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Abstract

CXS was contracted to perform a 3D Distributed IP survey on the Rathbun Property. The survey was designed to investigate some known mineralization and to explore the remaining area for additional mineralization.

The 3D IP survey highlighted multiple features that should be further investigated. Generally, the chargeability signature was low, however some chargeability trends were identified for additional work.

INVENTUS MINING CORP.

Q2963 – Rathbun Property

3D Distributed Induced Polarization Survey

C. Jason Ploeger, P.Geo. **January 24, 2023**

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF TABLES AND FIGURES

1. SURVEY DETAILS

1.1 PROJECT NAME

This project is known as the **Rathbun Property**.

1.2 CLIENT

Inventus Mining Corp.

82 Richmond Street East
Floor 1
Toronto, ON
M5C 1P1

1.3 OVERVIEW

CXS was contracted to perform a 3D Distributed IP survey on the Rathbun Property. The survey was designed to investigate some known mineralization and to explore the remaining area for additional mineralization. An infinite was located and placed at 525280E, 5184071N. Twenty-two logger locations were used with two orthogonal 100 metre dipoles at each logger site. A total of 14-line kilometres of current injection was performed at an injection interval of 50 metres. The survey was performed between March 21st and April 1st, 2022.

1.4 OBJECTIVE

The objective of the 3D distributed IP survey was to perform a detailed multidirectional reconnaissance survey of the area. The survey was designed to target the extents of the known mineralization and locate additional targets for future exploration.

1.5 SURVEY & PHYSICAL ACTIVITIES UNDERTAKEN

Survey/Physical Activity	Dates	Total Days in Field	Total Line Kilometres
Line Cutting	March 3rd to March 17th, 2022	14	14.3
3D Distributed IP	March 21st to April 1st, 2022	11	14.3

Table 1: Survey and Physical Activity Details

1.6 Summary of Results, Conclusions & Recommendations

The 3D IP survey highlighted multiple features that should be further investigated. Four anomalies of note which are represented by elevated chargeability with correlating low resistivity and may represent massive to semi-massive to disseminated mineralization.

1.7 Co-ordinate System

Projection: UTM zone 17N
Datum: NAD83
UTM Coordinates near center of grid: 526470 Easting and 5178983 Northing

2. SURVEY LOCATION DETAILS

2.1 LOCATION

The Rathbun Project is located in Rathbun Township approximately 40 km northeast of Sudbury, Ontario

