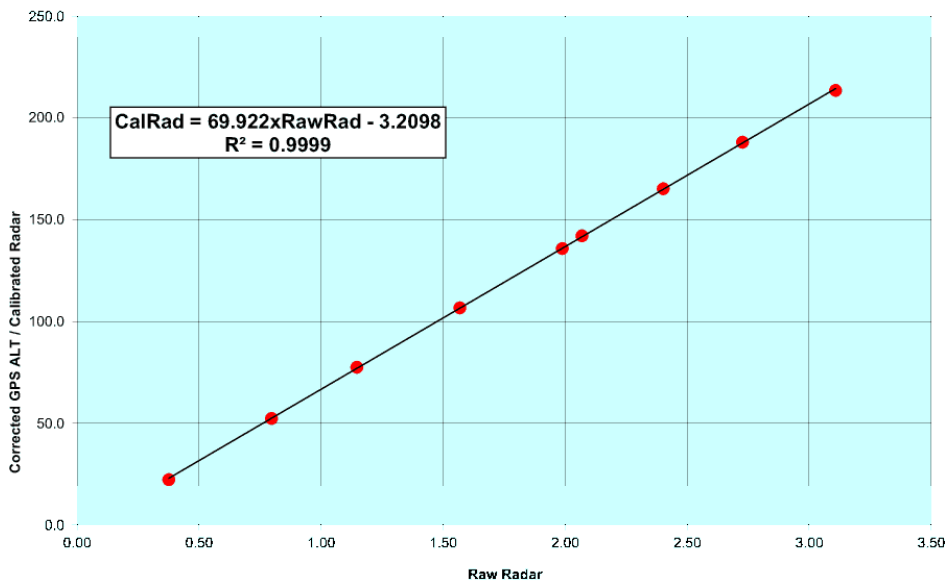
5.3. RADAR CALIBRATION

C-GGLS: RADAR CALIBRATION DATA SUMMARY							
Calibration performed: 15 Feb 2020, GLS1946							
						INTERCEPT	-3.2098
						SLOPE	69.9216
LINE	RAW RADAR	GPS ALT	CORRECTED GPS ALT	LASER	CALIBRATED RADAR	ERROR *	
Ground Ref		328.7	0.0				
S020	0.3754	351.1	22.4	25.3	23.0	0.6	
S050	0.7966	381.1	52.4	55.1	52.5	0.1	
S075	1.1464	406.2	77.5	79.8	76.9	-0.6	
S100	1.5685	435.3	106.6	108.7	106.5	-0.1	
S135	1.9883	464.4	135.7	138.4	135.8	0.1	
S140	2.0688	470.6	141.9	140.1	141.4	-0.5	
S165	2.4020	493.7	165.0	167.6	164.7	-0.3	
S190	2.7268	516.5	187.8	190.7	187.5	-0.3	
S215	3.1080	541.9	213.2	215.7	214.1	0.9	

* Error estimated as (Calibrated Radar) - (Corrected GPS Alt)

Imperial Units		
LINE	GPS_ALT (ft)	CAL_RAD (ft)
S020	73.5	75.6
S050	171.9	172.2
S075	254.3	252.5
S100	349.7	349.3
S135	445.2	445.6
S140	465.6	464.1
S165	541.3	540.5
S190	616.1	615.0
S215	699.5	702.4

Radar Altimeter Calibration 15 February GLS1946



6. LOGISTICS

6.1. PERSONNEL

The contractor supplied the following properly qualified and experienced personnel to carry out the survey and to reduce, compile and report on the data:

Survey:	Pilots	Stefan Guay (FOM) Nick Muller (Survey) Francis Nwadozi
	Office QC Processor	Allen Duffy
	Office Final Processing Manager	Allen Duffy Charles Barrie

6.2. FLIGHT REPORTING

The local Figure of Merit (FOM) calibration was flown on Friday Feb 7, 2020 at a location northeast of Thunder Bay with a low magnetic gradient; the data were examined and a clean FOM was calculated. The second Pilot arrived on Saturday.

The survey was flown in 5 flights (1939-1943) over 5 days from February 9-13th and, in total, consisted of 2 scheduled aircraft maintenance days and 3 survey days. The VLF-EM data did not record properly on Sunday; those lines were re-flown on the last flight Feb 13th.

The team made every effort to maintain efficiency while collecting VLF-EM data by flying control lines when VLF transmitters were scheduled to be offline (Monday) to maximize coverage. Also the survey was flown in an “every-other” line mode and the fill-in lines were planned as much as possible for different days such that VLF-off days would not be on adjacent lines (see section 7.5.1). There were no gaps in the VLF-EM data.

During the survey, the pilot maintained daily personal, aircraft and preflight safety reports. The base station and airborne data were monitored throughout the survey and recorded by precise notes of each flight. At the end of each flight day the flight report and data were uploaded to the project geophysicist who performed quality control on the raw and compensated survey data. Additionally, the geophysicist transcribed the operator notes and entered quality control notes into a spreadsheet in excel.

All survey personnel crew adopted and worked under the Terraquest Ltd. Health, Safety and Environmental Protection Manual (which include Site Specific Safety Plan and Emergency Response Plan) along with guidelines from the IAGSA safety and security standards.

6.3. BASE OF OPERATIONS

Terraquest's base of operations was at Thunder Bay Airport (CYQT). The base station (combined high sensitivity magnetic and GPS) was set up at a secure location at the airport.

The crew's accommodations were the responsibility and cost of Terraquest. The crew stayed at the Airlane Hotel, 698 Arthur Street West, Thunder Bay.

7. DATA PROCESSING

7.1. DATA QUALITY CONTROL / PRELIMINARY PLOTS

The field data were examined in the evening after each flight by a geophysicist to inspect the data for quality control and tolerances. All data were approved and checked for continuity and integrity. Magnetic data were corrected for diurnal to produce preliminary plots.

7.2. DIGITAL TERRAIN MODEL

The radar altimeter data were subtracted from the GPS altitude to produce a Digital Terrain Model. The resulting data were micro-leveled to remove line-to-line imperfections in the data. The final grids were created using bi-directional Akima spline interpolation at a cell size of 25 metres.

7.3. FINAL MAGNETIC DATA PROCESSING

1. Lag Correction of Total Magnetic Field

The evaluation of the magnetic lag factor was accomplished by acquiring survey data flown in opposite directions over a series of distinct magnetic anomalies. The measured factors were 0.7 seconds for the tail Mag and 0.5 seconds for the wing tips.

2. Diurnal Data and Diurnal Corrections of the Total Magnetic Field

Magnetic data from the Diurnal Base Station were scrutinized for spurious readings (data spikes) and any obvious cultural interference. Any such features were manually removed and the data re-interpolated (Akima spline) to maintain a continuous record. A low-pass filter (60 fid cut-off wavelength) was applied to the edited diurnal record. The resulting data was used to pre-level (diurnally correct) the measured TMI data for the Tie lines prior to implementing Tie-Traverse intersection leveling. Traverse line data were not pre-leveled with Diurnal Base Station to avoid the risk of contaminating the airborne data with any remaining imperfections in the base station record.

3. Total Magnetic Field Tie-Traverse Line Intersection Levelling

The lag corrected, pre-treated (altitude correction) data were refined using tie-line levelling. Using the Geosoft Oasis implementation of this procedure, an initial table of tie-traverse line intersection differences is compiled (together with supporting ancillary parameters such as local gradient, etc.) and intersection data is loaded into the processing databases. In a series of iterative levelling passes, outlier intersection values are either disabled or modified to refine and finalize the overall result.

4. The Magnetic Field Micro-Levelling

Minor levelling imperfections may still exist in the gradient enhanced intersection levelled data, most likely due to incomplete removal of diurnal influences in sections of lines between intersection points. These errors are removed by application of mild micro-levelling procedure whereby highly directional filtering identifies and removes residual noise correlated with the line direction.

5. Calculated Vertical Derivative

The first Vertical Derivative was calculated using a 2D FFT operator on the Total Field data grid. Unwanted, high frequency “ringing” in the resulting 1VD grid was minimized by concurrent application of an 8th order Butterworth low pass filter with a cut-off keyed to the line spacing.

6. Analytic Signal

The Analytic Signal, which is derived from the three orthogonal magnetic gradients, has the advantage of producing body centric anomalies - regardless of magnetic inclination - with source edges mapped out by the function’s maxima. Additionally, approximate source depth may be estimated by measuring individual anomaly widths at half amplitude.

7. Horizontal Gradients

Terraquest solves the spatial mathematical relationship of the three total field measurements (left, right and tail) by using the accurate location of the three magnetic sensors in space to directly calculate the East-West and North-South gradients, referenced to geographic north, at each point along the survey line.

Both gradients were then median-leveled to remove bias; followed by mild micro-leveling to remove any remaining imperfections. Following this, the transverse and longitudinal gradients were gridded using a bi-directional Akima algorithm and a cell size of 25 metres. The measured transverse and longitudinal gradients provide an improved rendition of the shorter wavelengths in magnetic field than the residual magnetic field measured by the tail sensor alone. This is because the direction and amplitude of the field’s total horizontal gradient can be determined using the 2 measured gradients, providing information regarding the behavior of the magnetic field in-between traverse lines. Thus, it is useful to incorporate the gradient data in the preparation of the residual magnetic field grid

8. Reconstructed Total Field (RTF)

Data grids of the measured horizontal gradients were used to generate the Reconstructed Total Magnetic Field using the 2D FFT process described by J. B. Nelson (Nelson, 1994)*. This product (RTF) has the advantage of being un-affected by magnetic diurnal activity, though longer magnetic spatial wavelengths are not represented due to measurement resolution limitations in the magnetometers. The resulting data units (expressed as pseudo nanoTesla) are not true nT; approximate conversion to true nT may be accomplished by application of scaling factor if required. Using the calculated Reconstructed Total Field data grid, a "RTF" Geosoft

database channel is created by performing a grid look-up ("grid sample") for each data point in the production database.

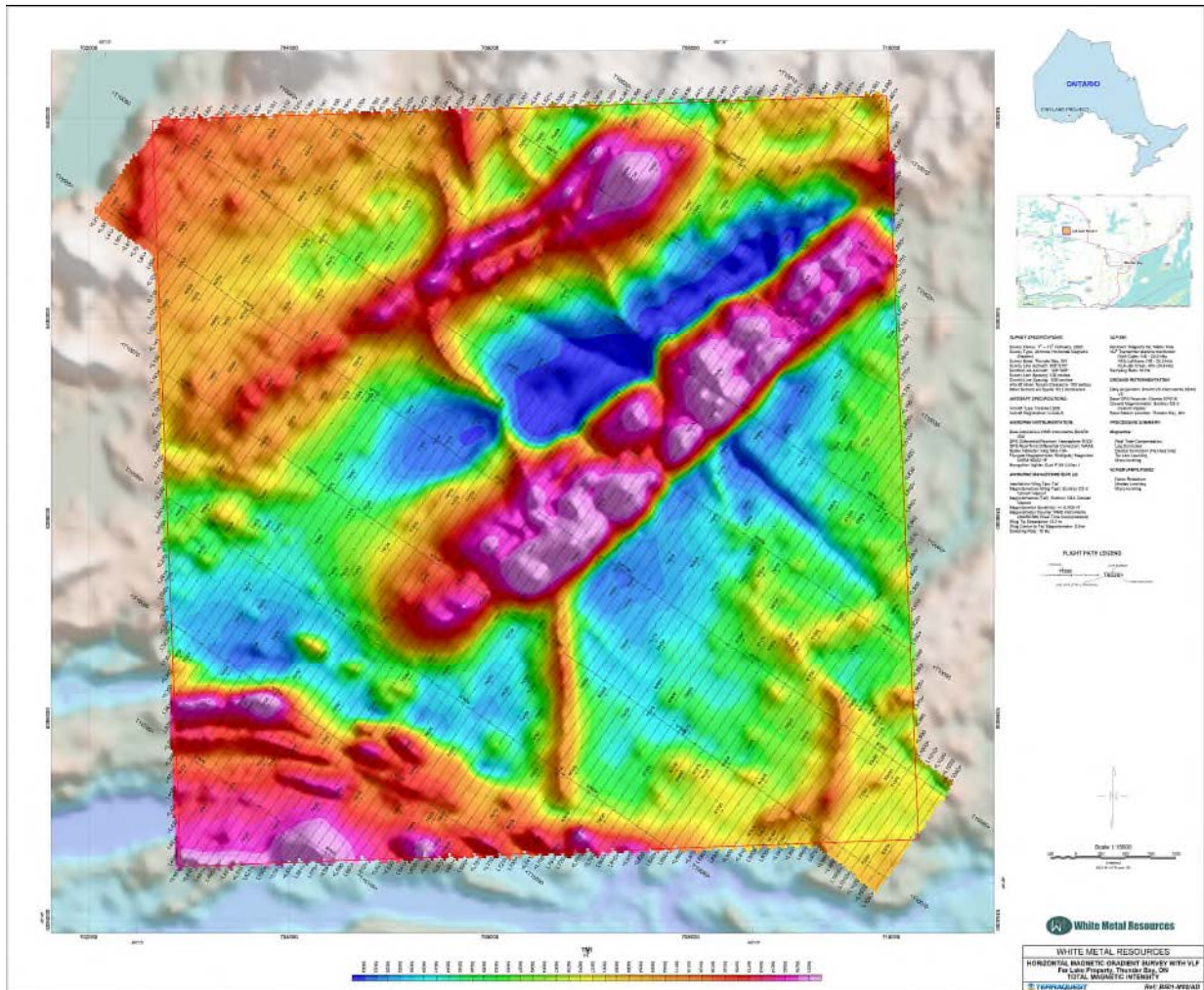
* Reference: Nelson, J.B., 1994, Leveling total-field aeromagnetic data with measured horizontal gradients: *Geophysics*, 59, 1166-1170

9. Grids

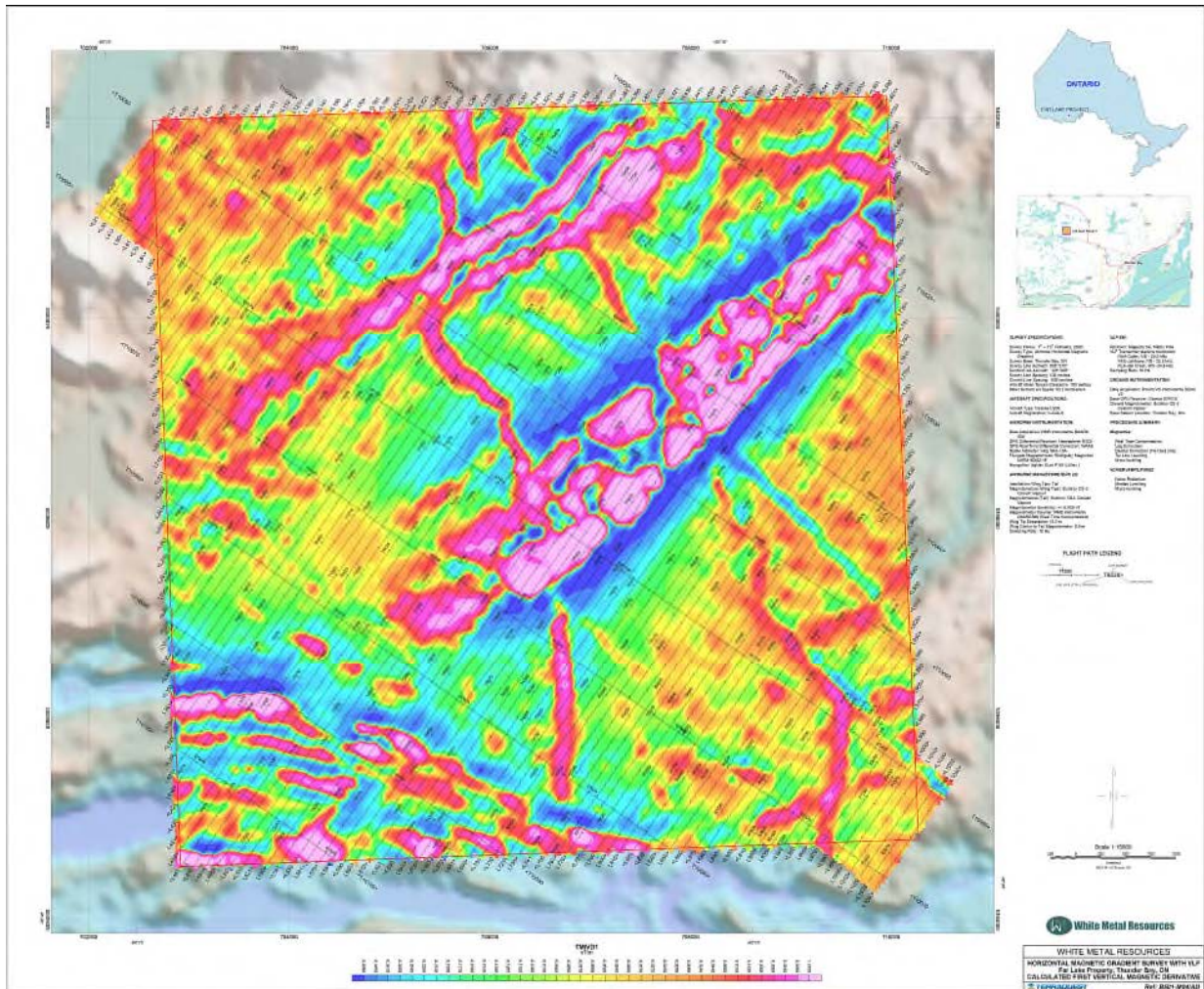
Magnetic data grids were created using bi-directional data interpolation (Akima) at a cell size of 25 metres.