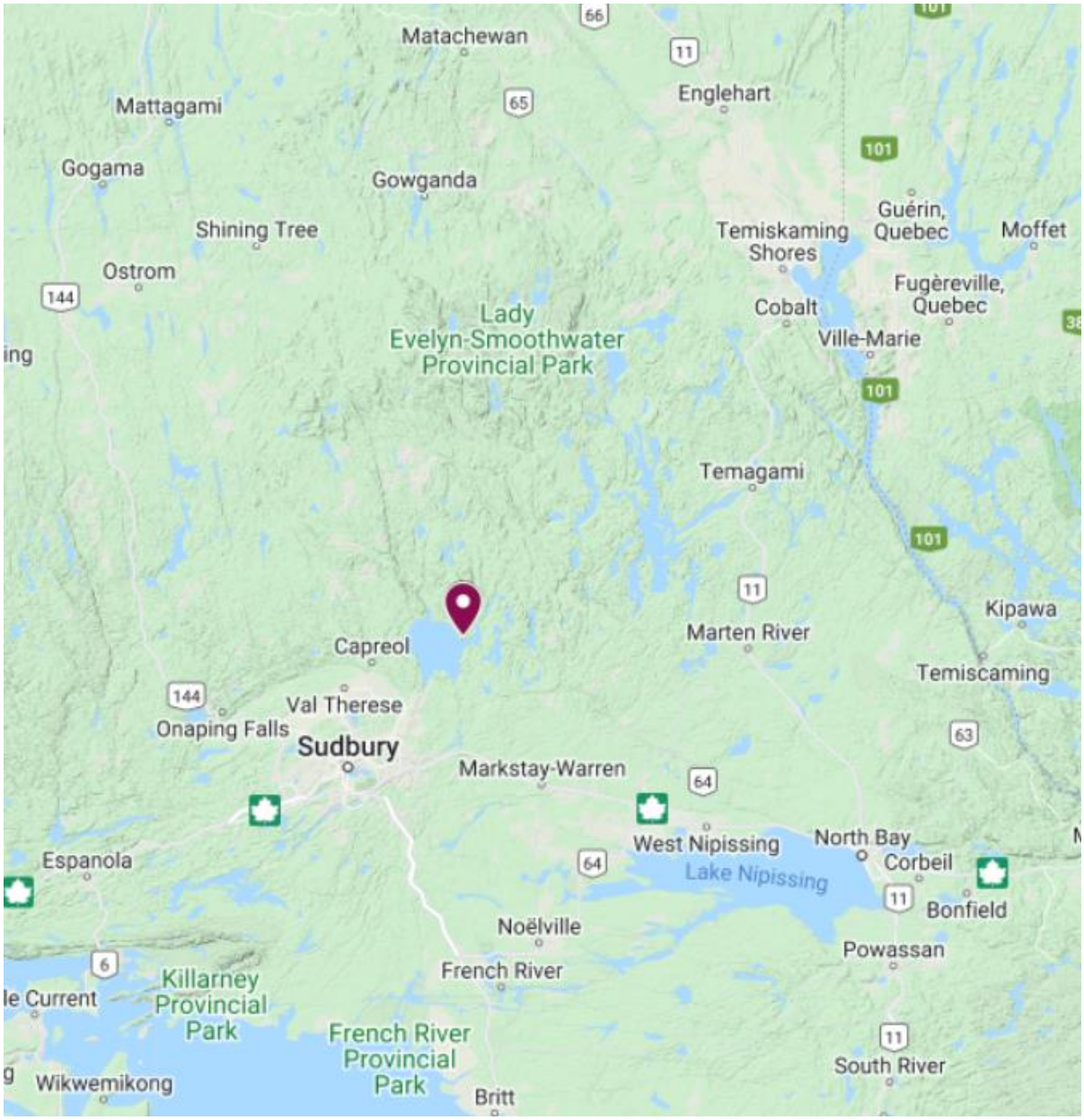


Figure 1: Location of the Rathbun Project (Map data ©2022 Google)

2.2 Access

Access to the survey area was via 4x4 truck and snowmachine. Highway 17 was travelled 11.5 kilometers east of the town of Wahnapitae to the intersection of Kukagami Road. From here Kukagami Road was travelled north for a distance of 21.5 kilometers to where it forks. At the fork Matagamasi Lake Road was travelled for 5 kilometers to where it forked into the Bushy Bay Road, which was travelled an additional 4.5km. From here, snowmachines were used for the final 2.5km to the survey area.

2.3 Mining Claims

The survey area covers a portion of mining claims 687020, 336843, 287359, 175308, 287335, 162606, 295359, 687021, 210329, 307563, 287336 and 687022 all located in Rathbun Township, within the Sudbury Mining Division.

Cell Number	Provincial Grid Cell ID	Ownership of Land	Township
687020	41I15B273 to 41I15B279 41I15B293 to 41I15B298 41I15B316 to 41I15B318	Inventus Mining Corp.	Rathbun
336843	41I15B315	8616868 Canada Ltd.	Rathbun
287359	41I15B334	Inventus Mining Corp.	Rathbun
175308	41I15B335	8616868 Canada Ltd.	Rathbun
287335	41I15B335	Inventus Mining Corp.	Rathbun
162606	41I15B336	8616868 Canada Ltd.	Rathbun
295359	41I15B336	Inventus Mining Corp.	Rathbun
687021	41I15A301, 41I15A321, 41I15B299 to 41I15B300 41I15B319 to 41I15B320 41I15B337 to 41I15B340 41I15B357 to 41I15B360	Inventus Mining Corp.	Rathbun
210329	41I15B354	Inventus Mining Corp.	Rathbun
307563	41I15B355	Inventus Mining Corp.	Rathbun
287336	41I15B356	Inventus Mining Corp.	Rathbun
687022	41I10J014 to 41I10J015 41I10J034 to 41I10J035 41I10J054 to 41I10J055 41I15B374 to 41I15B378	Inventus Mining Corp.	Rathbun

	41I15B394 to 41I15B396		

Table 2: Mining Lands and Cells Information

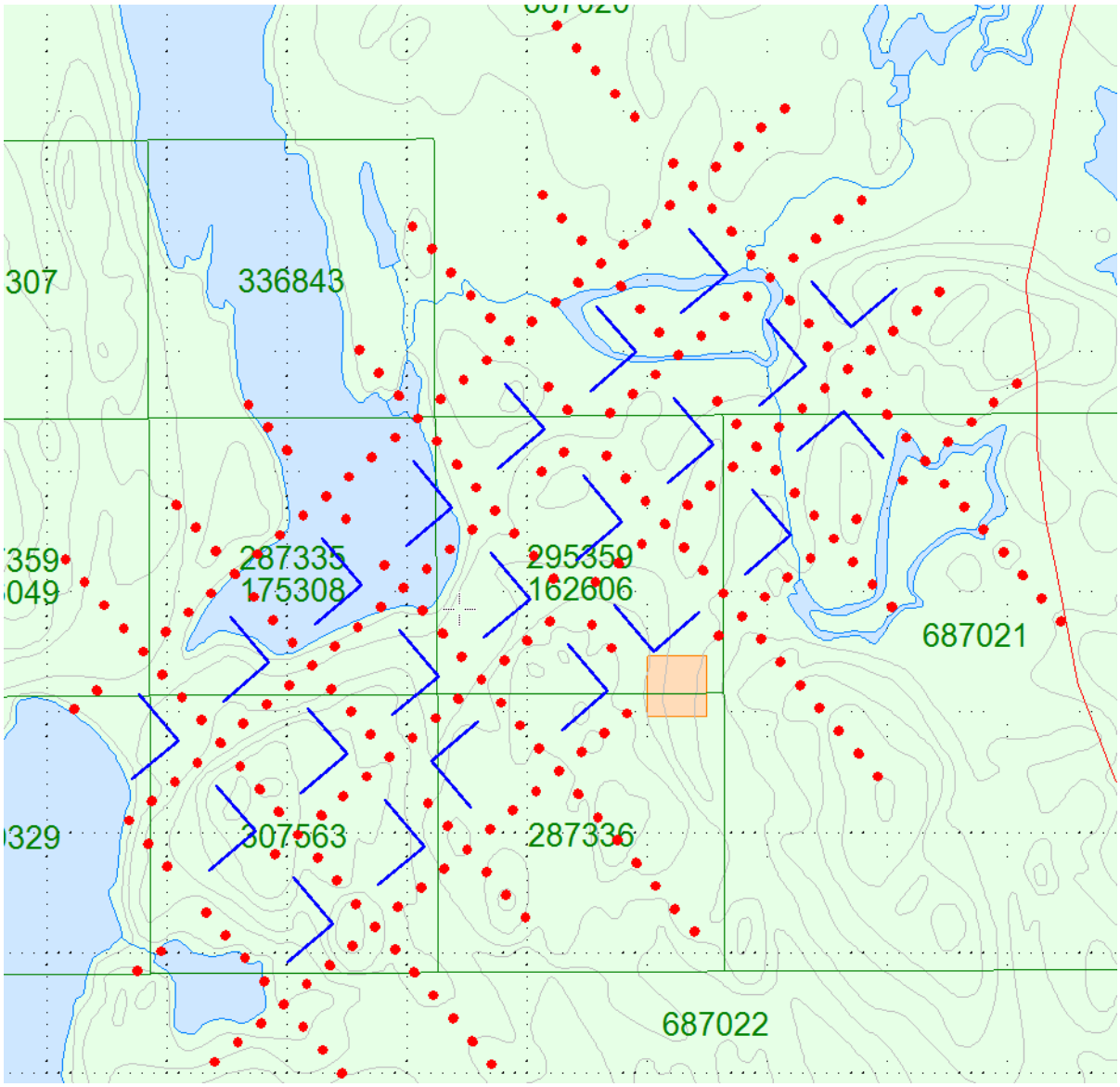


Figure 2: Operational Claim Map with 3D IP Electrode Sites – Red=Transmit Locations – Blue=Read Dipole

2.4 Property History

There have been many historical exploration projects carried out over the years all

over the survey area. The following list describes details of the previous geoscience work which was collected by the Mines and Minerals division and provided by OGSEarth (MNDM & OGSEarth, 2022).

- **1954 - 1958: Dolmac Mines Ltd. (File 41I15SE0090, 41I15SE0095, 41I15SE0096 and 41I15SE0102)**
  Ground Geophysics, Geological, Diamond Drilling
  During this period, Dolmec performed ground magnetometer and EM surveys along with some geological mapping. They also reported a total of 2634.5 feet of drilling was done with completion of 23 drill holes.

- **1963: Waco Petroleum Ltd. (File 20000004968)**
  Diamond Drilling
  In 1963 Waco reported drilling a total of 2634.5 feet with the completion of 6 drill holes.

- **1966: Paramaque Mines Ltd. (File 41I15SE0098)**
  Ground Geophysics, Geological.
  In 1966 Paramaque, initiated a ground geophysics program including ground magnetometer and EM surveys. The geology was mapped along with a compilation of previous work.

- **1967 - 1968: Mareast Exploration Limited. (File 41I15SE0093 and 41I15SE0094)**
  Ground Geophysics
  In 1967 and 1968 Mareast reported performing a ground magnetometer and VLF EM survey.

- **1971: Norlex Mines Ltd. (File 41I15SE1222)**
  Diamond Drilling
  In 1971 Norlex reported drilling a total of 2784 feet with the completion of 7 drill holes.

- **1981 - 1983: Floron Mining Enterprises Ltd. (File 41I15SE0081)**
  Physical
  Between 1981 and 1983 Floron reported performing some bedrock stripping and trenching.