7.4. MAGNETIC DATA MAPS

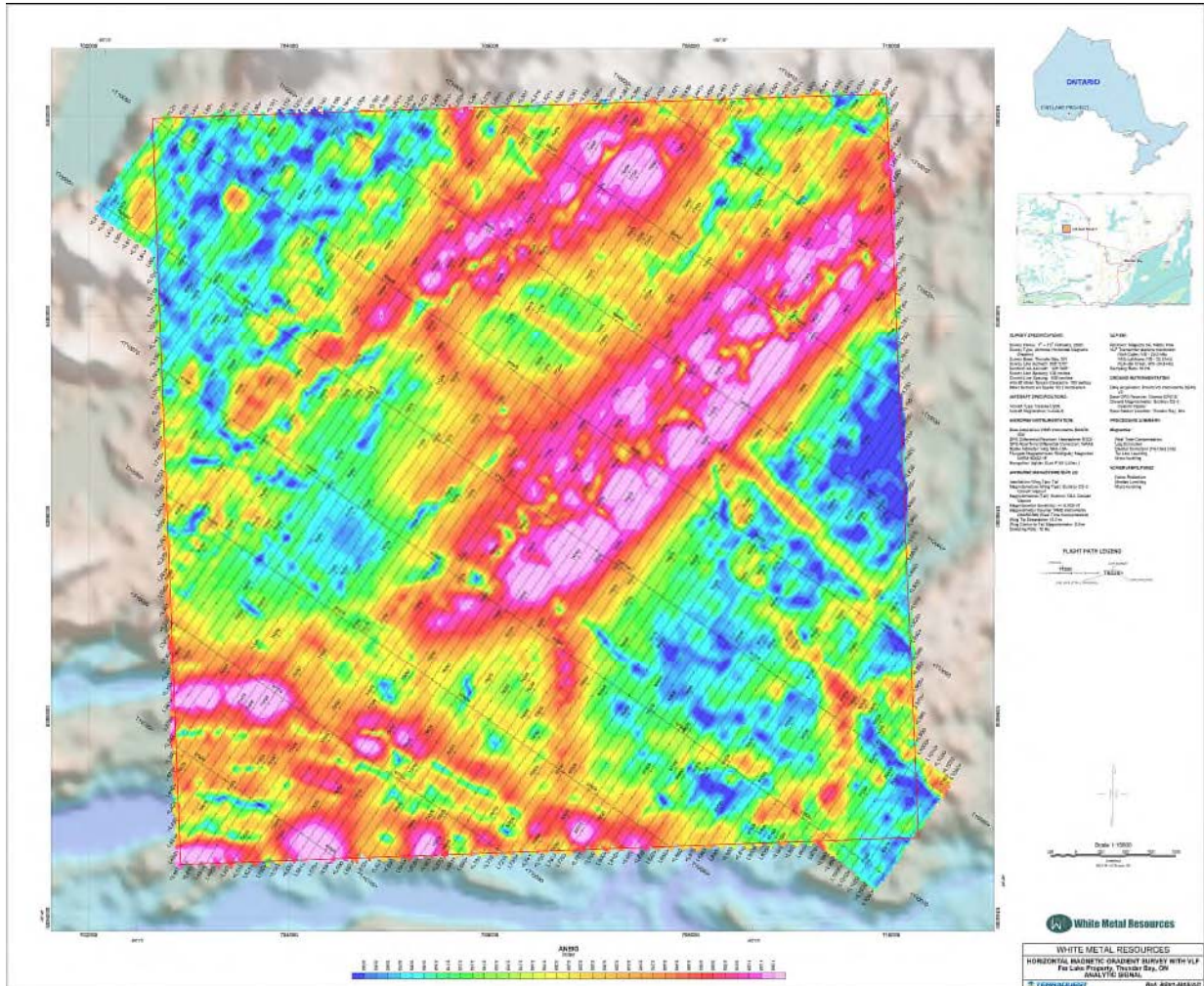
1. Total Magnetic Intensity



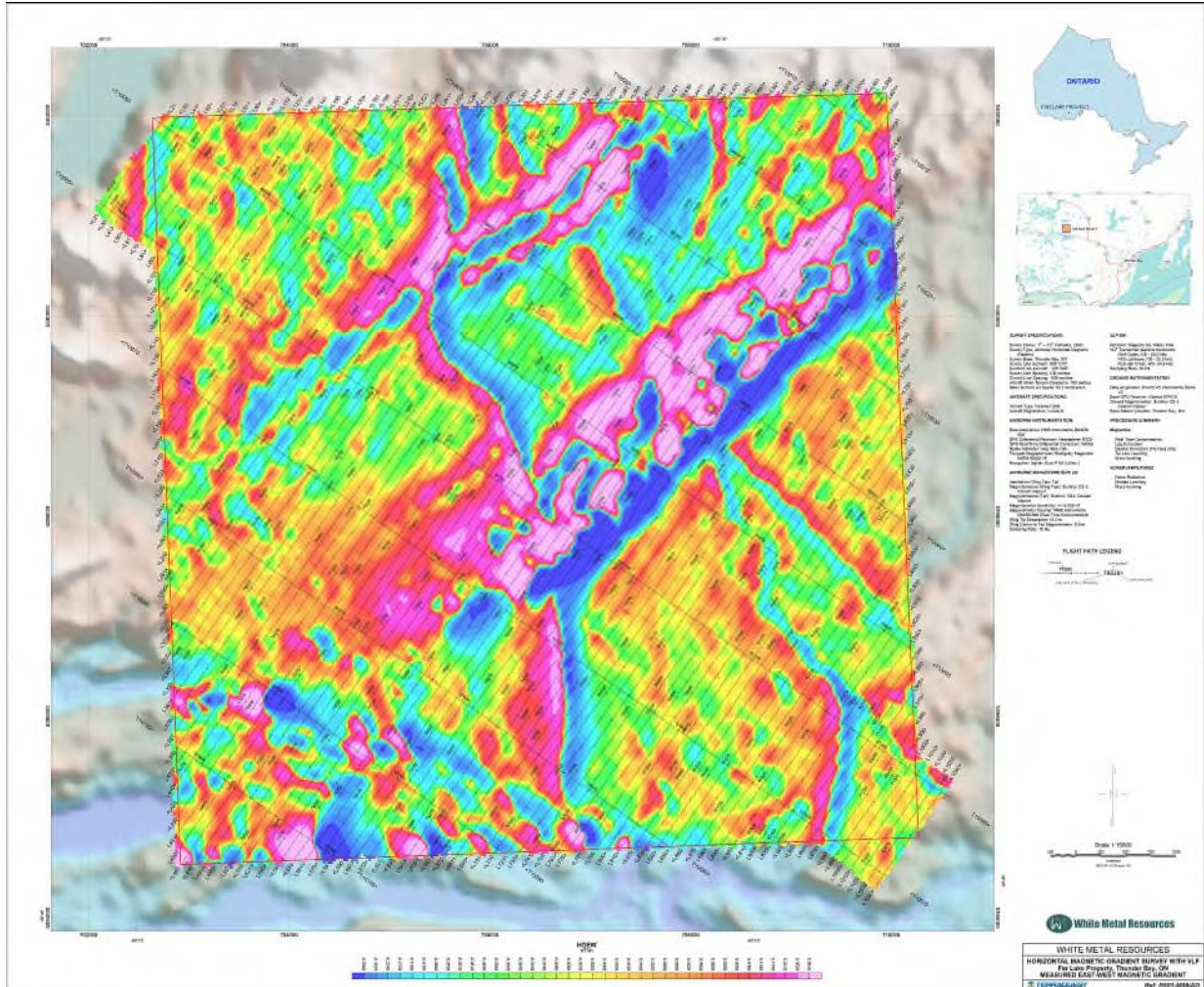
2. Calculated Vertical Derivative



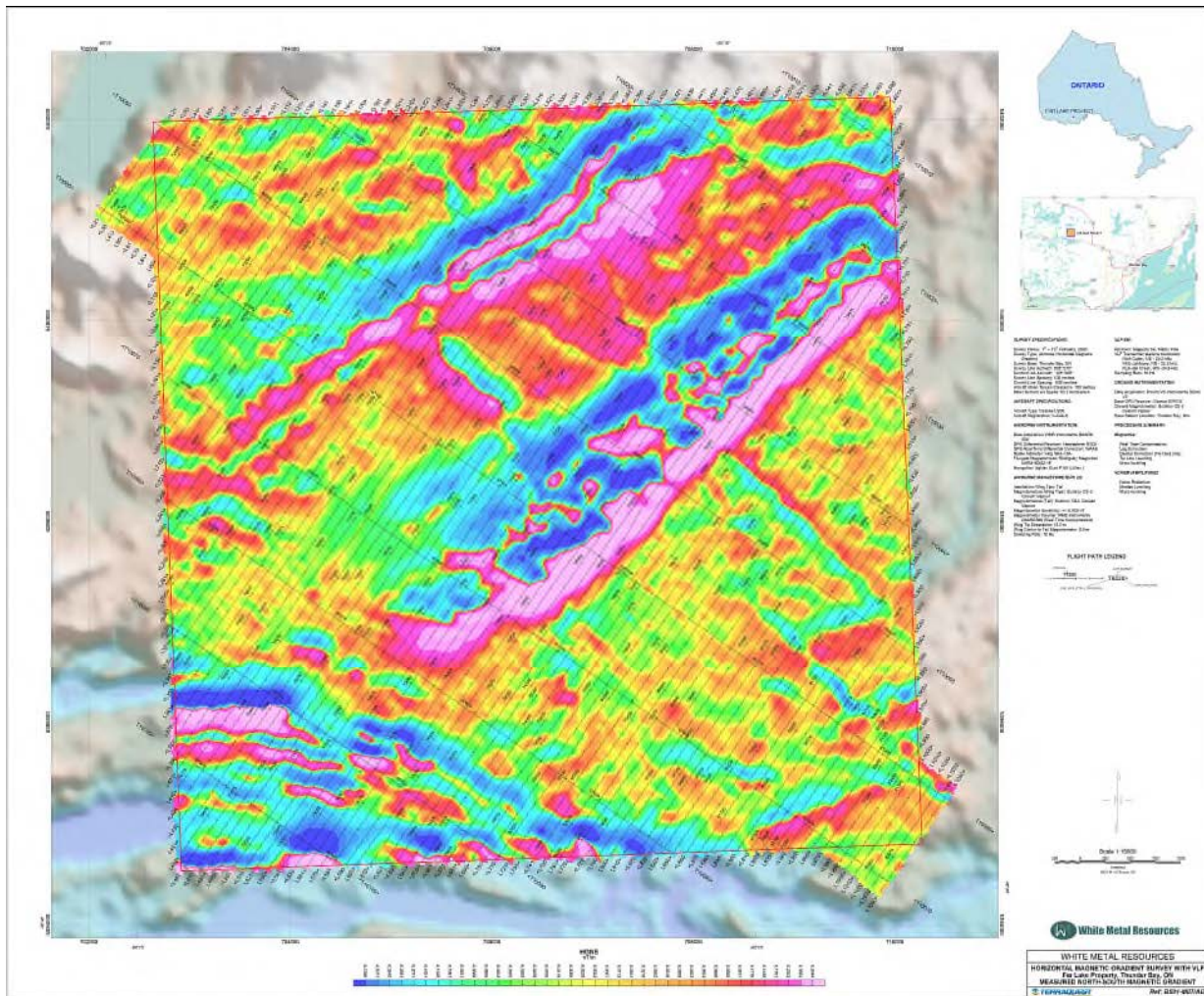
3. Analytic Signal



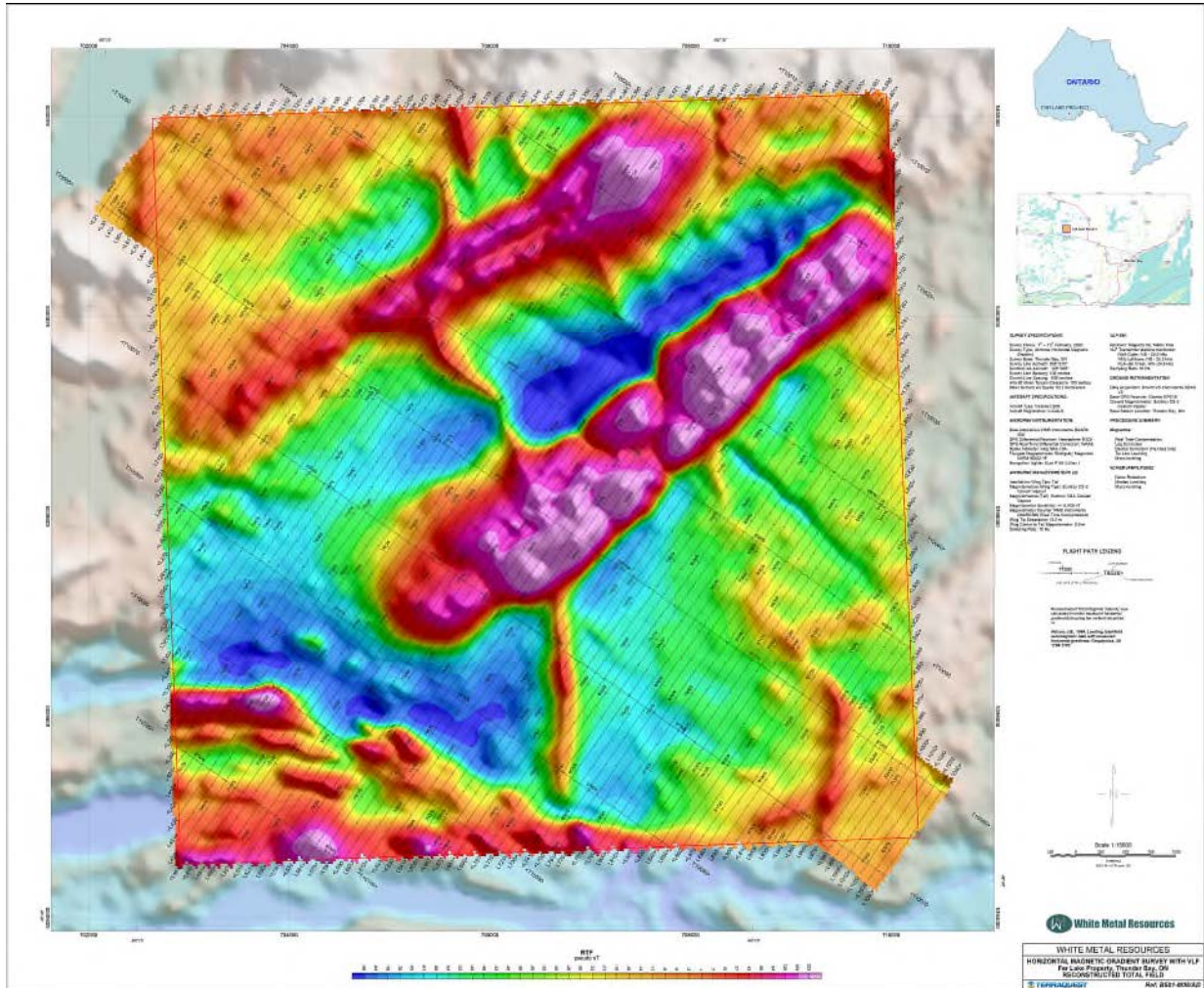
4. Measured Horizontal East-West Gradient



5. Measured Horizontal North-South Gradient



6. Reconstructed Total Field



7.5. ELECTROMAGNETIC TOTAL FIELD DATA PROCESSING

1. Matrix VLF-EM Monitoring

VLF-EM data were captured using a Magenta Inc. Matrix Digital VLF receiver. This instrument is capable of simultaneously monitoring up to four VLF frequencies, recording amplitude (secondary field), transmitter station azimuth (relative to aircraft orientation), vertical and planar ellipticities and field tilt angle. For this project, the following VLF transmitters were monitored:

- Station NAA: Cutler, Maine – 24.0 kHz
- Station NML: La Moure, North Dakota – 25.2 kHz
- Station NLK: Jim Creek, Washington – 24.8 kHz

Transmitter power, distances and azimuths relative to the survey block are illustrated the Figure on the next page. Transmitter stations are nominally shut down for scheduled maintenance as follows: NAA Cutler, Maine on Mondays, NML LaMoure, North Dakota on parts of Wednesdays, and NLK Seattle, Washington progressively throughout Wednesday such that there is generally always some signal. Deviations to this schedule are not uncommon.

The survey was flown in a manner that ensures as much as possible that adjacent lines do not have the same VLF Transmitter-off day (see discussion in section 6.2), this ensures that there no significant gaps in the recorded VLF data since the long wavelength of the VLF signal readily crosses three or more survey lines.

2. Matrix VLF-EM Processing Total Field

Field Amplitude was processed and presented separately for each of the frequencies. Processing of the raw amplitude data consisted of the following:

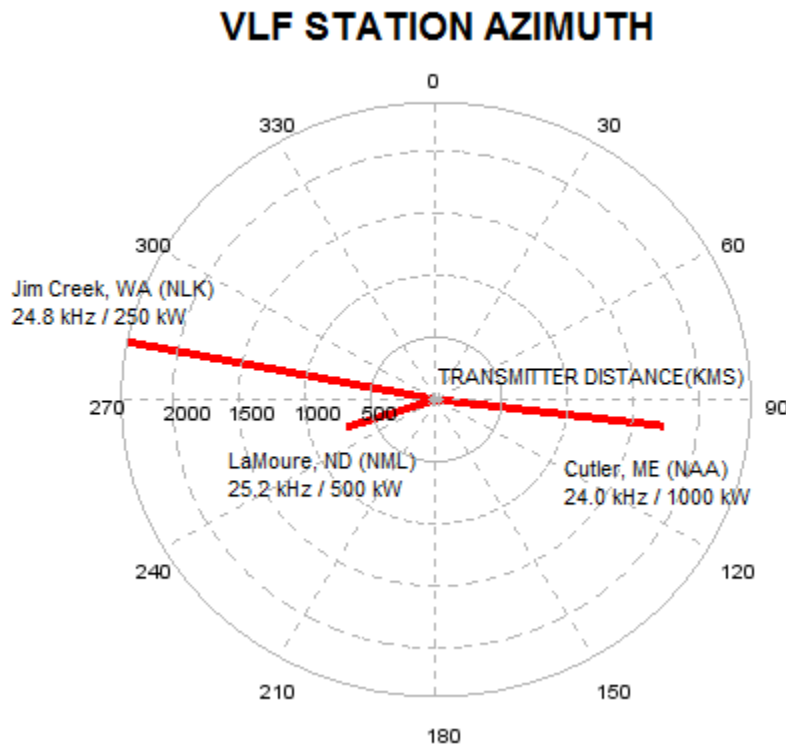
- Mask out any embedded “off-line” data
- Noise reduction filtering using non-linear Naudy filtering (5 pt filter width)
- Initial leveling (mean subtraction)
- Fine leveling (micro-leveling)
- Application of bias offsets such that finalized data ranged positive

The finalised amplitude data for each channel were presented as a series of colour images of total field strength (amplitude). Conductor axes and other VLF anomalous features (topographic effects, conductive lake sediments, etc.) are mapped by “hot” colours (light brown -> white) as peak centric lineaments.

Final corrected Amplitude data were high-pass filtered (30 fid cut-off) and used to create data grids which were analysed with a peak-detection algorithm (Blakely algorithm). The resulting peak locations were marked and superimposed on the amplitude images to emphasise conductor axes.

The orientation and distances of the primary fields are located on the legend of each Matrix VLF-EM Total Field conductivity map. The final grids were created using Minimum Curvature data interpolations at a cell size of 25 m.

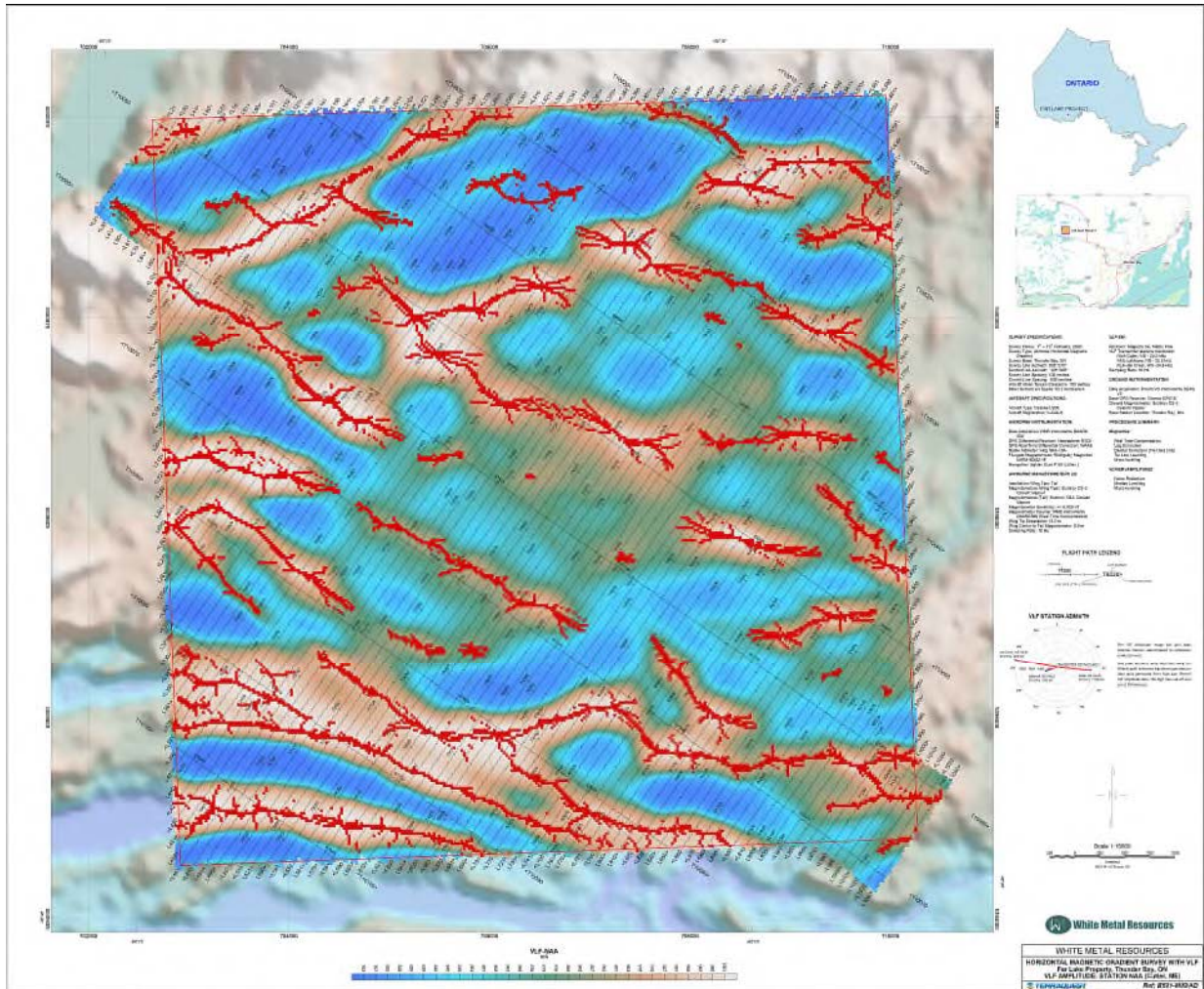
VLF STATION AZIMUTH – B501 Survey



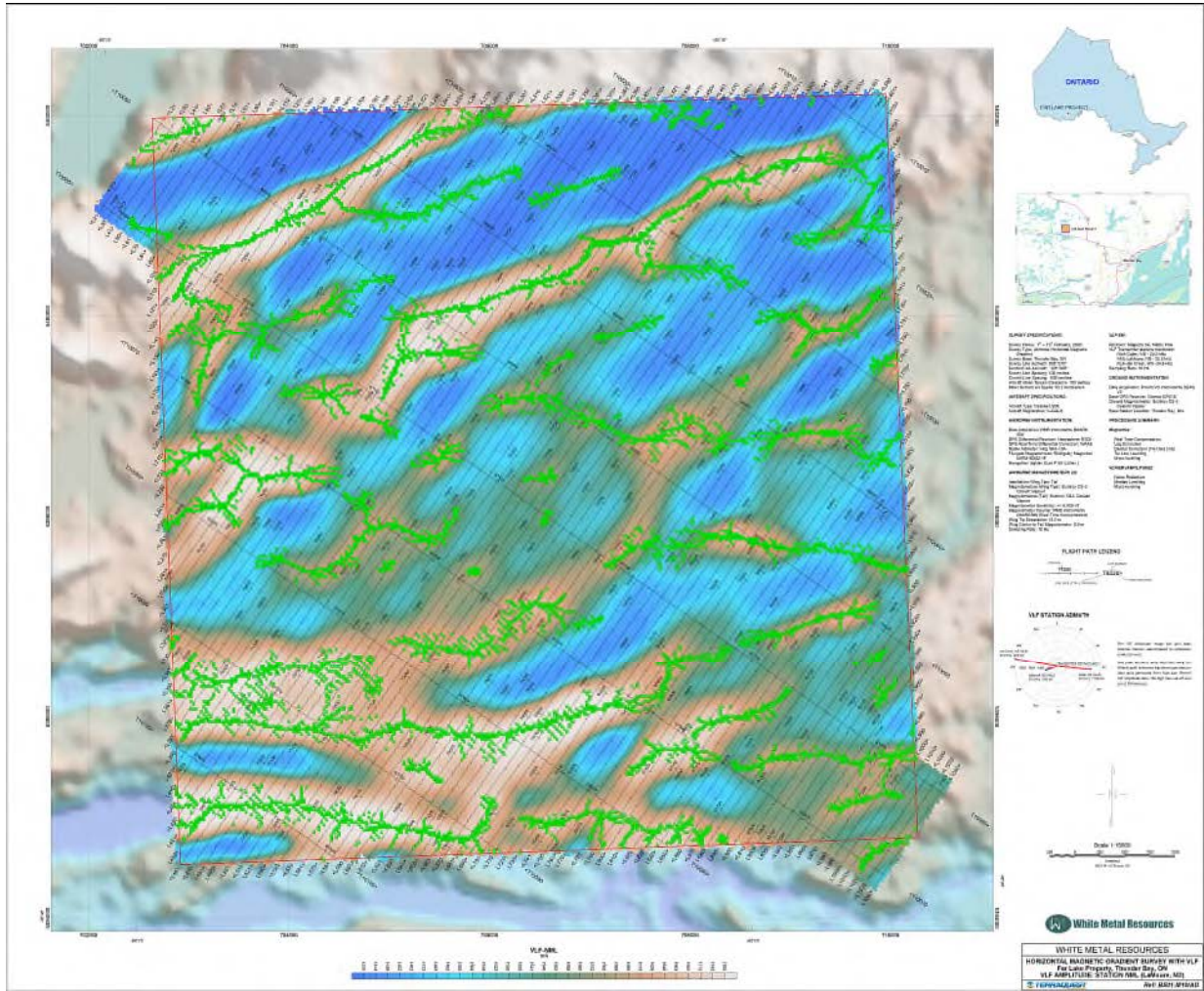
Comment: The Matrix VLF-EM conductivity data in this survey display excellent correlation with magnetic, lithological and structural trends across the survey area, accordingly this EM data set would be a good candidate for inversion modeling to create resistivity products. Where the conductivity products are successful in mapping structure, resistivity products have the potential to map lithologies independently from magnetic properties.