- **1982: Canadian Nickel Company Limited. (File 41I15SE0085)**
  Airborne Geophysical
  In 1982 Canadian Nickel flew an airborne magnetometer, EM and radiometric surveys.

- **1985 – 1986: A Jerome (File 41I15SE0059)**
  Diamond Drilling
  In 1985 and 1986 Jerome reported drilling a total of 3215 feet with the completion of 14 drill holes.

- **1989 - 1990: W Simms (File 41I15SE0043)**
  Airborne Geophysical
  In 1989 and 1990 Simms reported an airborne magnetometer and VLF EM surveys.

- **1985 - 2009: Flag Resource Limited (Files 41I15NE0019, 41I15SE0057, 41I14NE0047, 41I15SE0049, 41I15SE0052, 41I15SE0054, 41I15SE9329, 41I15SE0040, 41I15SE0041, 41I15SE9280, 41I15SE0016, 41I15SE0018, 41I15SE0026, 41I15SE2050, 41I15SE0028, 41I15SE0029, 41I15SE0046, 41I15SE2013, 41I15SE2008, 41I15SE2010, 41I15SE2014, 41I15SE2015, 41I15SE2023, 41I15SE2035, 41I15SE2041, 41I15NE0015, 41I15SE2018, 41I15SE2028, 20000015007, 20000015008, 20000000214 and 20000004454)**
  Airborne Geophysics, Ground Geophysics, Geological, Diamond Drilling
  During this period, Flag performed airborne magnetometer, VLF EM and EM surveys along with some ground Magnetometer, VLF EM and geological mapping. They also reported a total of 27838.5 feet along with 1327.8 meters of drilling done with completion of 88 drill holes in the area.

2.5 General Regional/Local Geological Settings

General Geology:

Most of the rocks in the interested area is of the Precambrian age (2.3 billion years). The region chiefly contains grounds of the Huronian Supergroup. It consists predominantly of glaciogenic conglomerates, sandstones, and limestones in order. Quartzite, greywackes, and arkoses of Lorrain formation were found only on one site which belongs to the Cobalt group. Most of the sediments are light greenish, but some of them were pinkish in color.

The Township of Rathbun has limited structural characteristics, but the special structure feature is the appearance of a north-south syncline axis that runs almost 600 meters. The other structural interest is the “Sudbury Breccias”, which are composed of clasts and banded matrix. Both are easy and identical, except the matrix has minor addition of water and carbon.

The eastern rim of the Sudbury deposit in this area holds the world's largest amount of Ni-Cu-PGE. In some parts, the lower-aged Huronian age supergroup is constrained by the older group of rhyolite supergroup.

Property Geology:

This area shows the most prominent amount of Sudbury Breccias. It is dominantly carrying the Huronian Supergroup and the Cobalt group, which contains quartzite, Greywackes, and arkoses of the Lorrain formation. Some of the samples were analyzed for their presence of Gold and Arsenic.

Sudbury Breccia is light green rounded fragments. Another type of Sudbury breccia is made of pink arkose rock of subangular to rounded fragments.

2.6 Target of Interest

Targetting of the survey revolved around the location of historical mineralization. The survey was designed to assist in delineating and defining the mineralization along with exploring the remainder of the area for additional mineralization.

3. PLANNING

3.1 EXPLORATION PERMIT/PLAN

The exploration program was designed to use a recently cut grid and existing roads. The 3D Distributed Induced Polarization survey was performed over mining claims held by Inventus Mining Corp. The required plan/permits are PR-19-000003, PR-PR-22-000013, for the entire area of the survey coverage.

3.2 SURVEY DESIGN

Specialized IP survey design software was used as a tool to assist in the targeting of the survey. In this case, a theoretical survey distribution scenario was established to determine the survey results coverage.

For optimal coverage, 22 receivers with 3 read electrodes each were planned in selected locations in between the current injection paths. The 3 read electrodes of each receiver were planned in 2 orthogonal directions, with 100-metre dipole lengths (grid north-south and grid east-west). Current injections were planned at 50-metre intervals along the newly cut lines. An infinite location was chosen for this survey to provide pole-dipole array. The infinite was planned to be at a location as far as possible from the grid, dependent on field conditions and access. A theoretical depth of 580 metres was obtained from the software with this layout.

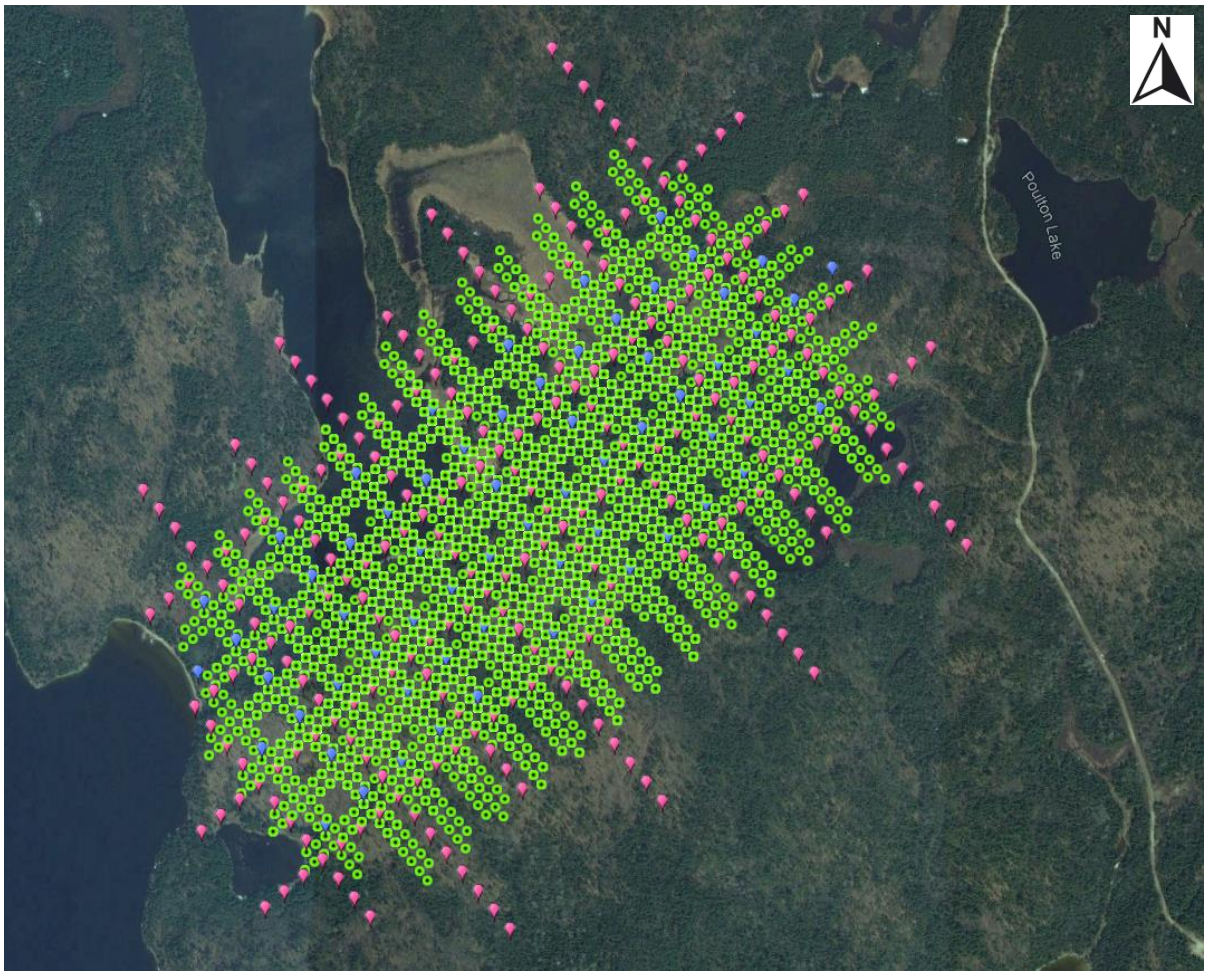


Figure 3: Survey Design Model Looking Down – Red=Current Injection, Blue=Receiver Electrodes, Green=Theoretical Data Point (©2022 Google, Image ©2022 Maxar Technologies)