7.6. MATRIX VLF-EM TOTAL FIELD MAPS

1. Amplitude of the Secondary Total Field Strength (NAA, Cutler, ME)



2. Amplitude of the Secondary Total Field Strength (NML, La Moure, ND)



7.7. MATRIX VLF-EM OPTIONAL INVERSION MODELLING

1. Introduction

Based on the quality of the Matrix data on this survey and correlation with airborne magnetic and ground data, the client requested to have the data inverted to calculate the resistivity. The final processed Total Field data were sent to EMTOMO to perform recently developed inversion procedures designed specifically for airborne VLF-EM data. Products from this processing include a resistivity channel in the database and six resistivity depth slices at 5, 10, 25, 40, 60 and 100m depths for Cutler and La Moure stations. (The transmitter azimuth for Cutler and Seattle are opposite but close in angle, accordingly the resulting recorded survey data are similar and data from Seattle were not modelled). These were final leveled by Terraquest Ltd. and provided as grids for each depth slice. The depth slices have been stacked as a three-dimensional image shown in section 7.8. A summary of inversion theory follows.

2. Inversion Processing

The VLF signal used in prospection is generated by communication antennas working in the frequency range of 10 kHz to 30 kHz. Those antennas behave like electric dipoles and its associated electromagnetic field (primary field) travels radially outward via two propagation mechanisms: along the earth's surface (wave guided) and by reflection at various charged layers in the ionosphere at altitudes of 60-400 km. The variable primary field induces electrical currents, mainly in conductive structures orientated parallel to the direction the electric field source (VLF transmitter). The induced currents generate an electromagnetic field (secondary field) that can be detected at surface or at some height by the receiver. Having a vertical component of the magnetic field, the following relationship exists between horizontal and vertical components:

$$H_z = T_{zy} H_y$$

where T_{zy} is the magnetic transference function or Tipper. In VLF-EM, the data are the In-phase and Quadrature, or the real and imaginary parts of the tipper (H_z^s/H_y), where H_z^s and H_y are the vertical component of the secondary field and the horizontal component of the total magnetic field.

The nonlinear, smoothness-constrained inversion algorithm (Sasaki, 1989, 2001; DeGroot and Constable, 1990) was adopted for VLF inversion (Monteiro Santos et al., 2006). The inversion is performed by an iterative process that allows the final model to be obtained, with its response fitting the data set in a least square sense. At each iteration, the optimization equations that must be solved to get the corrections of the parameters are represented as follows:

$$(\mathbf{J}^T \mathbf{J} + \lambda \mathbf{C}^T \mathbf{C}) \delta \vec{p} = \mathbf{J}^T \vec{b}$$

where $\delta\vec{p}$ is the vector containing the corrections applicable to the parameters (logarithm of block conductivity, σ_j) of an initial model, $\vec{b} = \vec{T}^o - T_i^c$ is the vector of the differences between the observed and calculated tipper components, \mathbf{J} is the Jacobian matrix whose elements are given by $(\sigma_j)(\partial T_i^c / \partial \sigma_j)$, the superscript T denotes the transpose operation, and λ is a Lagrange multiplier (Damping factor) that controls the amplitude of the parameter corrections and whose best value is determined empirically. The elements of the matrix \mathbf{C} are the coefficients of the values of the roughness in each parameter, which is defined in terms of the four neighbours' parameters.

DeGroot-Hedlin C. and Constable S.C., 1990. Occam's inversion to generate smooth, two-dimensional models from magnetotelluric data. Geophysics, 55, 1613-1624.

Monteiro Santos, F.A., António Mateus, Jorge Figueiras, Mário A. Gonçalves, 2006. Mapping groundwater contamination around a landfill facility using the VLF-EM method – a case study. Journal of Applied Geophysics.

Sasaki Y., 1989. Two-dimensional joint inversion of magnetotelluric and dipole-dipole resistivity data. Geophysics, 54, 254-262.

7.9. LIST OF FINAL PRODUCTS

A complete list of all final products is listed in the ReadMe file Appendix 9.3. All products including this Report are contained on an Archive DVD.

The following maps were produced in digital format in Low Resolution for the Operations Report, and High Resolution for the Database and Plotted Maps at 1:15,000 scale (2 copies):

1. Digital Terrain Model
2. Total Magnetic Intensity
3. Anomalous (IGRF corrected) Total Field with contours
4. Calculated Vertical Derivative of Total Magnetic Intensity
5. Analytic Signal
6. Measured Magnetic Horizontal Gradient - East-West
7. Measured Magnetic horizontal Gradient - North-South
8. Reconstructed Total Magnetic Field
9. Amplitude of the Secondary Total VLF-EM Field (NAA, Cutler, ME)
10. Amplitude of the Secondary Total VLF-EM Field (NML, La Moure, ND)
11. Amplitude of the Secondary Total VLF-EM Field (NLK, Jim Creek, WA)
12. VLF-EM Resistivity Depth Slices from Station NAA Cutler, ME
13. VLF-EM Resistivity Depth Slices from Station NML, La Moure, ND

- Digital grid archives in GEOSOFT
- Two copies of all final maps plotted on glossy film
- PNG format of maps
- Digital Profile Archives in GEOSOFT GDB format (compatible with 4.1 or higher)
- Operations Report in PDF format
- Readme.txt

8. SUMMARY

An airborne, high sensitivity, horizontal magnetic gradient and Matrix VLF-EM survey was performed over the Far Lake Project located approximately 80 km northwest of Thunder Bay, Ontario. The survey was comprised of a single block flown with a mean terrain clearance of respectively 100.3 metres. The traverse line interval was 100 metres and control line intervals were 1000 metres. The aircraft mean speed was 277.2 km/hr (63.1 m/sec) with a data sample rate of 10 Hz, the equivalent data points are approximately 6.3 metres along the flight lines. The base of operations was at Thunder Bay International Airport (CYQT); a high sensitivity magnetic and a GPS base station was setup at a quiet and secure area at the airport. Throughout the survey this base station recorded the diurnal magnetic activity and was synchronized to the airborne data using GPS time. The data were subjected to final processing to produce a digital archive and two glossy colour copies of the following maps:


- a) **Digital Terrain Model** with Flight Path
- b) **Magnetics:** Total Magnetic Intensity of tail sensor, Analytic Signal, Calculated Vertical Derivative, Measured Horizontal Gradients (East-West and North-South), Reconstructed Total Magnetic Field
- c) **MATRIX VLF-EM:** Amplitude of the Secondary Total Field from i) NAA, Cutler, ME, ii) NML, La Moure, ND and iii) NLK, Jim Creek, WA, and High-Pass Filter Products from all three frequencies.
- d) **MATRIX VLF-EM:** Inversion Modelling Plotted as Resistivity Depth Slices shown as a montage at 5, 10, 25, 40, 60 and 100 metres depths separately for NAA Cutler ME and NML La Moure ND.

This report along with the aeromagnetic gradient and total field VLF-EM data have been archived with a README as Geosoft database (GDB), GRID, and .PNG formats. A second README contains the database, normal grids and 3D grids (voxels) of inverted resistivity data interpretation.

High resolution horizontal gradient magnetic data have provided a detailed data set which can be used to improve the magnetic mapping. The Matrix VLF-EM total field products show good correlation with both magnetic and geologic trends and have been successful in identifying and mapping the structural fabric across the survey area. The Matrix VLF-EM data have been inverted to obtain resistivity data channels, grids and map images of depth slices of the inverted VLF-EM, providing a wealth of new three-dimensional EM information.

Respectfully Submitted,


Charles Barrie, M.Sc., P. Geol.
Vice President
Terraquest Ltd.



9. APPENDICES

9.1. APPENDIX I - CERTIFICATE OF QUALIFICATION

I, Charles Q. Barrie, certify that I:

- 1) am registered as a Fellow with the Geological Association of Canada, as P. Geo. with the Association of Professional Geoscientists of Ontario and work professionally as a geologist,
- 2) hold an Honours degree in Geology from McMaster University, Canada, obtained in 1977,
- 3) hold an M.Sc. in Geology from Dalhousie University, Canada, obtained in 1980,
- 4) am a member of the Prospectors and Developers Association of Canada,
- 5) am a member of the Canadian Institute of Mining, Metallurgy and Petroleum,
- 6) have worked as a geologist for thirty-nine years,
- 7) am employed by and am a co-owner of Terraquest Ltd., specializing in high sensitivity airborne geophysical surveys for thirty-four years, and
- 8) have prepared this operations and specifications report pertaining to airborne data collected by Terraquest Ltd.

Markham, Ontario, Canada

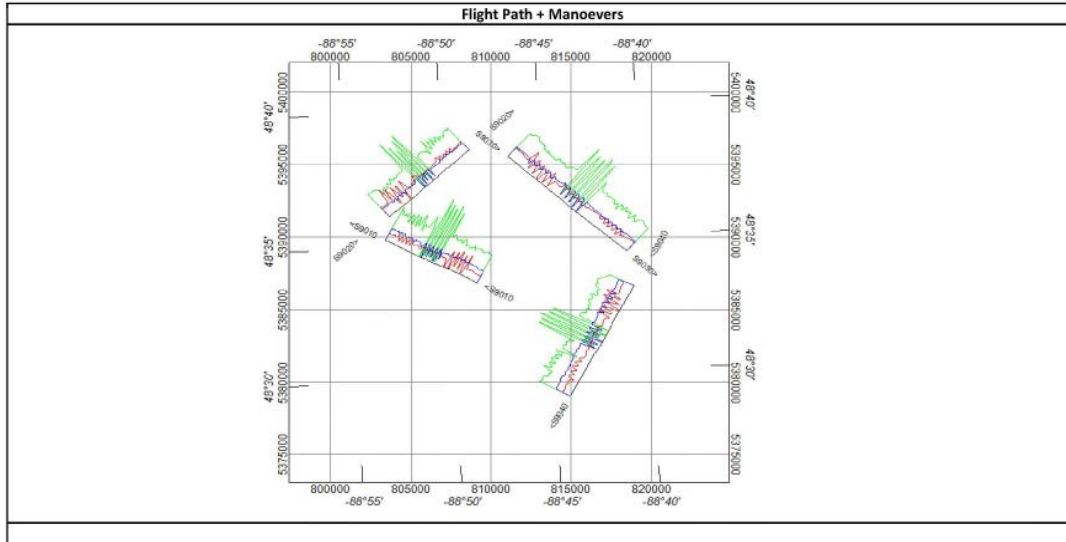
Signed


Charles Barrie, M.Sc., P. Geo.
Vice President
Terraquest Ltd.



9.2. APPENDIX II - MAGNETIC FIGURE OF MERIT (FOM)

B501 - WHITEMETAL / WINTER 2019					
Magnetic Figure of Merit Analysis (SRCDAT: 071948 FLIGHT 1938)					
Job Ref:	B501	Date:	7-Feb-20	Aircraft:	C-GGLS
Location:	Thunder Bay, ON				



FOM Index : Sensor 1												
Calculation note: Residual noise was isolated using a 101 pt Hanning high pass convolution filter with a subsequent low-pass filter (1.0 fid cutoff) applied to reduce non-related HF noise. Individual min-max values determined from the maximum consecutive peak-to-trough residual noise amplitude within each manoeuvre group												
LINE	DIR	TRAV FLG	PITCH		ROLL		YAW		P	R	Y	Σ
			MAX	MIN	MAX	MIN	MAX	MIN				
9010	N	H	0.0193	-0.0584	0.0733	-0.0706	0.0165	-0.0779	0.0777	0.1439	0.0943	0.3160
9020	E	H	0.0572	-0.0444	0.0140	-0.0296	0.0268	-0.0161	0.1016	0.0436	0.0429	0.1882
9030	S	H	0.0000	-0.0359	0.0349	-0.0383	0.0504	-0.0227	0.0358	0.0733	0.0731	0.1822
9040	W	H	0.0999	-0.0749	0.0240	-0.0372	0.0464	-0.0415	0.1748	0.0612	0.0879	0.3239
Σ									0.3900	0.3220	0.2982	1.0102
Full FOM Index :									1.0102			
Eq. Traverse FOM Index (Σ Trav x 2) :									0.9963			

FOM Index : Sensor 2												
LINE	DIR	TRAV FLG	PITCH		ROLL		YAW		P	R	Y	Σ
			MAX	MIN	MAX	MIN	MAX	MIN				
9010	N	H	0.0037	-0.0408	0.0683	-0.0673	0.0054	-0.0811	0.0446	0.1356	0.0865	0.2667
9020	E	H	0.0198	-0.0200	0.0354	-0.0469	0.0356	-0.0457	0.0398	0.0823	0.0814	0.2034
9030	S	H	0.0351	-0.0703	0.1038	-0.0806	0.0962	-0.0772	0.1053	0.1843	0.1735	0.4632
9040	W	H	0.1104	-0.0647	0.0387	-0.0325	0.0430	-0.0467	0.1751	0.0712	0.0897	0.3360
Σ									0.3648	0.4735	0.4310	1.2692
Full FOM Index :									1.2692			
Eq. Traverse FOM Index (Σ Trav x 2) :									1.4596			

FOM Index : Sensor3												
LINE	DIR	TRAV FLG	PITCH		ROLL		YAW		P	R	Y	Σ
			MAX	MIN	MAX	MIN	MAX	MIN				
9010	N	H	-0.0032	-0.0418	0.0157	-0.0197	-0.0020	-0.0576	0.0387	0.0355	0.0556	0.1297
9020	E	H	0.0355	-0.0288	0.0022	-0.0144	0.0295	-0.0159	0.0644	0.0166	0.0454	0.1264
9030	S	H	0.0031	-0.0542	0.0288	-0.0104	0.0473	-0.0265	0.0572	0.0392	0.0739	0.1703
9040	W	H	0.0992	-0.0505	0.0325	-0.0173	0.0172	-0.0179	0.1497	0.0498	0.0352	0.2346
Σ									0.3100	0.1411	0.2100	0.6611
Full FOM Index :									0.6611			
Eq. Traverse FOM Index (Σ Trav x 2) :									0.6002			

9.3. APPENDIX III – README

1. README for Aeromagnetic Gradient and Total Field VLF-EM Survey

TERRAQUEST Final Data Archive Documentation
=====

TERRAQUEST reference : B501

Client: White Metal Resources
Project: Far Lake
Type: Aeromagnetic Gradient Survey /w VLF (Fixed Wing)
Operations: Winter, 2020
Survey Base: Thunder Bay, ON
Aircraft: Cessna 206
Archive Version: 200331
Prepared By: Allen Duffy

1. Data Organisation:

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| | +---GRIDS
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| | | AMP1FNL.grd.gi
| | | AMP1FNL_HP.grd
| | | AMP1FNL_HP.grd.gi
| | | AMP2FNL.grd
| | | AMP2FNL.grd.gi
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| | | AMP3FNL.grd
| | | AMP3FNL.grd.gi
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| | | B501_M08_RTF.png
| | | B501_M09_VLFNAA.png
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*Operations Report for White Metal Resources
Horizontal Magnetic Gradient, Matrix VLF-EM & Resistivity Airborne Survey, Far Lake, Thunder Bay, ON*

```

| | | B501_M10_VLFNML.png
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| |     B501_M05_ANSIG.png
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| |     B501_M11_VLFNLK.png
| |
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| |
| | \---REPORT
| | | B501 White Metal Res.-Mag Gradient & VLF-EM Survey- Far Lake, ON,Report.pdf

```

2. Database Contents: "B501ARC_FAR_LAKE_200331.gdb"

Data sampled at 10Hz ...

```

X_UTM_WIN      : UTM Easting - WGS84, UTM Zone 15N (metres)
Y_UTM_WIN      : UTM Easting - WGS84, UTM Zone 15N (metres)
Flight         : Flight Number
DATE           : Flight Date (DD/MM/YYYY format - ASCII)
FID            : Fiducial (UTC seconds)
TIME           : UTC TIME (hh:mm:ss.ss format)
RADAR          : Radar Altimeter (metres AGL)
ALT            : WGS84 Altitude (metres AMSL)
LAT            : Latitude (degrees)
LON            : Longitude (degrees)
DTMFNL        : Calculated Digital Terrain model (m AMSL)
DIURNAL        : Raw Diurnal (nT)
DIUEDIT        : Edited Diurnal (culture removed, nT)
VMX            : Fluxgate X component (nT)
VMY            : Fluxgate Y component (nT)
VMZ            : Fluxgate Z component (nT)
TF1UNC        : Raw measured TMI (nT) - Left Wing
TF2UNC        : Raw measured TMI (nT) - Right Wing
TF3UNC        : Raw measured TMI (nT) - Tail
TF1CMP        : Compensated TMI (nT) - Left Wing
TF2CMP        : Compensated TMI (nT) - Right Wing
TF3CMP        : Compensated TMI (nT) - Tail
TF1CMPEDIT    : Edited (spikes removed), Compensated TMI (nT) - Left Wing
TF2CMPEDIT    : Edited (spikes removed), Compensated TMI (nT) - Right Wing
TF3CMPEDIT    : Edited (spikes removed), Compensated TMI (nT) - Tail
HGEWML_LAG    : Measured East-West Magnetic gradient (nT/m), lag corrected
HGNSML_LAG    : Measured North-South Magnetic gradient (nT/m), lag corrected
TF3LAG        : Lag corrected TF3 (Tail TMI)
TF3LVL        : Tie-line levelled TF3 (Tail TMI)
TF3FNL        : Final, micro-levelled TF3 (Tail TMI)
IGRF_TF       : IGRF Total Field (calculation date: 12 FEB 2020, 2020 coeffcieints)
TF3ANM        : Anomalous (IGRF corrected) TMI
SER06_AMP1    : Raw VLF Amplitude (Station NAA, Cutler, Maine)
SER06_DIR1    : Raw VLF Azimuth (Station NAA, Cutler, Maine)
SER06_EP1     : Raw VLF Planar Ellipticity (Station NAA, Cutler, Maine)
SER06_EV1     : Raw VLF Vertical Ellipticity (Station NAA, Cutler, Maine)
SER06_TLT1    : Raw VLF Tilt Angle (Station NAA, Cutler, Maine)
SER06_AMP2    : Raw VLF Amplitude (Station NML, LaMoure, North Dakota)
SER06_DIR2    : Raw VLF Azimuth (Station NML, LaMoure, North Dakota)
SER06_EP2     : Raw VLF Planar Ellipticity (Station NML, LaMoure, North Dakota)
SER06_EV2     : Raw VLF Vertical Ellipticity (Station NML, LaMoure, North Dakota)
SER06_TLT2    : Raw VLF Tilt Angle (Station NML, LaMoure, North Dakota)
SER06_AMP3    : Raw VLF Amplitude (Station NLK, Jim Creek, Washington)
SER06_DIR3    : Raw VLF Azimuth (Station NLK, Jim Creek, Washington)
SER06_EP3     : Raw VLF Planar Ellipticity (Station NLK, Jim Creek, Washington)

```

*Operations Report for White Metal Resources
Horizontal Magnetic Gradient, Matrix VLF-EM & Resistivity Airborne Survey, Far Lake, Thunder Bay, ON*

SER06_EV3 : Raw VLF Vertical Ellipticity (Station NLK, Jim Creek, Washington)
SER06_TLT3 : Raw VLF Tilt Angle (Station NLK, Jim Creek, Washington)
AMP1FNL : Processed VLF Amplitude (Total Field) - Station NAA (Cutler, Maine)
AMP1FNL_HP : Processed VLF Amplitude (HP filtered) - Station NAA (Cutler, Maine)
AMP2FNL : Processed VLF Amplitude (Total Field) - Station NML (LaMoure, North Dakota)
AMP2FNL_HP : Processed VLF Amplitude (HP filtered) - Station NML (LaMoure, North Dakota)
AMP3FNL : Processed VLF Amplitude (Total Field) - Station NLK (Jim Creek, Washington)
AMP3FNL_HP : Processed VLF Amplitude (HP filtered) - Station NLK (Jim Creek, Washington)
IP1_LAG_ML : Final In-Phase (from Tilt Angle) - Station NAA (Cutler, Maine)
QD1_LAG_ML : Final Quadrature (from Vertical Ellipticity) - Station NAA (Cutler, Maine)
IP2_LAG_ML : Final In-Phase (from Tilt Angle) - Station NML (LaMoure, North Dakota)
QD2_LAG_ML : Final Quadrature (from Vertical Ellipticity) - Station NML (LaMoure, North Dakota)
IP3_LAG_ML : Final In-Phase (from Tilt Angle) - Station NLK (Jim Creek, Washington)
QD3_LAG_ML : Final Quadrature (from Vertical Ellipticity) - Station NLK (Jim Creek, Washington)

3. GRIDS

Grids prepared using Bi-Directional (Akima) spline with a 25m grid cell size

AMP1FNL.grd : VLF Amplitude (Total Field) - Station NAA (Cutler, Maine)
AMP1FNL_HP.grd : VLF Amplitude (HP filtered) - Station NAA (Cutler, Maine)
AMP2FNL.grd : VLF Amplitude (Total Field) - Station NML (La Moure, North Dakota)
AMP2FNL_HP.grd : VLF Amplitude (HP filtered) - Station NML (La Moure, North Dakota)
AMP3FNL.grd : VLF Amplitude (Total Field) - Station NLK (Jim Creek, Washington)
AMP3FNL_HP.grd : VLF Amplitude (HP filtered) - Station NLK (Jim Creek, Washington)
DTMFNL.grd : Digital Terrain Model (m AMSL)
HGEW.grd : Measured East-West Horizontal Magnetic Gradient (nT/m)
HGNS.grd : Measured North-South Horizontal Magnetic Gradient (nT/m)
RTF.grd : Reconstructed Total Magnetic Field (calculated from Horizontal Gradients, pseudo nT)
TF3ANM.grd : Anomalous (IGRF corrected) TMI (nT)
TF3ANSIG.grd : Calculated Analytic Signal
TF3FNL.grd : Final, Corrected Total Magnetic Field (nT)
TF3VD1.grd : Calculated First Vertical Magnetic Derivative (nT/m)

4. MAPS

PNG images of the printed map series in full resolution (300 DPI) and low resolution (email-able, files in sub folder 'LORES'). Data are presented on a series of 11 1:15000 scale maps:

B501_M01_FPwDTM.png : Flight Path with DTM grid
B501_M02_TMI.png : Total Magnetic Intensity
B501_M03_TMIANM.png : Anomalous (IGRF corrected) Total Field with contours
B501_M04_TMIVD1.png : Calculated Vertical Magnetic Derivative
B501_M05_ANSIG.png : Calculated Analytic Signal
B501_M06_HGEW.png : Measured East-West Magnetic Gradient
B501_M07_HGNS.png : Measured North-South Magnetic Gradient
B501_M08_RTF.png : Reconstructed Total Field (from Horizontal Gradients)
B501_M09_VLFNAA.png : VLF Amplitude (Total Field) - Station NAA (Cutler, Maine)
B501_M10_VLFNML.png : VLF Amplitude (Total Field) - Station NML (La Moure, North Dakota)
B501_M11_VLFNLK.png : VLF Amplitude (Total Field) - Station NLK (Jim Creek, Washington)

5. README

Archive documentation: this file (B501ARC_FAR_LAKE.ReadMe)

6. REPORT

Operational Report ("B501R White Metal Res.-Mag Gradient & VLF-EM Survey- Far Lake, ON,Report-Rev:1.pdf")

*Operations Report for White Metal Resources
Horizontal Magnetic Gradient, Matrix VLF-EM & Resistivity Airborne Survey, Far Lake, Thunder Bay, ON*

AZIMUTH : AZIMUTH (flight line direction, 0 - 360 deg)
NAA_RES_005M : Resistivity (model inversion) - depth=5 metres (ohm-m)
NAA_RES_010M : Resistivity (model inversion) - depth=10 metres (ohm-m)
NAA_RES_025M : Resistivity (model inversion) - depth=25 metres (ohm-m)
NAA_RES_040M : Resistivity (model inversion) - depth=40 metres (ohm-m)
NAA_RES_060M : Resistivity (model inversion) - depth=60 metres (ohm-m)
NAA_RES_100M : Resistivity (model inversion) - depth=100 metres (ohm-m)
NAA_RES_005M_FNL : Final resistivity - depth=5 metres (ohm-m)
NAA_RES_010M_FNL : Final resistivity - depth=10 metres (ohm-m)
NAA_RES_025M_FNL : Final resistivity - depth=25 metres (ohm-m)
NAA_RES_040M_FNL : Final resistivity - depth=40 metres (ohm-m)
NAA_RES_060M_FNL : Final resistivity - depth=60 metres (ohm-m)
NAA_RES_100M_FNL : Final resistivity - depth=100 metres (ohm-m)

Database Contents: "B501_VLFINVERSION_xxx.gdb"

Model Inversion (XYZ) data archive: separate databases for NAA and NML.

Data organised using the following database line structure:

DVLFINV_xxx : "Random" concatenated XYZ data into single line
Lxxx_005 : "Line" containing on DEPTH=5m XYZ points
Lxxx_010 : "Line" containing on DEPTH=10m XYZ points
Lxxx_025 : "Line" containing on DEPTH=25m XYZ points
Lxxx_040 : "Line" containing on DEPTH=40m XYZ points
Lxxx_060 : "Line" containing on DEPTH=60m XYZ points
Lxxx_100 : "Line" containing on DEPTH=100m XYZ points

... where "xxx" is "NAA" or "NML"

Note: the "Line" data can be used to generate 3D data grids of resistivity

Database channels :

X_UTM : UTM Easting - WGS84, UTM Zone 15N (metres)
Y_UTM : UTM Easting - WGS84, UTM Zone 15N (metres)
RES_005M : Resistivity (model inversion) - depth=5 metres (ohm-m)
RES_010M : Resistivity (model inversion) - depth=10 metres (ohm-m)
RES_025M : Resistivity (model inversion) - depth=25 metres (ohm-m)
RES_040M : Resistivity (model inversion) - depth=40 metres (ohm-m)
RES_060M : Resistivity (model inversion) - depth=60 metres (ohm-m)
RES_100M : Resistivity (model inversion) - depth=100 metres (ohm-m)
RES : Final resistivity for specific depth in "Line" data - used for 3D gridding
DEPTH : Depth in "Line" data - used as "z" channel in 3D gridding
NAA_RES_005M_FNL : Final resistivity - depth=5 metres (ohm-m)
NAA_RES_010M_FNL : Final resistivity - depth=10 metres (ohm-m)
NAA_RES_025M_FNL : Final resistivity - depth=25 metres (ohm-m)
NAA_RES_040M_FNL : Final resistivity - depth=40 metres (ohm-m)
NAA_RES_060M_FNL : Final resistivity - depth=60 metres (ohm-m)
NAA_RES_100M_FNL : Final resistivity - depth=100 metres (ohm-m)

3. GRIDS

Grids prepared using Bi-Directional (Akima) spline with a 25m grid cell size

NAA_RES_005M_FNL.grd : final resistivity depth slice (5 metres) : Station NAA
NAA_RES_010M_FNL.grd : final resistivity depth slice (10 metres) : Station NAA
NAA_RES_025M_FNL.grd : final resistivity depth slice (25 metres) : Station NAA
NAA_RES_040M_FNL.grd : final resistivity depth slice (40 metres) : Station NAA
NAA_RES_060M_FNL.grd : final resistivity depth slice (60 metres) : Station NAA
NAA_RES_100M_FNL.grd : final resistivity depth slice (100 metres) : Station NAA
NML_RES_005M_FNL.grd : final resistivity depth slice (5 metres) : Station NML
NML_RES_010M_FNL.grd : final resistivity depth slice (10 metres) : Station NML
NML_RES_025M_FNL.grd : final resistivity depth slice (25 metres) : Station NML
NML_RES_040M_FNL.grd : final resistivity depth slice (40 metres) : Station NML
NML_RES_060M_FNL.grd : final resistivity depth slice (60 metres) : Station NML

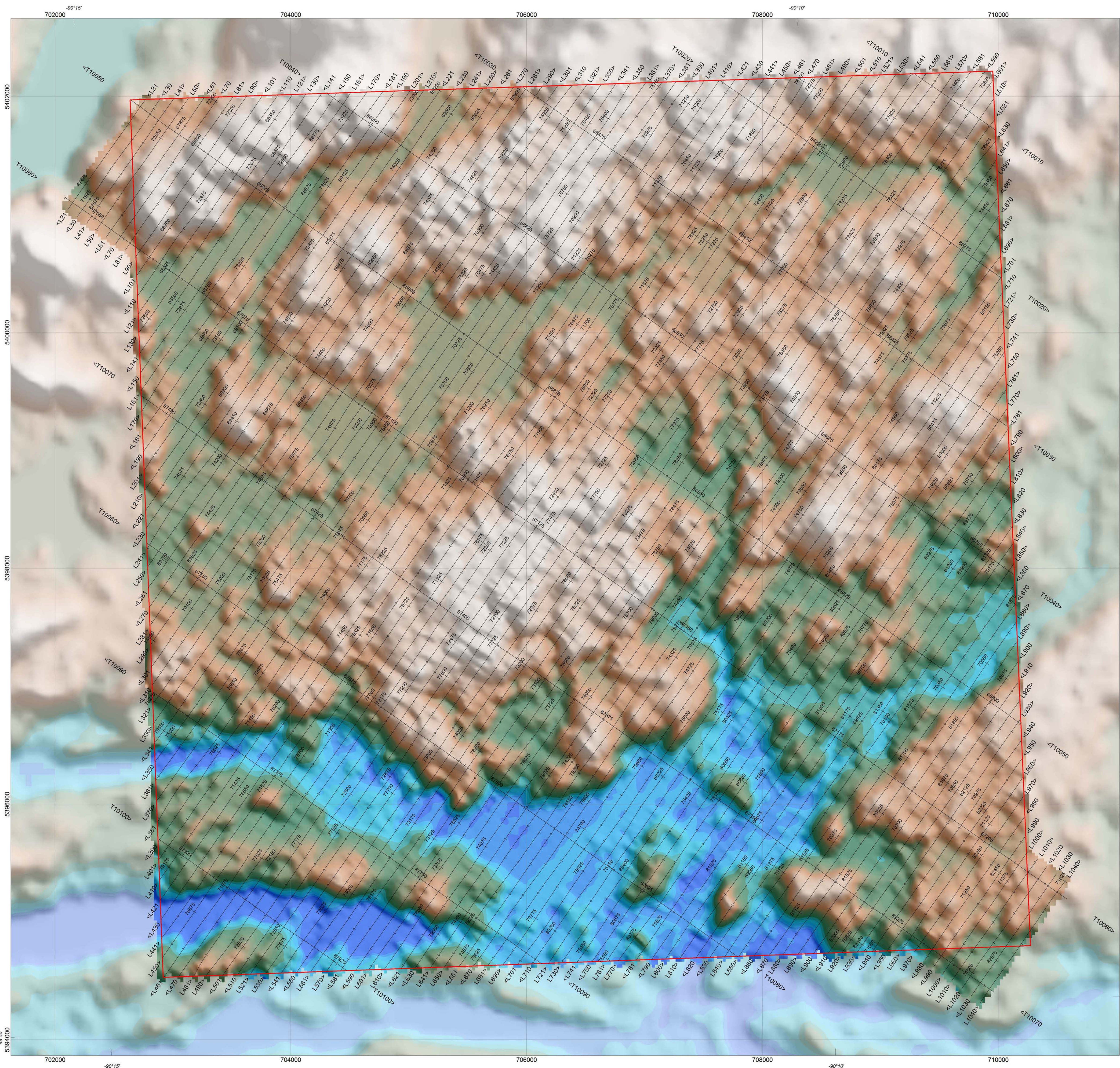
*Operations Report for White Metal Resources
Horizontal Magnetic Gradient, Matrix VLF-EM & Resistivity Airborne Survey, Far Lake, Thunder Bay, ON*

3D grids :

NAA_RES_25.geosoft_voxel : Geosoft 3D Voxel resistivity grid; cell size = 25 m

5. README

Archive documentation: this file (B501ARC_FAR_LAKE_VLF_INTERP.ReadMe)



SURVEY SPECIFICATIONS:
 Survey Flown: Feb - 13th February, 2020
 Survey Type: Airborne Horizontal Magnetic Gradient
 Survey Base: Thunder Bay, ON
 Survey Line Azimuth: 035°21'15"
 Control Line Azimuth: 125°30'5"
 Survey Line Spacing: 100 metres
 Control Line Spacing: 1000 metres
 Aircraft Mean Terrain Clearance: 100 metres
 Mean Ground Air Speed: 63.1 metres/sec

AIRCRAFT SPECIFICATIONS:
 Aircraft Type: Cessna U206
 Aircraft Registration: C-GGLS

AIRBORNE INSTRUMENTATION:
 Data Acquisition: RMS Instruments DAARC 500
 GPS Differential Receiver: Hemisphere R320
 GPS Real Time Differential Correction: WAAS
 Radar Altimeter: King KRA-10A
 Fluxgate Magnetometer: Billingsley Magnetics WIFM100G2-1F
 Navigation: AgNav Gula P151 (LinAv)

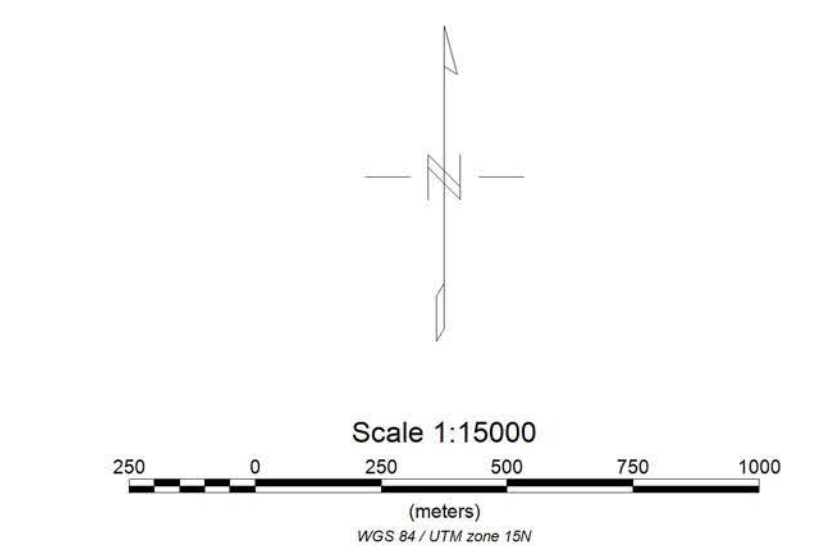
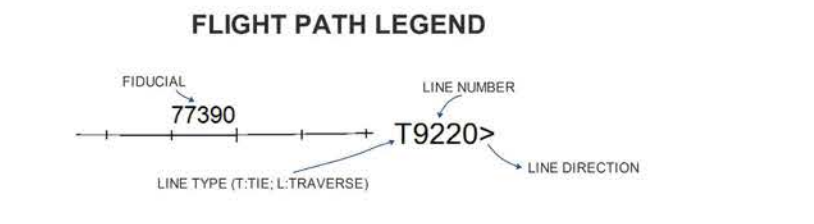
AIRBORNE MAGNETOMETERS (3):
 Installation: Wing Tips, Tail
 Magnetometers (Wing Tips): Scintrex CS-3 Cesium Vapour
 Magnetometers (Tail): Scintrex CS-L Cesium Vapour
 Magnetometer Sensitivity: +/- 0.005 nT
 Magnetometer Counter: RMS Instruments DAARC500 (Real Time Compensated)
 Wing Tip Separation: 13.2 m
 Wing Centre to Tail Magnetometer: 8.9 m
 Sampling Rate: 10 Hz

VLF-EM:
 Receiver: Magenta Inc. Matrix Plus
 VLF Transmitter stations monitored: NAA-Custer, ME - 24.0 kHz
 NML-LaMoure, ND - 25.2 kHz
 NLK-Jim Creek, WA - 24.8 kHz
 Sampling Rate: 10 Hz

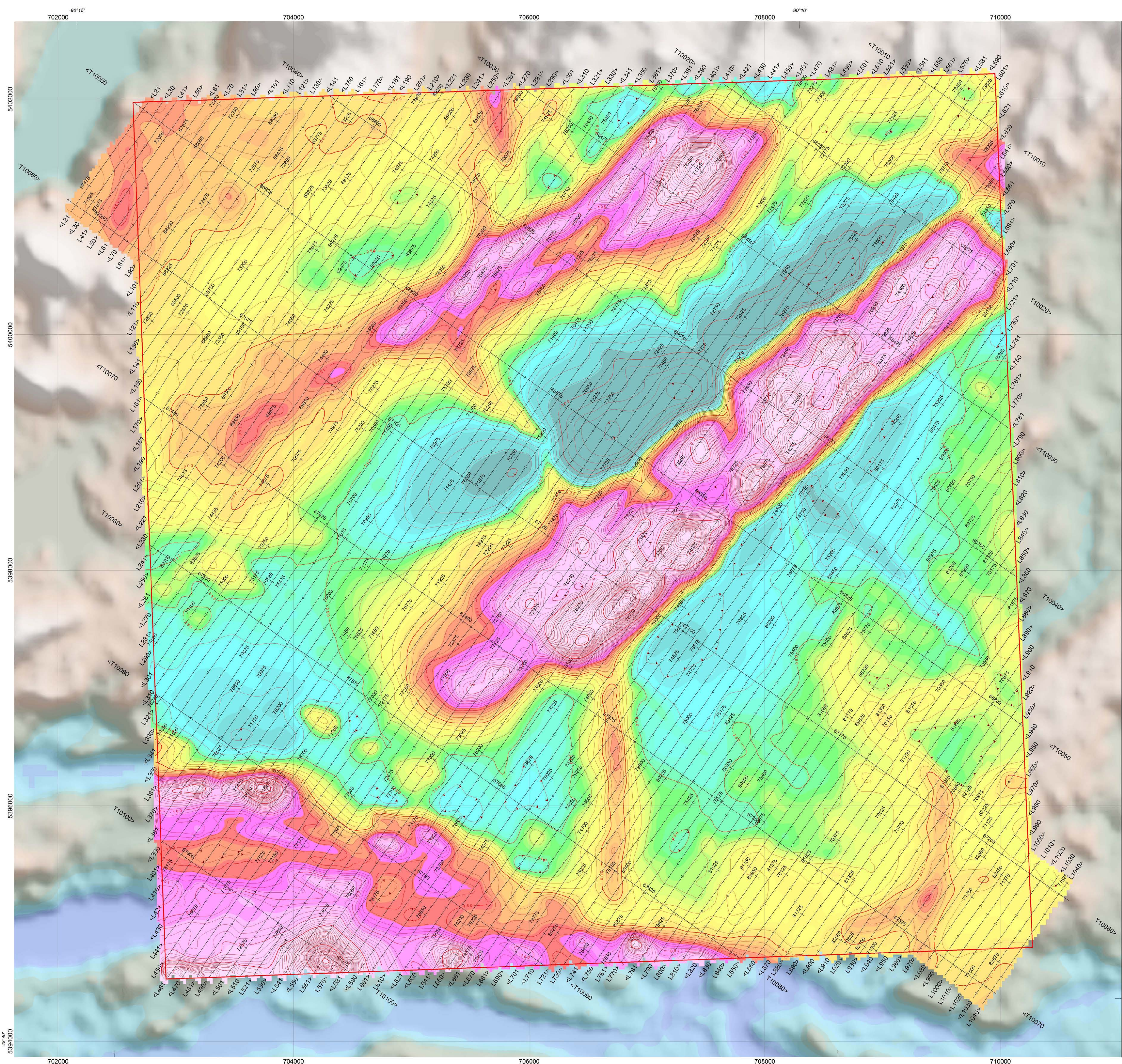
GROUND INSTRUMENTATION
 Data Acquisition: Kroum VS Instruments SDAS V2
 Base GPS Receiver: Garmin GPS18
 Ground Magnetometer: Scintrex CS-3 Cesium Vapour
 Base Station Location: Thunder Bay, ON