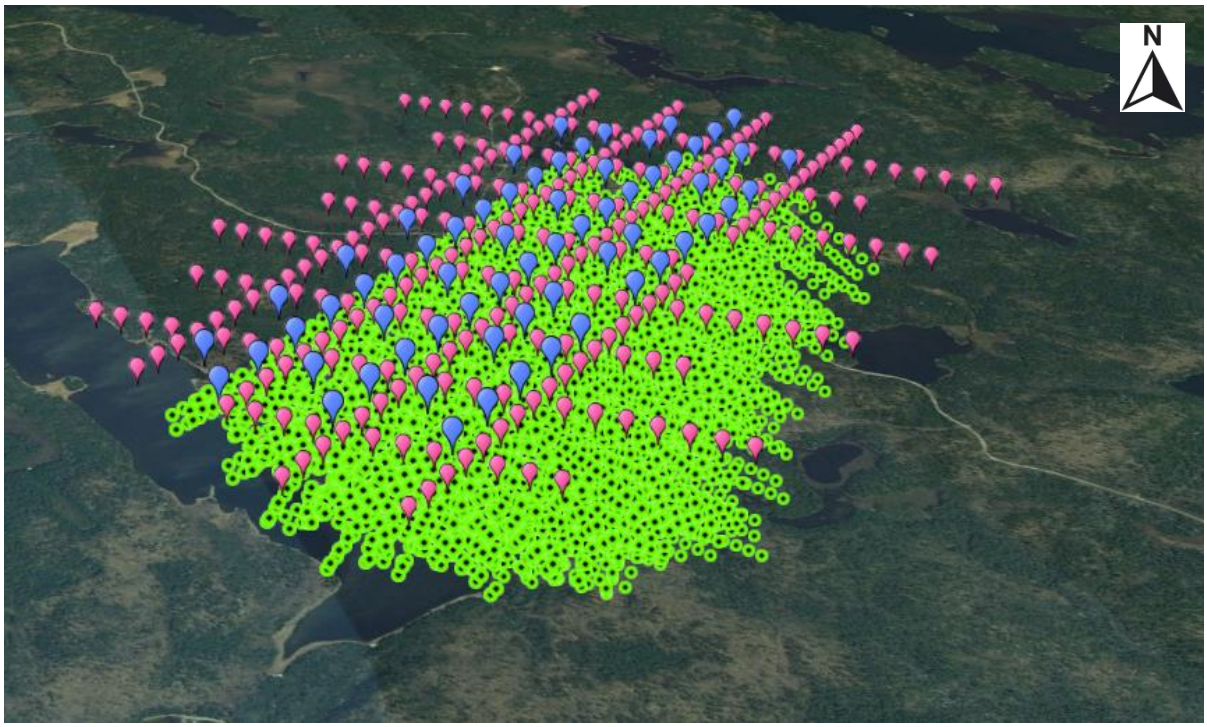


Figure 4: Survey Design Model Looking Northeast – Red=Current Injection, Blue=Receiver Electrodes, Green=Theoretical Data Point (©2022 Google, Image ©2022 CNES/Airbus)