PROCESSING SUMMARY:
Magnetics:
 Real Time Compensation
 Lag Correction
 Diurnal Correction (Tie lines only)
 Tie Line Levelling
 Micro-levelling

VLFEM (AMPLITUDE):
 Noise Reduction
 Median Levelling
 Micro-levelling



WHITE METAL RESOURCES
 HORIZONTAL MAGNETIC GRADIENT SURVEY WITH VLF
 Far Lake Property, Thunder Bay, ON
 FLIGHT PATH WITH DTM
 Ref: B501-M01/AD



SURVEY SPECIFICATIONS:
 Survey Flown: Feb - 13th February, 2020
 Survey Type: Airborne Horizontal Magnetic
 Gradient
 Survey Base: Thunder Bay, ON
 Survey Line Azimuth: 035°21'15"
 Control Line Azimuth: 125°30'5"
 Survey Line Spacing: 100 metres
 Control Line Spacing: 1000 metres
 Aircraft Mean Terrain Clearance: 100 metres
 Mean Ground Air Speed: 63.1 metres/sec

AIRCRAFT SPECIFICATIONS:
 Aircraft Type: Cessna U206
 Aircraft Registration: C-GGLS

AIRBORNE INSTRUMENTATION:
 Data Acquisition: RMS Instruments DAARC 500
 GPS Differential Receiver: Hemisphere R320
 GPS Real Time Differential Correction: WAAS
 Radar Altimeter: King KRA-10A
 Fluxgate Magnetometer: Billingsley Magnetics WIFM100G2-1F
 Navigation: AgNav Gula P151 (LInav)

AIRBORNE MAGNETOMETERS (3):
 Installation: Wing Tips, Tail
 Magnetometers (Wing Tips): Scintrex CS-3 Cesium Vapour
 Magnetometers (Tail): Scintrex CS-L Cesium Vapour
 Magnetometer Sensitivity: +/- 0.005 nT
 Magnetometer Counter: RMS Instruments DAARC500 (Real Time Compensated)
 Wing Tip Separation: 13.2 m
 Wing Centre to Tail Magnetometer: 8.9 m
 Sampling Rate: 10 Hz

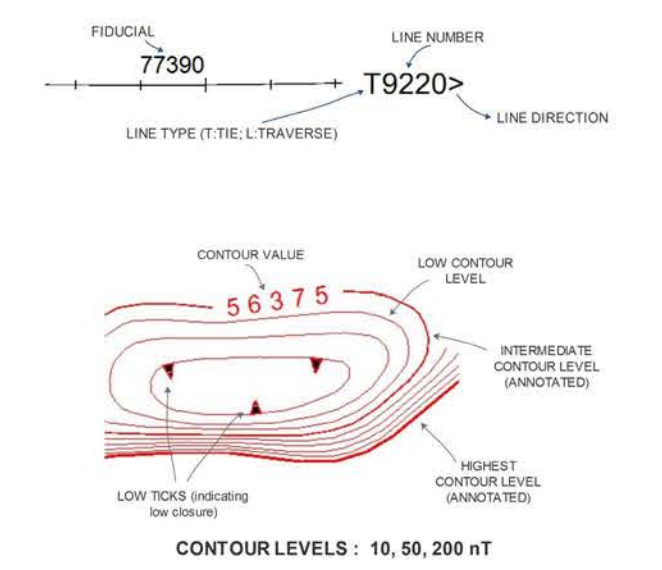
VLF-EM:
 Receiver: Magenta Inc. Matrix Plus
 VLF Transmitter stations monitored:
 NAA-Custer, ME - 24.0 kHz
 NML-LaMoore, ND - 25.2 kHz
 NLK-Jim Creek, WA - 24.8 kHz
 Sampling Rate: 10 Hz

GROUND INSTRUMENTATION
 Data Acquisition: Kroum VS Instruments SDAS V2
 Base GPS Receiver: Garmin GPS18
 Ground Magnetometer: Scintrex CS-3 Cesium Vapour
 Base Station Location: Thunder Bay, ON

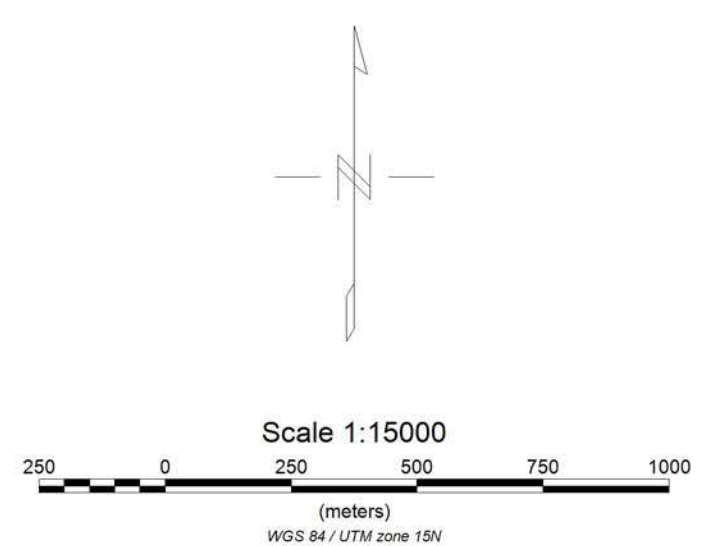
PROCESSING SUMMARY:
Magnetics:
 Real Time Compensation
 Lag Correction
 Diurnal Correction (Tie lines only)
 Tie Line Levelling
 Micro-levelling

VLF/EM (AMPLITUDE):
 Noise Reduction
 Median Levelling
 Micro-levelling

FLIGHT PATH LEGEND

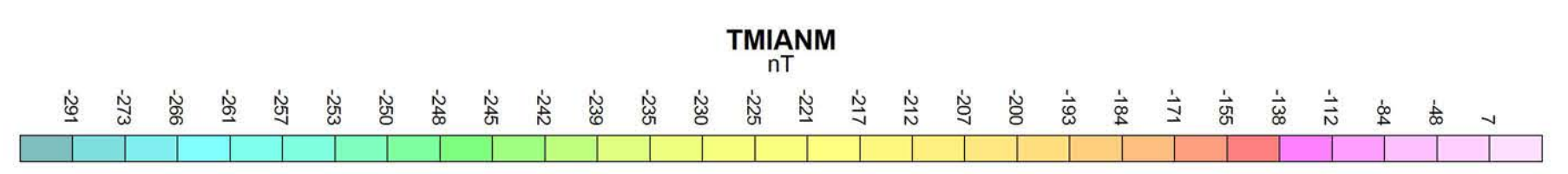


The IGRF field was determined using 2020 field coefficients with a calculation date of 12 February, 2020 and an average altitude of 584 metres above sea-level.

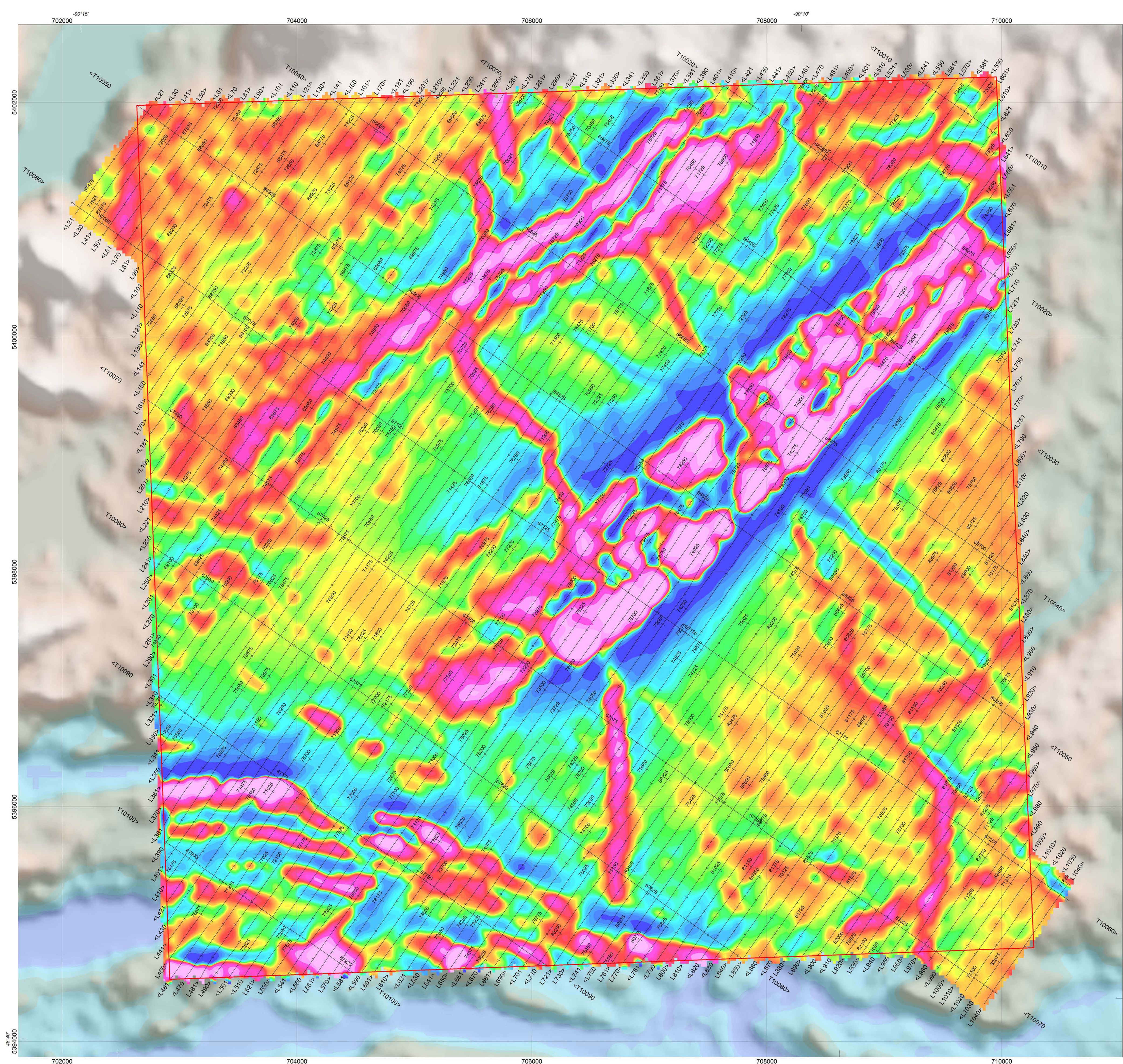


WHITE METAL RESOURCES
 HORIZONTAL MAGNETIC GRADIENT SURVEY WITH VLF
 Far Lake Property, Thunder Bay, ON
 ANOMALOUS (IGRF CORRECTED) TOTAL FIELD

TERRAQUEST Ref: B501-M03/AD



TMIANM
nT



SURVEY SPECIFICATIONS:
 Survey Flown: Feb - 13th February, 2020
 Survey Type: Airborne Horizontal Magnetic
 Gradient
 Survey Base: Thunder Bay, ON
 Survey Line Azimuth: 035°21'15"
 Control Line Azimuth: 125°30'5"
 Survey Line Spacing: 100 metres
 Control Line Spacing: 1000 metres
 Aircraft Mean Terrain Clearance: 100 metres
 Mean Ground Air Speed: 63.1 metres/sec

AIRCRAFT SPECIFICATIONS:
 Aircraft Type: Cessna U206
 Aircraft Registration: C-GGLS

AIRBORNE INSTRUMENTATION:
 Data Acquisition: RMS Instruments DAARC 500
 GPS Differential Receiver: Hemisphere R320
 GPS Real Time Differential Correction: WAAS
 Radar Altimeter: King KRA-10A
 Fluxgate Magnetometer: Billingsley Magnetics WFM100G2-1F
 Navigation: AgNav Gula P151 (LinAv)

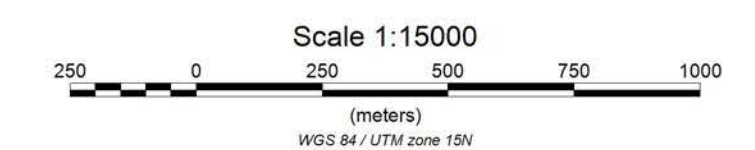
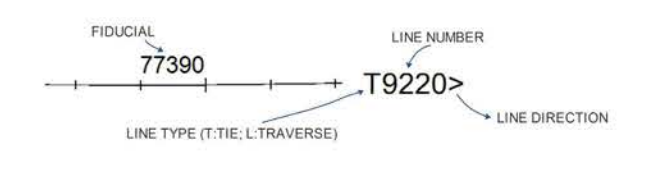
AIRBORNE MAGNETOMETERS (3):
 Installation: Wing Tips, Tail
 Magnetometers (Wing Tips): Scintrex CS-3 Cesium Vapour
 Magnetometers (Tail): Scintrex CS-L Cesium Vapour
 Magnetometer Sensitivity: +/- 0.005 nT
 Magnetometer Counter: RMS Instruments DAARC500 (Real Time Compensated)
 Wing Tip Separation: 13.2 m
 Wing Centre to Tail Magnetometer: 8.9 m
 Sampling Rate: 10 Hz

VLF-EM:
 Receiver: Magenta Inc. Matrix Plus
 VLF Transmitter stations monitored:
 NAA-Cutter, ME - 24.0 kHz
 NML-LaMoire, ND - 25.2 kHz
 NLK-Jim Creek, WA - 24.8 kHz
 Sampling Rate: 10 Hz

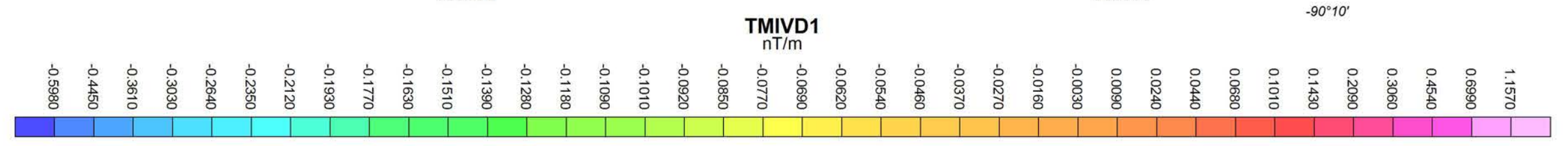
GROUND INSTRUMENTATION
 Data Acquisition: Kroum VS Instruments SDAS V2
 Base GPS Receiver: Garmin GPS18
 Ground Magnetometer: Scintrex CS-3 Cesium Vapour
 Base Station Location: Thunder Bay, ON

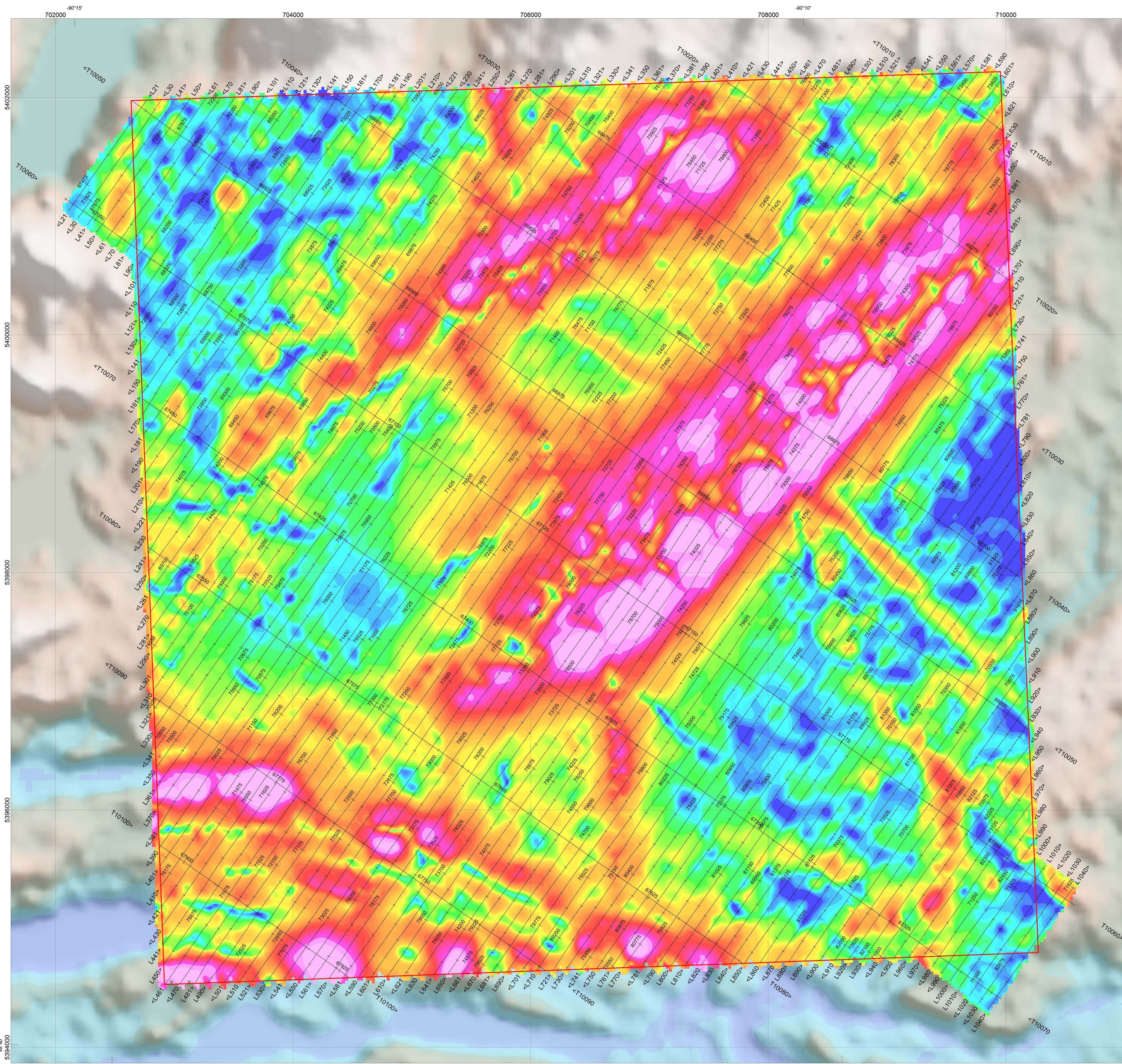
PROCESSING SUMMARY:
Magnetics:
 Real Time Compensation
 Lag Correction
 Diurnal Correction (Tie lines only)
 Tie Line Levelling
 Micro-levelling
VLF/EM (AMPLITUDE):
 Noise Reduction
 Median Levelling
 Micro-levelling

FLIGHT PATH LEGEND



WHITE METAL RESOURCES
 HORIZONTAL MAGNETIC GRADIENT SURVEY WITH VLF
 Far Lake Property, Thunder Bay, ON
 CALCULATED FIRST VERTICAL MAGNETIC DERIVATIVE
 TERRAQUEST Ref: B501-M04/AD





SURVEY SPECIFICATIONS:
 Survey Flown: Feb - 13th February, 2020
 Survey Type: Airborne Horizontal Magnetic
 Gradient
 Survey Base: Thunder Bay, ON
 Survey Line Azimuth: 035°/215°
 Control Line Azimuth: 125°/305°
 Survey Line Spacing: 100 metres
 Control Line Spacing: 1000 metres
 Aircraft Mean Terrain Clearance: 100 metres
 Mean Ground Air Speed: 63.1 metres/sec

AIRCRAFT SPECIFICATIONS:
 Aircraft Type: Cessna U206
 Aircraft Registration: C-GGLS

AIRBORNE INSTRUMENTATION:
 Data Acquisition: RMS Instruments DAARC 500
 GPS Differential Receiver: Hemisphere R320
 GPS Real Time Differential Correction: WAAS
 Radar Altimeter: King KRA-10A
 Fluxgate Magnetometer: Billingsley Magnetics WIFM100G2-1F
 Navigation: AgNav Gula P151 (LInav)

AIRBORNE MAGNETOMETERS (3):
 Installation: Wing Tips, Tail
 Magnetometers (Wing Tips): Scintrex CS-3 Cesium Vapour
 Magnetometers (Tail): Scintrex CS-L Cesium Vapour
 Magnetometer Sensitivity: +/- 0.005 nT
 Magnetometer Counter: RMS Instruments DAARC500 (Real Time Compensated)
 Wing Tip Separation: 13.2 m
 Wing Centre to Tail Magnetometer: 8.9 m
 Sampling Rate: 10 Hz

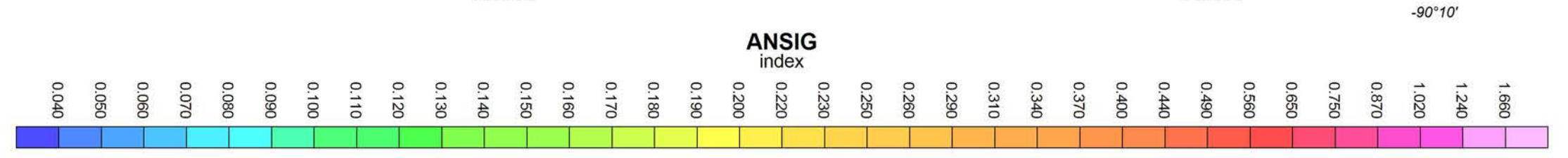
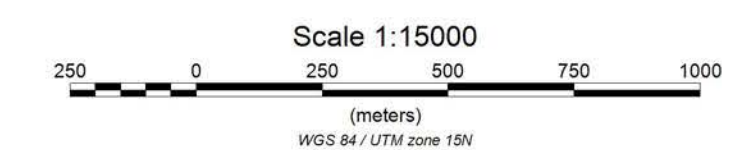
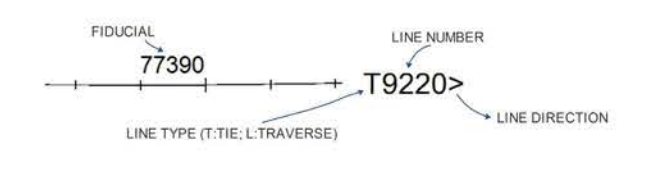
VLF-EM:
 Receiver: Magenta Inc. Matrix Plus
 VLF Transmitter stations monitored:
 NAA-Custer, ME - 24.0 kHz
 NML-LaMoure, ND - 25.2 kHz
 NLK-Jim Creek, WA - 24.8 kHz
 Sampling Rate: 10 Hz

GROUND INSTRUMENTATION
 Data Acquisition: Kroum VS Instruments SDAS V2
 Base GPS Receiver: Garmin GPS18
 Ground Magnetometer: Scintrex CS-3 Cesium Vapour
 Base Station Location: Thunder Bay, ON

PROCESSING SUMMARY:
Magnetics:
 Real Time Compensation
 Lag Correction
 Diurnal Correction (Tie lines only)
 Tie Line Levelling
 Micro-levelling

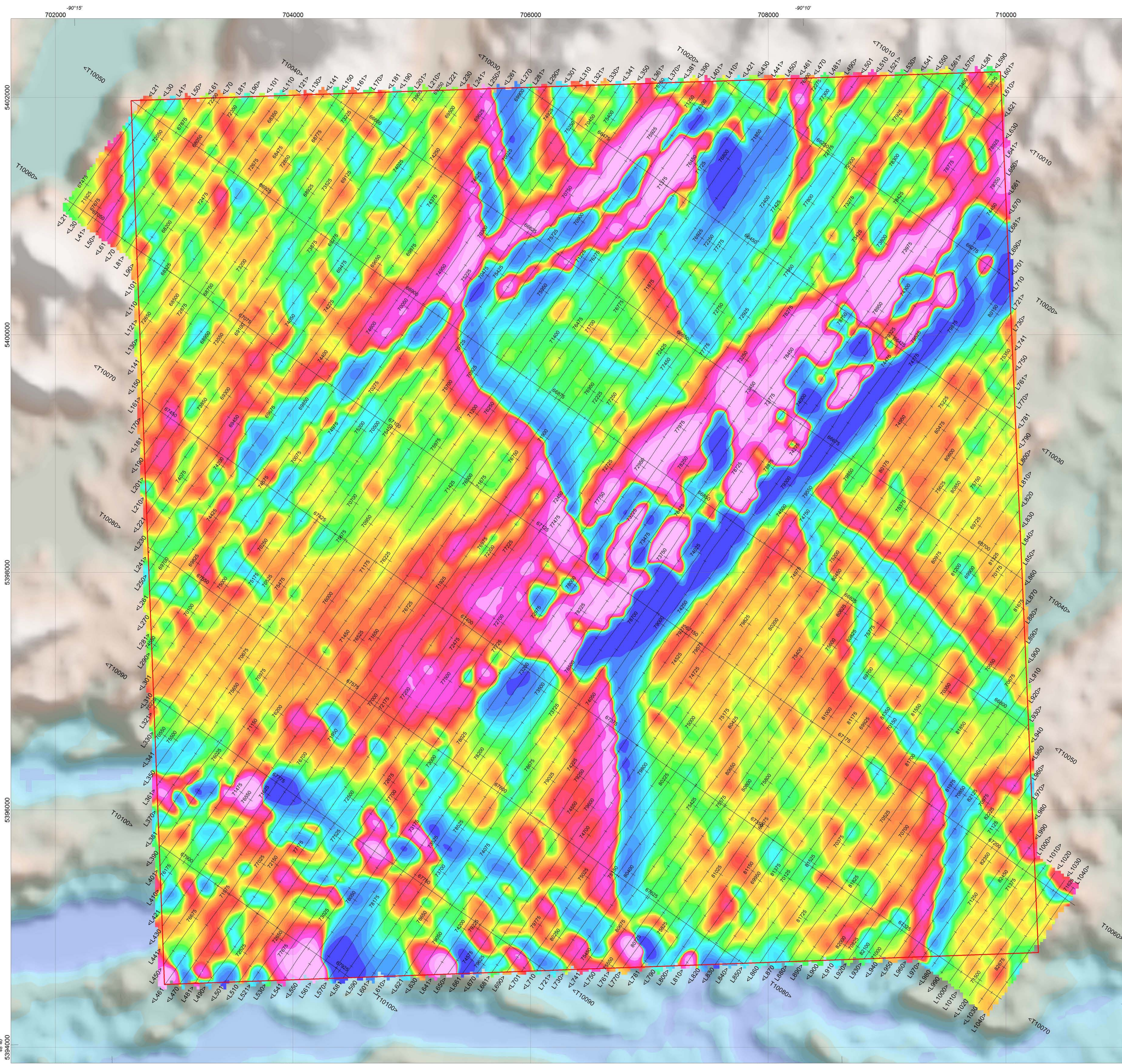
VLF/EM (AMPLITUDE):
 Noise Reduction
 Median Levelling
 Micro-levelling

FLIGHT PATH LEGEND



WHITE METAL RESOURCES
 HORIZONTAL MAGNETIC GRADIENT SURVEY WITH VLF
 Far Lake Property, Thunder Bay, ON
 ANALYTIC SIGNAL

TERRAQUEST Ref: B501-M05/AD



SURVEY SPECIFICATIONS:
 Survey Flown: Feb - 13th February, 2020
 Survey Type: Airborne Horizontal Magnetic
 Gradient
 Survey Base: Thunder Bay, ON
 Survey Line Azimuth: 035°21'15"
 Control Line Azimuth: 125°30'5"
 Survey Line Spacing: 100 metres
 Control Line Spacing: 1000 metres
 Aircraft Mean Terrain Clearance: 100 metres
 Mean Ground Air Speed: 63.1 metres/sec

AIRCRAFT SPECIFICATIONS:
 Aircraft Type: Cessna U206
 Aircraft Registration: C-GGLS

AIRBORNE INSTRUMENTATION:
 Data Acquisition: RMS Instruments DAARC 500
 GPS Differential Receiver: Hemisphere R320
 GPS Real Time Differential Correction: WAAS
 Radar Altimeter: King KRA-10A
 Fluxgate Magnetometer: Billingsley Magnetics WFM100G2-1F
 Navigation: AgNav Gula P151 (LinAv)

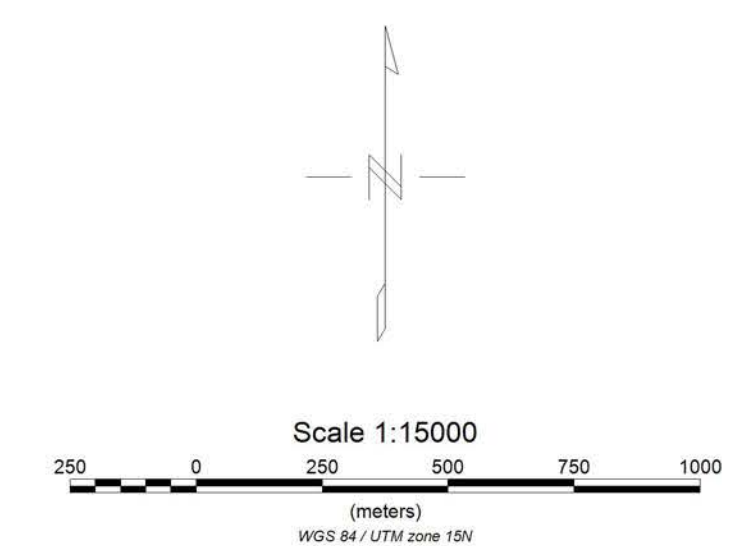
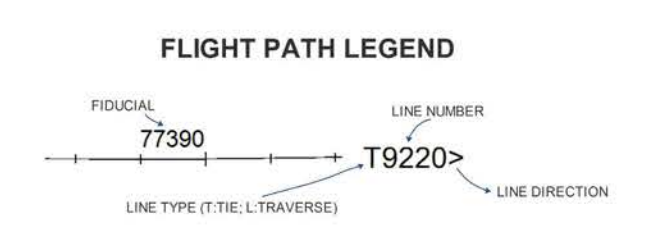
AIRBORNE MAGNETOMETERS (3):
 Installation: Wing Tips, Tail
 Magnetometers (Wing Tips): Scintrex CS-3 Cesium Vapour
 Magnetometers (Tail): Scintrex CS-L Cesium Vapour
 Magnetometer Sensitivity: +/- 0.005 nT
 Magnetometer Counter: RMS Instruments DAARC500 (Real Time Compensated)
 Wing Tip Separation: 13.2 m
 Wing Centre to Tail Magnetometer: 8.9 m
 Sampling Rate: 10 Hz

VLF-EM:
 Receiver: Magenta Inc. Matrix Plus
 VLF Transmitter stations monitored:
 NAA-Custer, ME - 24.0 kHz
 NML-LaMoore, ND - 25.2 kHz
 NLK-Jim Creek, WA - 24.8 kHz
 Sampling Rate: 10 Hz

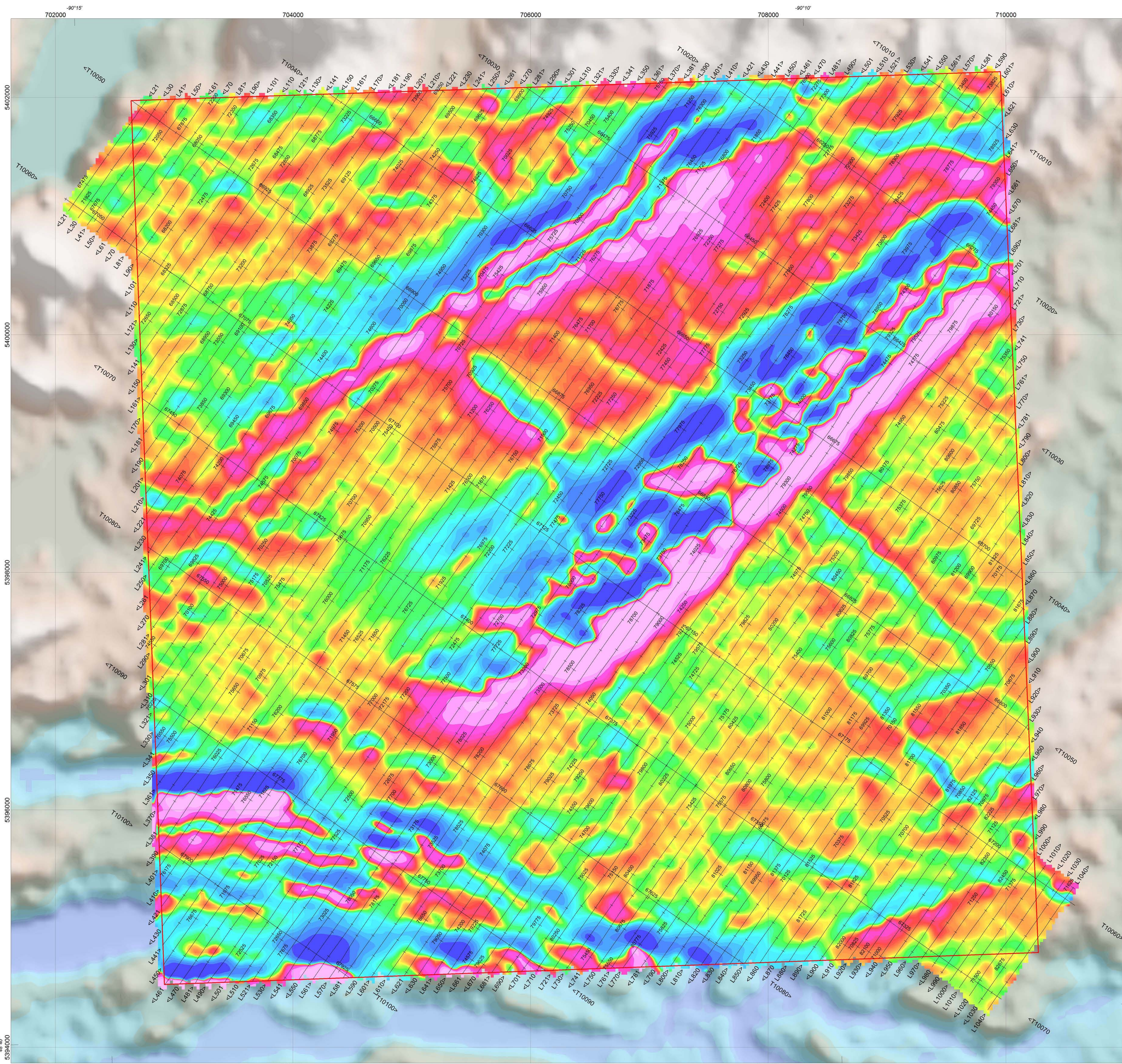
GROUND INSTRUMENTATION
 Data Acquisition: Kroum VS Instruments SDAS V2
 Base GPS Receiver: Garmin GPS18
 Ground Magnetometer: Scintrex CS-3 Cesium Vapour
 Base Station Location: Thunder Bay, ON

PROCESSING SUMMARY:
Magnetics:
 Real Time Compensation
 Lag Correction
 Diurnal Correction (Tie lines only)
 Tie Line Levelling
 Micro-levelling

VLF/EM (AMPLITUDE):
 Noise Reduction
 Median Levelling
 Micro-levelling



WHITE METAL RESOURCES
 HORIZONTAL MAGNETIC GRADIENT SURVEY WITH VLF
 Far Lake Property, Thunder Bay, ON
 MEASURED EAST-WEST GRADIENT
 Ref: B501-M06/AD



SURVEY SPECIFICATIONS:
 Survey Flown: Feb - 13th February, 2020
 Survey Type: Airborne Horizontal Magnetic Gradient
 Survey Base: Thunder Bay, ON
 Survey Line Azimuth: 035°21'15"
 Control Line Azimuth: 125°30'5"
 Survey Line Spacing: 100 metres
 Control Line Spacing: 1000 metres
 Aircraft Mean Terrain Clearance: 100 metres
 Mean Ground Air Speed: 63.1 metres/sec

AIRCRAFT SPECIFICATIONS:
 Aircraft Type: Cessna U206
 Aircraft Registration: C-GGLS

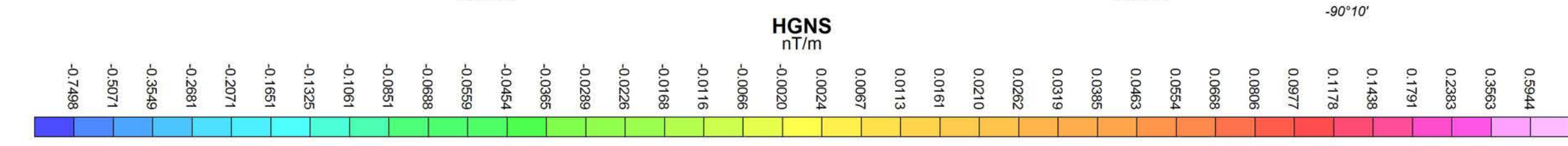
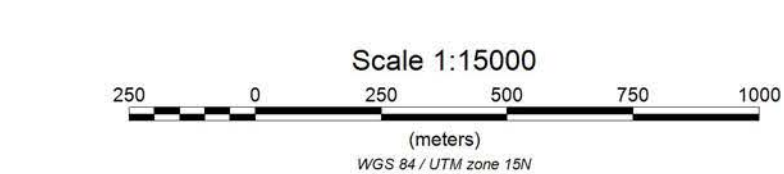
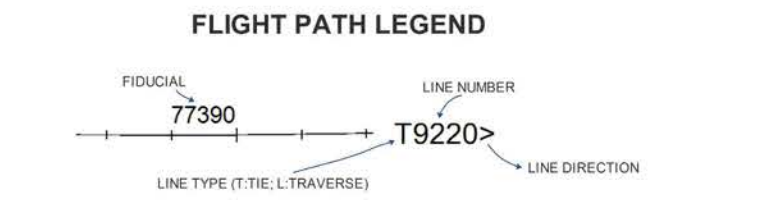
AIRBORNE INSTRUMENTATION:
 Data Acquisition: RMS Instruments DAARC 500
 GPS Differential Receiver: Hemisphere R320
 GPS Real Time Differential Correction: WAAS
 Radar Altimeter: King KRA-10A
 Fluxgate Magnetometer: Billingsley Magnetics WFM100G2-1F
 Navigation: AgNav Gula P151 (LinAv)

AIRBORNE MAGNETOMETERS (3):
 Installation: Wing Tips, Tail
 Magnetometers (Wing Tips): Scintrex CS-3 Cesium Vapour
 Magnetometers (Tail): Scintrex CS-L Cesium Vapour
 Magnetometer Sensitivity: +/- 0.005 nT
 Magnetometer Counter: RMS Instruments DAARC500 (Real Time Compensated)
 Wing Tip Separation: 13.2 m
 Wing Centre to Tail Magnetometer: 8.9 m
 Sampling Rate: 10 Hz

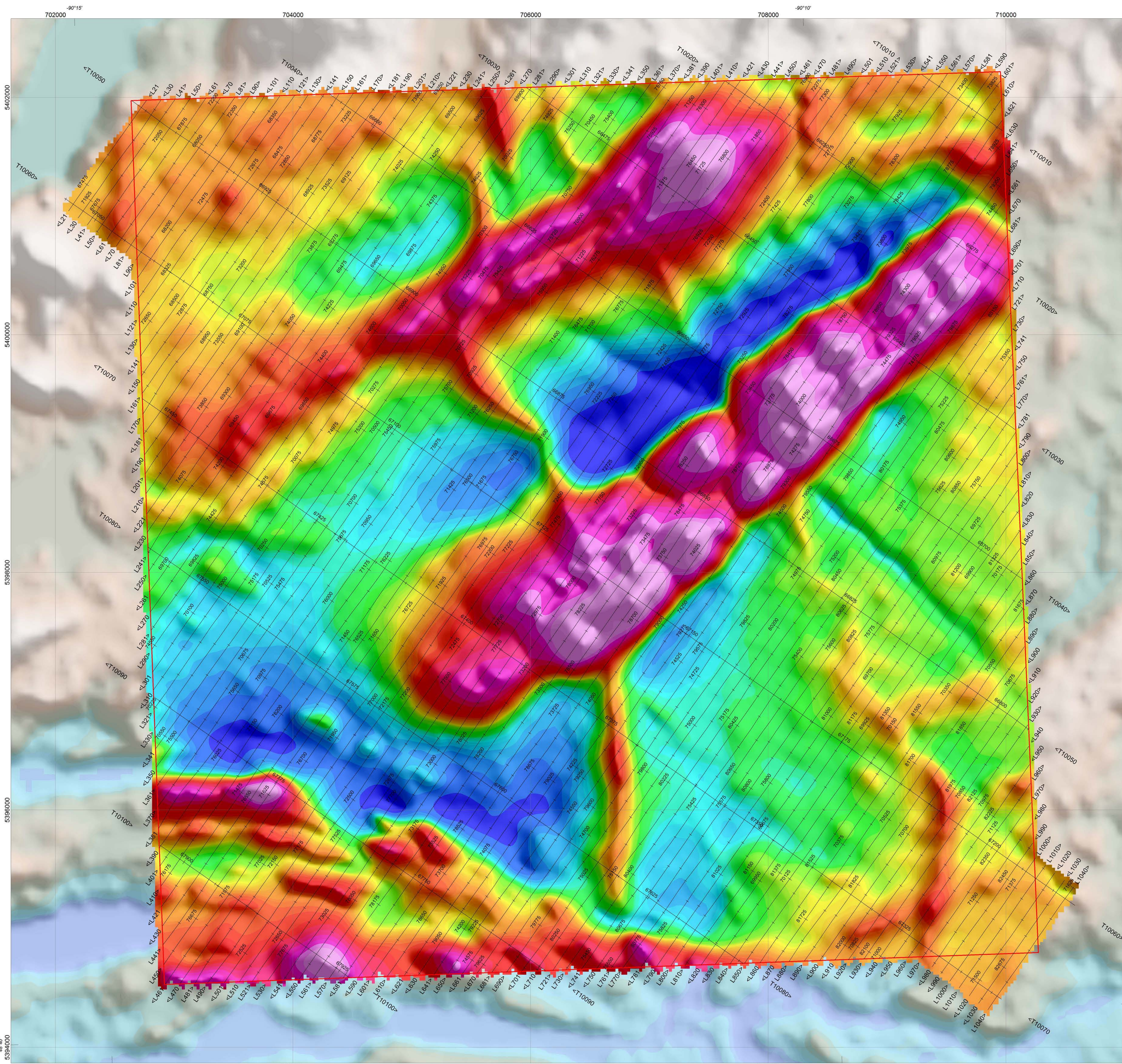
VLF-EM:
 Receiver: Magenta Inc. Matrix Plus
 VLF Transmitter stations monitored:
 NAA-Cutter, ME - 24.0 kHz
 NML-LaMoure, ND - 25.2 kHz
 NLK-Jim Creek, WA - 24.8 kHz
 Sampling Rate: 10 Hz