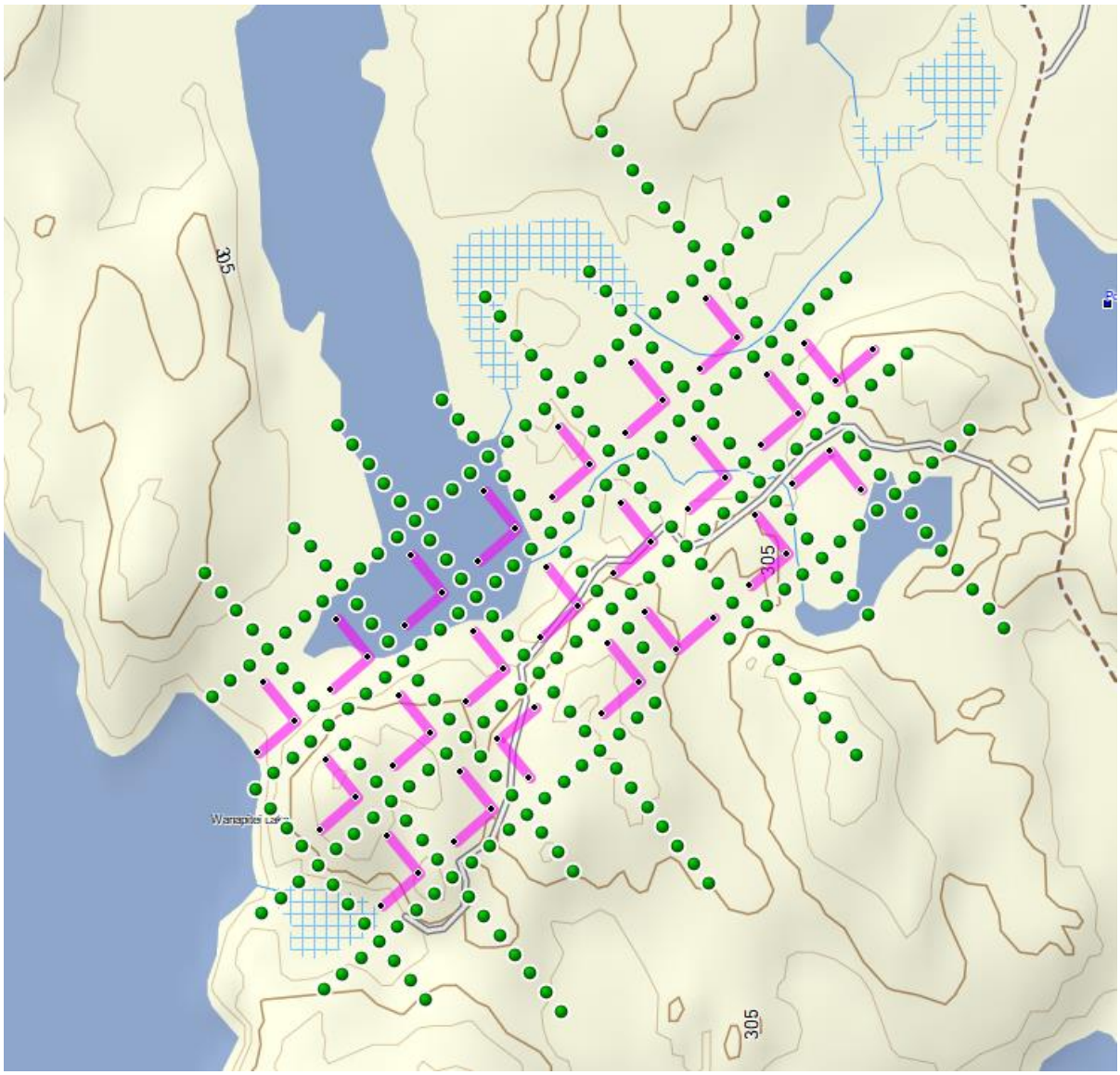


Figure 5: Planned Survey Layout – Green Circles=Current Injections, Purple Lines=Di-poles, Black Dots=Read Electrodes

4. SURVEY WORK UNDERTAKEN

4.1 SUMMARY

CXS was contracted to perform a 3D IP survey over the Rathbun Project. The crew accessed the site on March 21st and completed the survey on April 1st, 2022.

A total length of 14.3 kilometres was covered with 270 injected current locations for this 3D Distributed Induced Polarization survey. Collected GPS locations were applied to the electrode field locations. The survey area footprint was 1.53 km^2 with the dimensions of (0.9 x1.7km).

4.2 SURVEY GRID

A grid was cut along the intended current injection paths. The grid consisted of 8 northwest-southeast lines (0E, 200E, 400E, 600E, 800E, 1000E, 1200E and 1400E). 4 east-west tie lines (400S, 200S, 0N and 200N), spaced at 200m intervals and the stations were picketed at 25-metre intervals. The grid was cut by Five on Line Contracting based out of Belleterre, Quebec in March prior to the survey acquisition.