GROUND INSTRUMENTATION
 Data Acquisition: Kroum VS Instruments SDAS V2
 Base GPS Receiver: Garmin GPS18
 Ground Magnetometer: Scintrex CS-3 Cesium Vapour
 Base Station Location: Thunder Bay, ON

PROCESSING SUMMARY:
Magnetics:
 Real Time Compensation
 Lag Correction
 Diurnal Correction (Tie lines only)
 Tie Line Levelling
 Micro-levelling
VLFEM (AMPLITUDE):
 Noise Reduction
 Median Levelling
 Micro-levelling



WHITE METAL RESOURCES
 HORIZONTAL MAGNETIC GRADIENT SURVEY WITH VLF
 Far Lake Property, Thunder Bay, ON
 MEASURED NORTH-SOUTH MAGNETIC GRADIENT
 Ref: B501-M07/AD



SURVEY SPECIFICATIONS:
 Survey Flown: Feb - 13th February, 2020
 Survey Type: Airborne Horizontal Magnetic
 Gradient
 Survey Base: Thunder Bay, ON
 Survey Line Azimuth: 035°21'15"
 Control Line Azimuth: 125°30'5"
 Survey Line Spacing: 100 metres
 Control Line Spacing: 1000 metres
 Aircraft Mean Terrain Clearance: 100 metres
 Mean Ground Air Speed: 63.1 metres/sec

AIRCRAFT SPECIFICATIONS:
 Aircraft Type: Cessna U206
 Aircraft Registration: C-GGLS

AIRBORNE INSTRUMENTATION:
 Data Acquisition: RMS Instruments DAARC 500
 GPS Differential Receiver: Hemisphere R320
 GPS Real Time Differential Correction: WAAS
 Radar Altimeter: King KRA-10A
 Fluxgate Magnetometer: Billingsley Magnetics WIFM100G2-1F
 Navigation: AgNav Gula P151 (Linav)

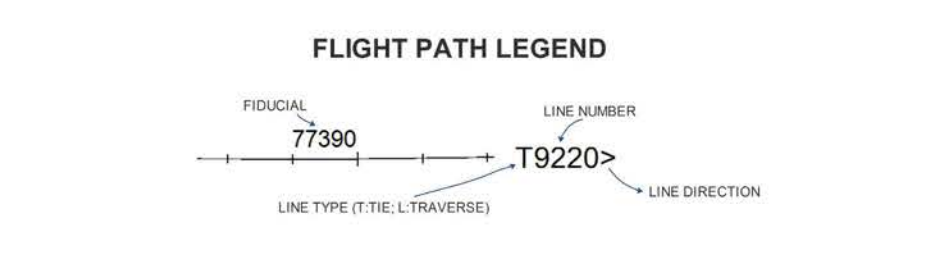
AIRBORNE MAGNETOMETERS (3):
 Installation: Wing Tips, Tail
 Magnetometers (Wing Tips): Scintrex CS-3 Cesium Vapour
 Magnetometers (Tail): Scintrex CS-L Cesium Vapour
 Magnetometer Sensitivity: +/- 0.005 nT
 Magnetometer Counter: RMS Instruments DAARC500 (Real Time Compensated)
 Wing Tip Separation: 13.2 m
 Wing Centre to Tail Magnetometer: 8.9 m
 Sampling Rate: 10 Hz

VLF-EM:
 Receiver: Magenta Inc. Matrix Plus
 VLF Transmitter stations monitored:
 NAA-Custer, ME - 24.0 kHz
 NML-LaMoore, ND - 25.2 kHz
 NLK-Jim Creek, WA - 24.8 kHz
 Sampling Rate: 10 Hz

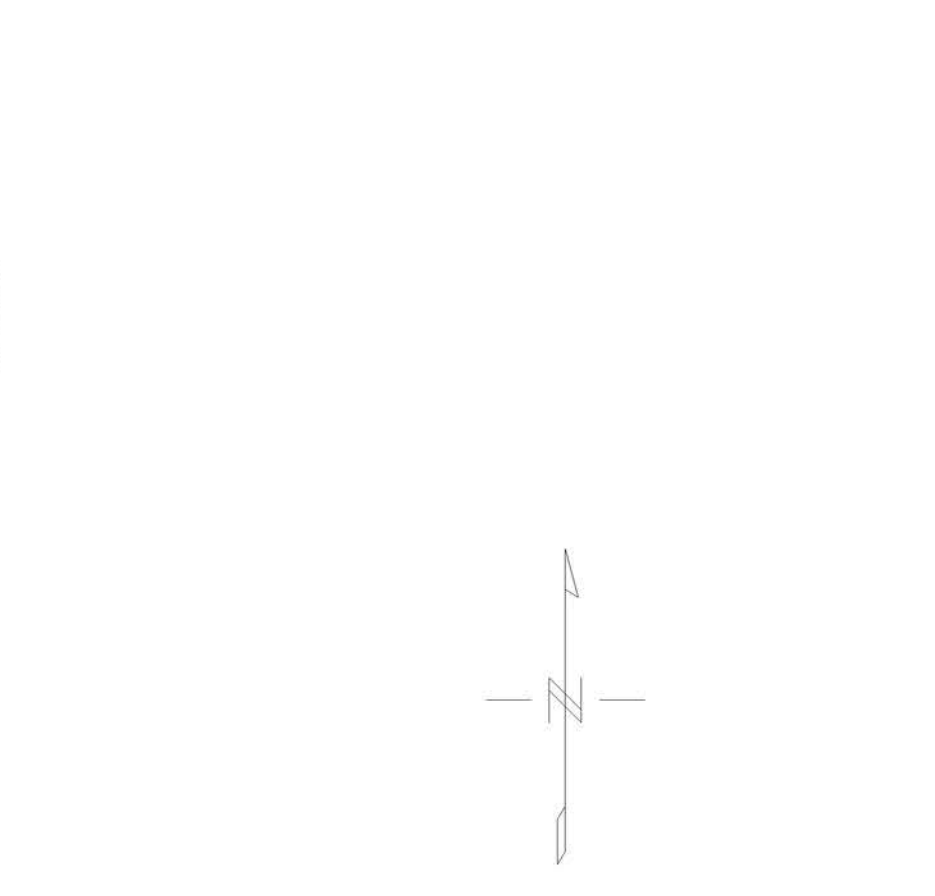
GROUND INSTRUMENTATION
 Data Acquisition: Kroum VS Instruments SDAS V2
 Base GPS Receiver: Garmin GPS18
 Ground Magnetometer: Scintrex CS-3 Cesium Vapour
 Base Station Location: Thunder Bay, ON

PROCESSING SUMMARY:
Magnetics:
 Real Time Compensation
 Lag Correction
 Diurnal Correction (Tie lines only)
 Tie Line Levelling
 Micro-levelling

VLFEM (AMPLITUDE):
 Noise Reduction
 Median Levelling
 Micro-levelling



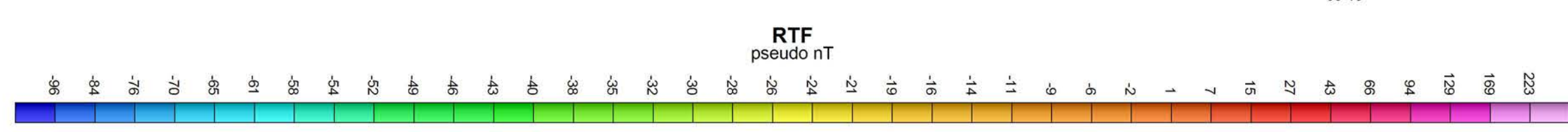
Reconstructed Total Magnetic Intensity was calculated from the measured horizontal gradient data using the method described in:
 Nelson, J.B., 1984, Levelling total-field aeromagnetic data with measured horizontal gradients: *Geophysics*, 59, 1166-1170

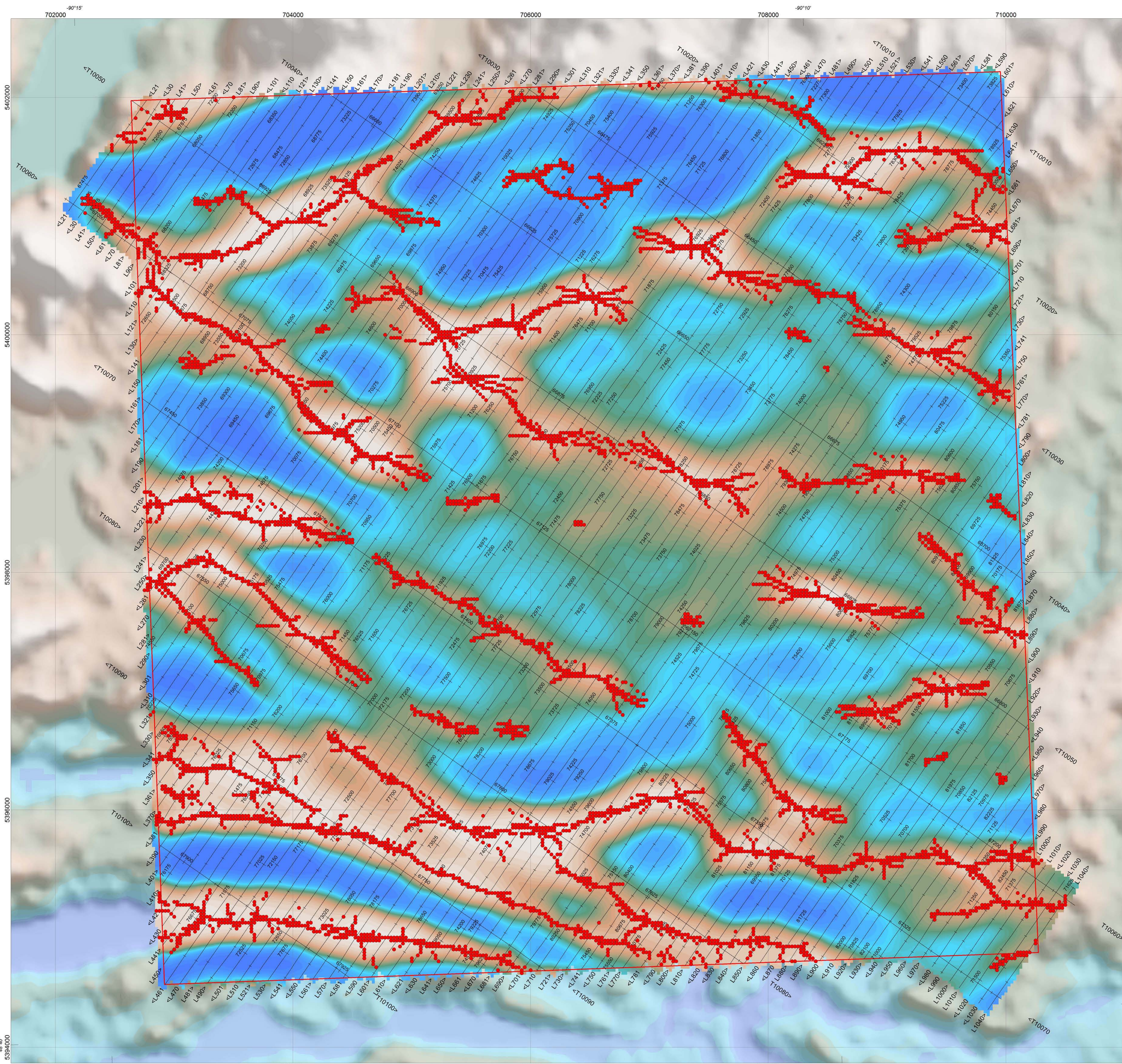


Scale 1:15000
 (meters)
 WGS 84 / UTM zone 18V



WHITE METAL RESOURCES
 HORIZONTAL MAGNETIC GRADIENT SURVEY WITH VLF
 Far Lake Property, Thunder Bay, ON
 RECONSTRUCTED TOTAL FIELD
 Ref: B501-M08/AD





SURVEY SPECIFICATIONS:
 Survey Flight: Feb - 13th February, 2020
 Survey Type: Airborne Horizontal Magnetic Gradient
 Survey Base: Thunder Bay, ON
 Survey Line Azimuth: 035°/215°
 Control Line Azimuth: 125°/305°
 Survey Line Spacing: 100 metres
 Control Line Spacing: 1000 metres
 Aircraft Mean Terrain Clearance: 100 metres
 Mean Ground Air Speed: 63.1 metres/sec

AIRCRAFT SPECIFICATIONS:
 Aircraft Type: Cessna U206
 Aircraft Registration: C-GGLS

AIRBORNE INSTRUMENTATION:
 Data Acquisition: RMS Instruments DAARC 500
 GPS Differential Receiver: Hemisphere R320
 GPS Real Time Differential Correction: WAAS
 Radar Altimeter: King KRA-10A
 Fluxgate Magnetometer: Billingsley Magnetics WIFM100G2-1F
 Navigation: AgNav Gula P151 (LInav)

AIRBORNE MAGNETOMETERS (3):
 Installation: Wing Tips, Tail
 Magnetometers (Wing Tips): Scintrex CS-3 Cesium Vapour
 Magnetometers (Tail): Scintrex CS-L Cesium Vapour
 Magnetometer Sensitivity: +/- 0.005 nT
 Magnetometer Counter: RMS Instruments DAARC500 (Real Time Compensated)
 Wing Tip Separation: 13.2 m
 Wing Centre to Tail Magnetometer: 8.9 m
 Sampling Rate: 10 Hz

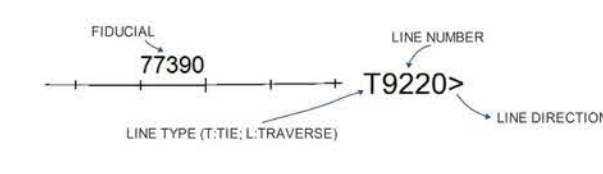
VLF-EM:
 Receiver: Magenta Inc. Matrix Plus
 VLF Transmitter stations monitored: NAA-Cutler, ME - 24.0 kHz
 NML-LaMoure, ND - 25.2 kHz
 NUK-Im Creek, WA - 24.8 kHz
 Sampling Rate: 10 Hz

GROUND INSTRUMENTATION
 Data Acquisition: Kroum VS Instruments SDAS V2
 Base GPS Receiver: Garmin GPS18
 Ground Magnetometer: Scintrex CS-3 Cesium Vapour
 Base Station Location: Thunder Bay, ON

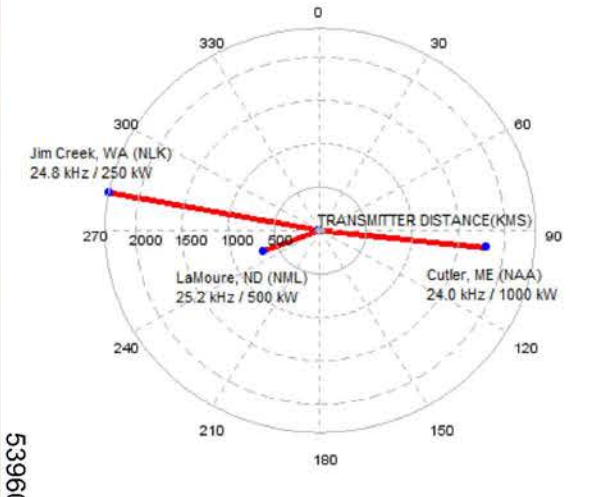
PROCESSING SUMMARY:
Magnetics:
 Real Time Compensation
 Lag Correction
 Diurnal Correction (Tie lines only)
 Tie Line Levelling
 Micro-levelling

VLF/EM (AMPLITUDE):
 Noise Reduction
 Median Levelling
 Micro-levelling

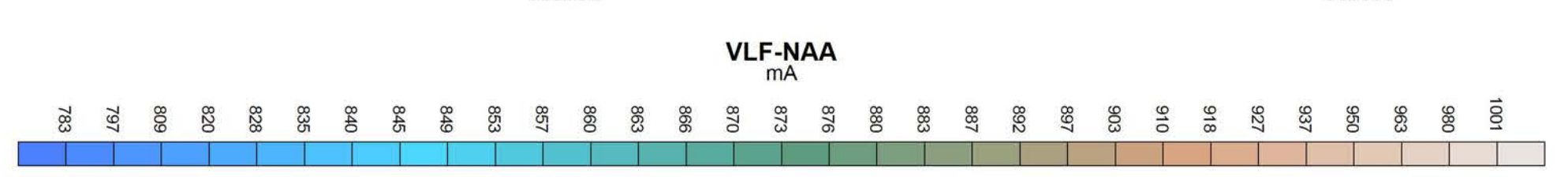
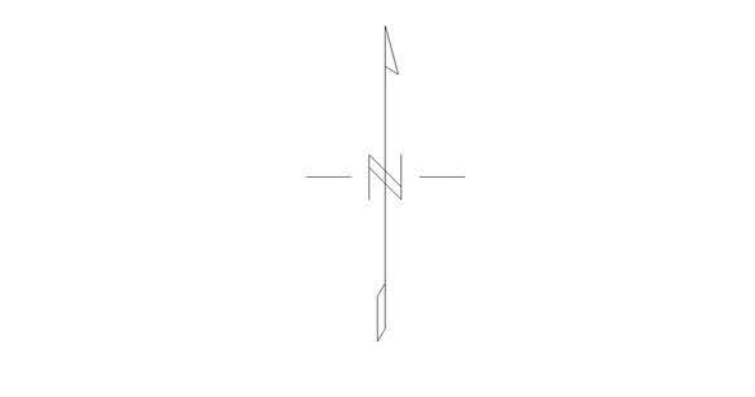
FLIGHT PATH LEGEND



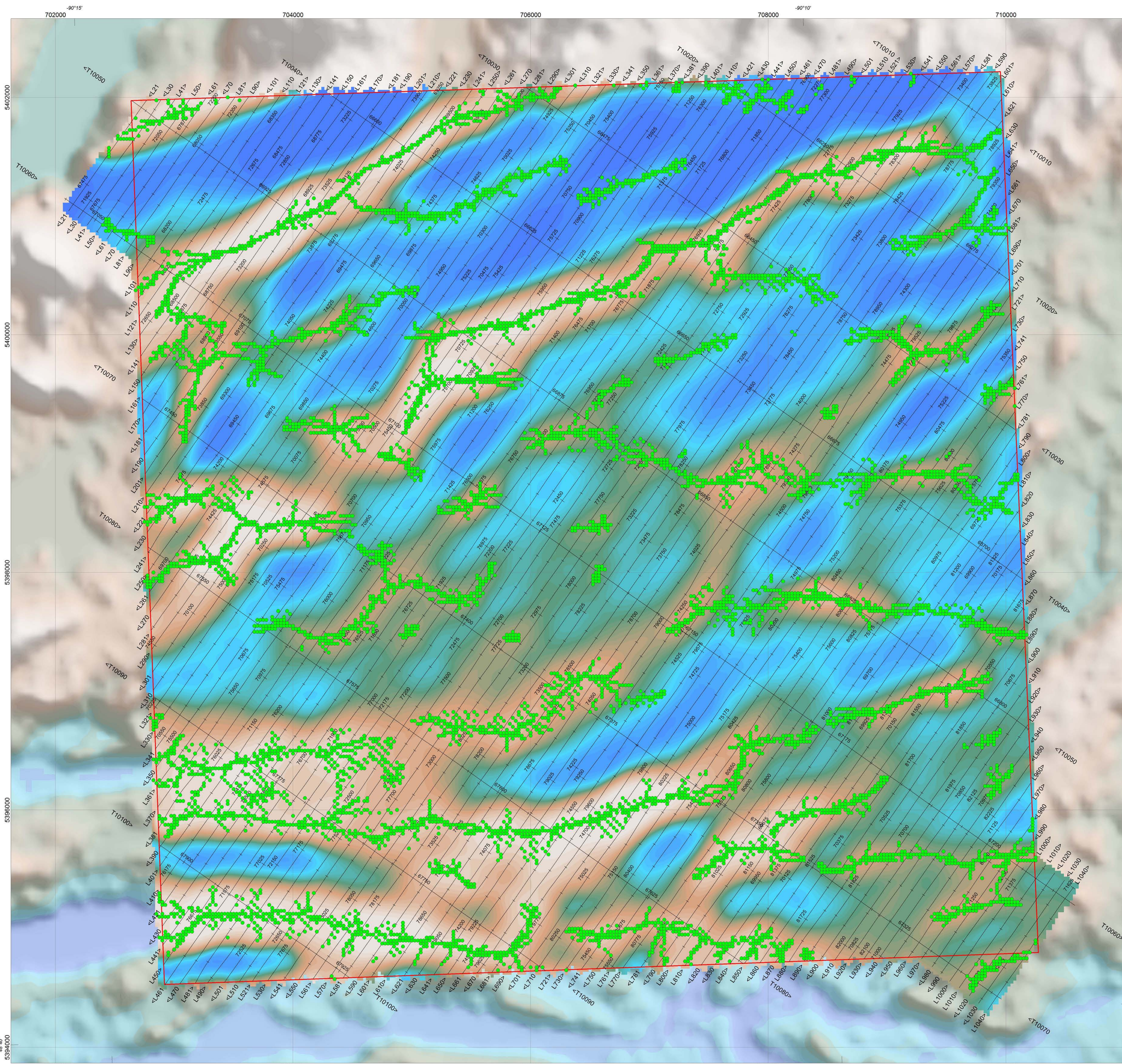
VLF STATION AZIMUTH



The VLF Amplitude image has grid peak location markers superimposed to emphasize conductor axes.
 Grid peak locations were identified using the Blakely peak detection algorithm operating on data grids generated from high pass filtered VLF amplitude data. The high pass cut-off was set at 30 feds (sec).



WHITE METAL RESOURCES
 HORIZONTAL MAGNETIC GRADIENT SURVEY WITH VLF
 Far Lake Property, Thunder Bay, ON
 VLF AMPLITUDE: STATION NAA (Cutler, ME)
 Ref: B501-M09/AD



SURVEY SPECIFICATIONS:
 Survey Flown: 7th - 13th February, 2020
 Survey Type: Airborne Horizontal Magnetic Gradient
 Survey Base: Thunder Bay, ON
 Survey Line Azimuth: 035°/215°
 Control Line Azimuth: 125°/305°
 Survey Line Spacing: 100 metres
 Control Line Spacing: 1000 metres
 Aircraft Mean Terrain Clearance: 100 metres
 Mean Ground Air Speed: 63.1 metres/sec

AIRCRAFT SPECIFICATIONS:
 Aircraft Type: Cessna U206
 Aircraft Registration: C-GGLS

AIRBORNE INSTRUMENTATION:
 Data Acquisition: RMS Instruments DAARC 500
 GPS Differential Receiver: Hemisphere R320
 GPS Real Time Differential Correction: WAAS
 Radar Altimeter: King KRA-10A
 Fluxgate Magnetometer: Billingsley Magnetics WFM100G2-1F
 Navigation: AgNav Gula P151 (LInav)

AIRBORNE MAGNETOMETERS (3):
 Installation: Wing Tips, Tail
 Magnetometers (Wing Tips): Scintrex CS-3 Cesium Vapour
 Magnetometers (Tail): Scintrex CS-L Cesium Vapour
 Magnetometer Sensitivity: +/- 0.005 nT
 Magnetometer Counter: RMS Instruments DAARC500 (Real Time Compensated)
 Wing Tip Separation: 13.2 m
 Wing Centre to Tail Magnetometer: 8.9 m
 Sampling Rate: 10 Hz

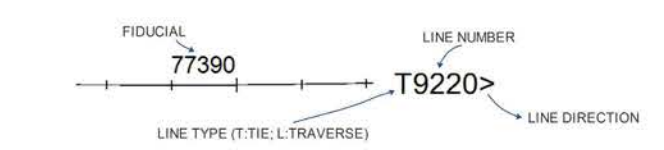
VLF-EM:
 Receiver: Magenta Inc. Matrix Plus
 VLF Transmitter stations monitored:
 NAA-Custer, ME - 24.0 kHz
 NML-LaMoire, ND - 25.2 kHz
 NUK-Am Creek, WA - 24.8 kHz
 Sampling Rate: 10 Hz

GROUND INSTRUMENTATION
 Data Acquisition: Kroum VS Instruments SDAS V2
 Base GPS Receiver: Garmin GPS18
 Ground Magnetometer: Scintrex CS-3 Cesium Vapour
 Base Station Location: Thunder Bay, ON

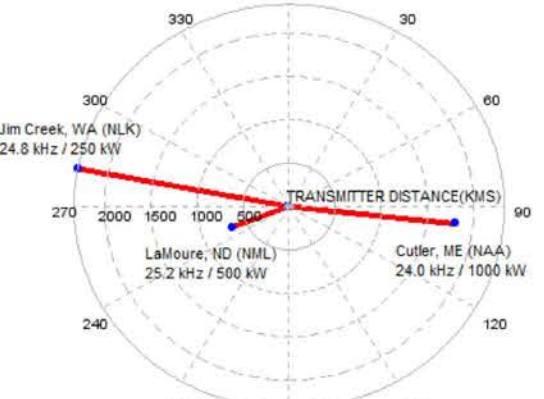
PROCESSING SUMMARY:
Magnetics:
 Real Time Compensation
 Lag Correction
 Diurnal Correction (Tie lines only)
 Tie Line Levelling
 Micro-levelling

VLF/EM (AMPLITUDE):
 Noise Reduction
 Median Levelling
 Micro-levelling

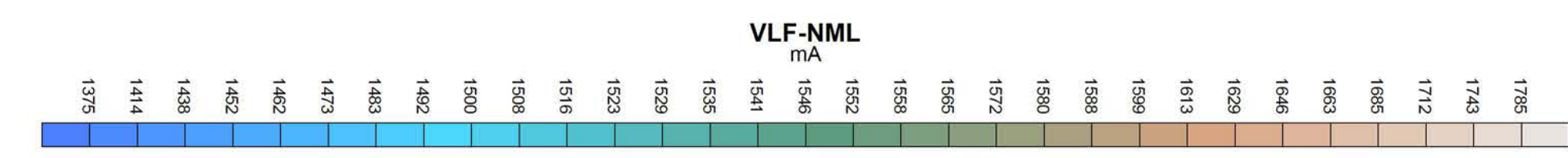
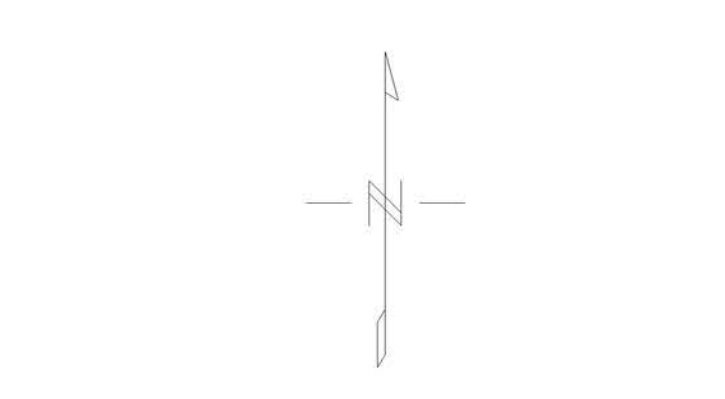
FLIGHT PATH LEGEND



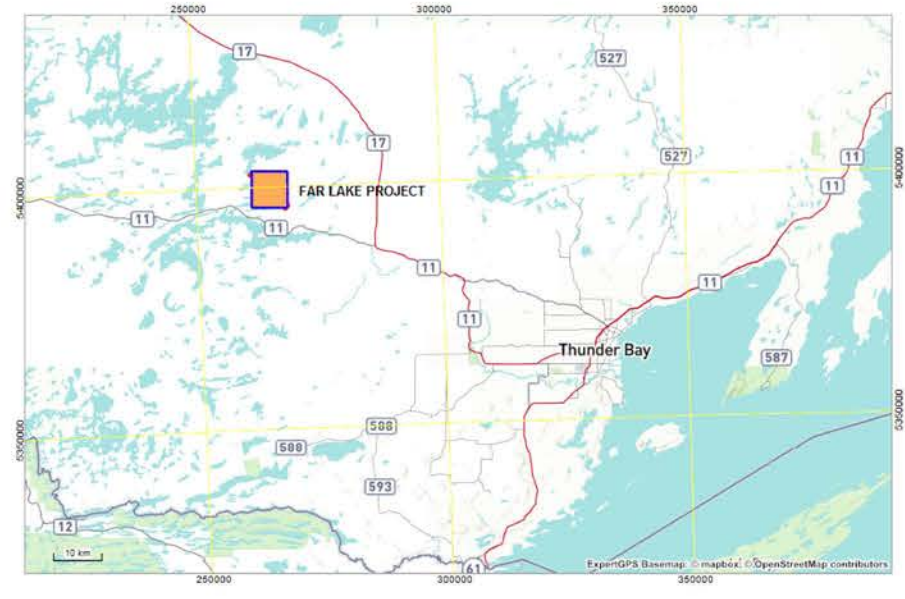
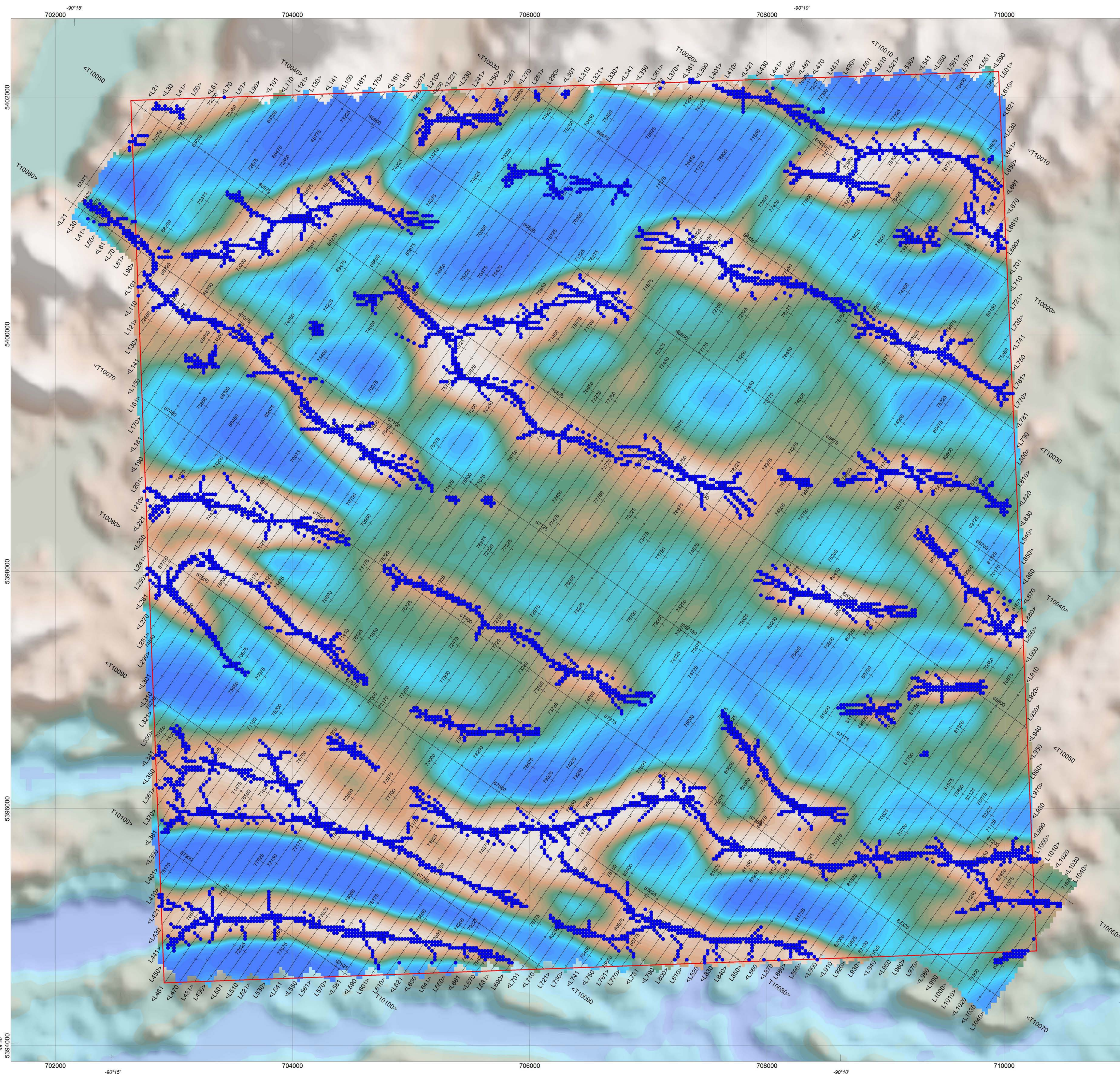
VLF STATION AZIMUTH



The VLF Amplitude image has grid peak location markers superimposed to emphasize conductor axes.
 Grid peak locations were identified using the Blakely peak detection algorithm operating on data grids generated from high pass filtered VLF amplitude data. The high pass cut-off was set at 30 feds (secs).



WHITE METAL RESOURCES
 HORIZONTAL MAGNETIC GRADIENT SURVEY WITH VLF
 Far Lake Property, Thunder Bay, ON
 VLF AMPLITUDE: STATION NML (LaMoire, ND)
 TERRAQUEST Ref: B501-M10/AD



SURVEY SPECIFICATIONS:
 Survey Flown: Feb - 13th February, 2020
 Survey Type: Airborne Horizontal Magnetic Gradient
 Survey Base: Thunder Bay, ON
 Survey Line Azimuth: 035°/215°
 Control Line Azimuth: 125°/305°
 Survey Line Spacing: 100 metres
 Control Line Spacing: 1000 metres
 Aircraft Mean Terrain Clearance: 100 metres
 Mean Ground Air Speed: 63.1 metres/sec

AIRCRAFT SPECIFICATIONS:
 Aircraft Type: Cessna U206
 Aircraft Registration: C-GGLS

AIRBORNE INSTRUMENTATION:
 Data Acquisition: RMS Instruments DAARC 500
 GPS Differential Receiver: Hemisphere R320
 GPS Real Time Differential Correction: WAAS
 Radar Altimeter: King KRA-10A
 Fluxgate Magnetometer: Billingsley Magnetics WIFM100G2-1F
 Navigation: AgNav Gula P151 (LNAV)

AIRBORNE MAGNETOMETERS (3):
 Installation: Wing Tips, Tail
 Magnetometers (Wing Tips): Scintrex CS-3 Cesium Vapour
 Magnetometers (Tail): Scintrex CS-L Cesium Vapour
 Magnetometer Sensitivity: +/- 0.005 nT
 Magnetometer Counter: RMS Instruments DAARC500 (Real Time Compensated)
 Wing Tip Separation: 13.2 m
 Wing Centre to Tail Magnetometer: 8.9 m
 Sampling Rate: 10 Hz

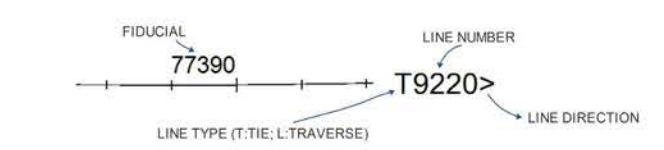
VLF-EM:
 Receiver: Magenta Inc. Matrix Plus
 VLF Transmitter stations monitored: NAA-Cutter, ME - 24.0 kHz
 NML-LaMoire, ND - 25.2 kHz
 NLK-Jim Creek, WA - 24.8 kHz
 Sampling Rate: 10 Hz

GROUND INSTRUMENTATION
 Data Acquisition: Kroum VS Instruments SDAS V2
 Base GPS Receiver: Garmin GPS18
 Ground Magnetometer: Scintrex CS-3 Cesium Vapour
 Base Station Location: Thunder Bay, ON

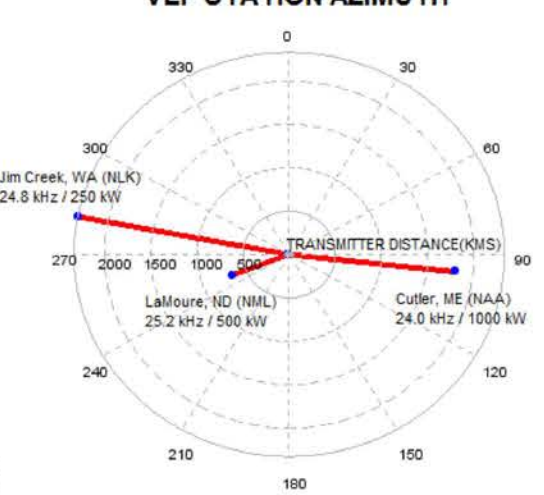
PROCESSING SUMMARY:
Magnetics:
 Real Time Compensation
 Lag Correction
 Diurnal Correction (Tie lines only)
 Tie Line Levelling
 Micro-levelling

VLF/EM (AMPLITUDE):
 Noise Reduction
 Median Levelling
 Micro-levelling

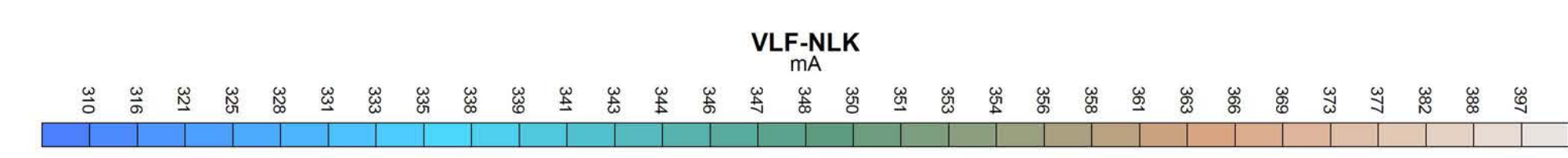
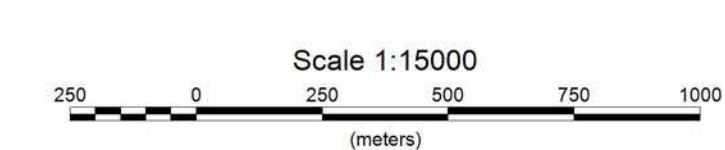
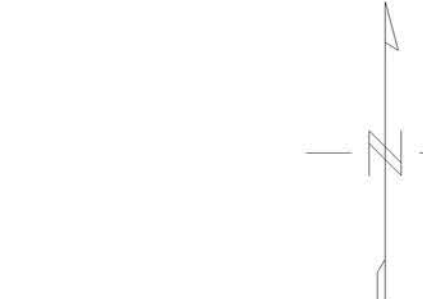
FLIGHT PATH LEGEND



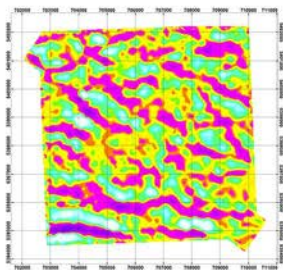
VLF STATION AZIMUTH



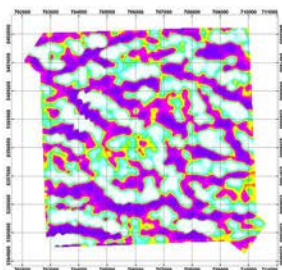
The VLF Amplitude image has grid peak location markers superimposed to emphasize conductor axes.
 Grid peak locations were identified using the Blakely peak detection algorithm operating on data grids generated from high pass filtered VLF amplitude data. The high pass cut-off was set at 30 feds (secs).



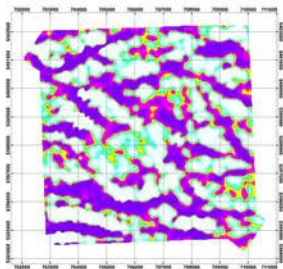
WHITE METAL RESOURCES
 HORIZONTAL MAGNETIC GRADIENT SURVEY WITH VLF
 Far Lake Property, Thunder Bay, ON
 VLF AMPLITUDE: STATION NLK (Jim Creek, WA)
 TERRAQUEST Ref: B501-M11/AD



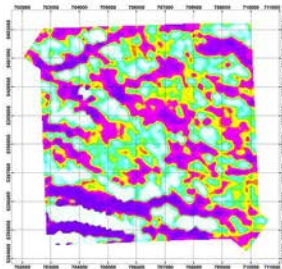
DEPTH = 5 metres



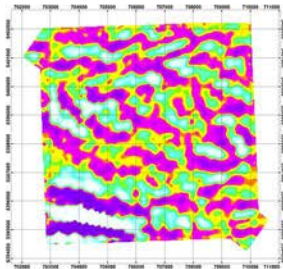
DEPTH = 10 metres



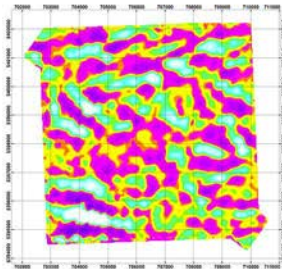
DEPTH = 25 metres



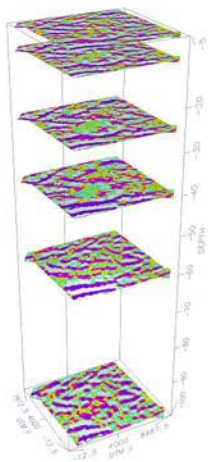
DEPTH = 40 metres



DEPTH = 60 metres



DEPTH = 100 metres



PROPERTY INFORMATION:

Acres: 1000 +/- 1/4 (Private) 2022
 Range: 1000
 Section: 10000
 Township: 10000
 County: 10000
 City: 10000
 Province: 10000

PROPERTY INFORMATION:

Acres: 1000 +/- 1/4 (Private) 2022
 Range: 1000
 Section: 10000
 Township: 10000
 County: 10000
 City: 10000
 Province: 10000

PROPERTY INFORMATION:

Acres: 1000 +/- 1/4 (Private) 2022
 Range: 1000
 Section: 10000
 Township: 10000
 County: 10000
 City: 10000
 Province: 10000

CLIENT:

White Metal Resources
 10000
 10000
 10000

CLIENT:

White Metal Resources
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CLIENT:

White Metal Resources
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 10000



WHITE METAL RESOURCES

HORIZONTAL MAGNETIC GRADIENT SURVEY WITH VLF
 Far Lake Property, Thunder Bay, ON
 VLF RESISTIVITY INVERSION - Station NML