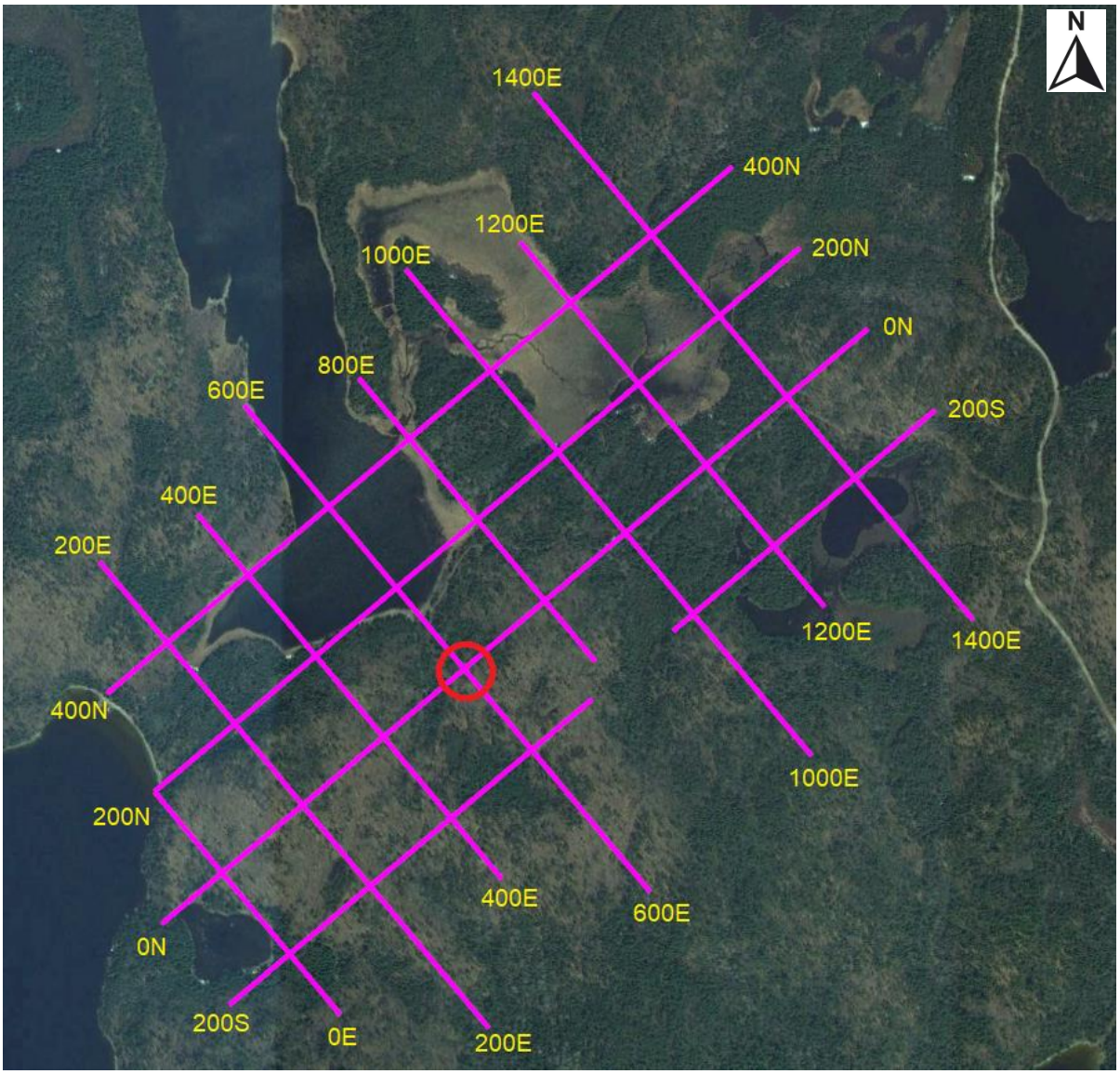


Figure 6: Survey Grid (©2022 Google, Image ©2022 Maxar Technologies)

4.3 Survey Setup

22 receivers were placed in 22 previously selected locations scattered between the grid lines. Each receiver was connected to 2 relatively orthogonal, ~100-metre dipoles (grid north-south and grid east-west). The coordinates of the read electrodes were recorded by GPS and are listed in Table 3. Due to field conditions, exact locations and directions were not always achieved. The infinite location was chosen by the crew and located at 525280E 5184071N, approximately 5km north of the grid, located as far as possible to achieve a pole-dipole array scenario. The survey area footprint was 1.53 km^2 with the dimensions of (0.9 x1.7km).

Read Electrode	UTM X (m)	UTM Y (m)
402-P1	525752	5178831
402-P2	525818	5178755
402-P3	525743	5178691
403-P1	525907	5178959
403-P2	525971	5178885
403-P3	525894	5178818
404-P1	526059	5179089
404-P2	526123	5179013
404-P3	526047	5178948
405-P1	526213	5179220
405-P2	526276	5179141
405-P3	526198	5179075
406-P1	526364	5179346
406-P2	526428	5179271
406-P3	526354	5179208
407-P1	526517	5179476
407-P2	526581	5179401
407-P3	526505	5179335
408-P1	526669	5179605
408-P2	526734	5179529
408-P3	526657	5179465
409-P1	525882	5178678
409-P2	525946	5178602
409-P3	525871	5178537
410-P1	526032	5178804
410-P2	526101	5178728
410-P3	526023	5178666
411-P1	526188	5178935
411-P2	526252	5178860
411-P3	526175	5178797
412-P1	526875	5179518
412-P2	526939	5179441
412-P3	527016	5179505

Read Electrode	UTM X (m)	UTM Y (m)
413-P1	526342	5179068
413-P2	526405	5178989
413-P3	526329	5178925
414-P1	526492	5179195
414-P2	526557	5179118
414-P3	526480	5179054
415-P1	526645	5179324
415-P2	526710	5179247
415-P3	526634	5179183
416-P1	526798	5179452
416-P2	526863	5179377
416-P3	526786	5179312
417-P1	525935	5178461
417-P2	526001	5178384
417-P3	526067	5178459
418-P1	526165	5178653
418-P2	526230	5178579
418-P3	526153	5178507
419-P1	526305	5178644
419-P2	526241	5178718
419-P3	526316	5178783
420-P1	526469	5178912
420-P2	526536	5178837
420-P3	526457	5178772
421-P1	526546	5178978
421-P2	526612	5178903
421-P3	526686	5178966
422-P1	526773	5179171
422-P2	526835	5179099
422-P3	526763	5179031
422-P1	526992	5179224
422-P2	526922	5179309
422-P3	526850	5179236

Table 3: Receiver Electrode Coordinates

4.4 Data Acquisition

CXS began acquiring data on March 26th, 2022. Current injection sites were injected along the recently established grid lines and existing roads at approximately 50-metre increments. GPS points were collected at each injection rod location prior to each current injection and recorded along with their respective injection details, such as injection file numbers and ground conditions. There was a total of 270 injection locations for this survey.

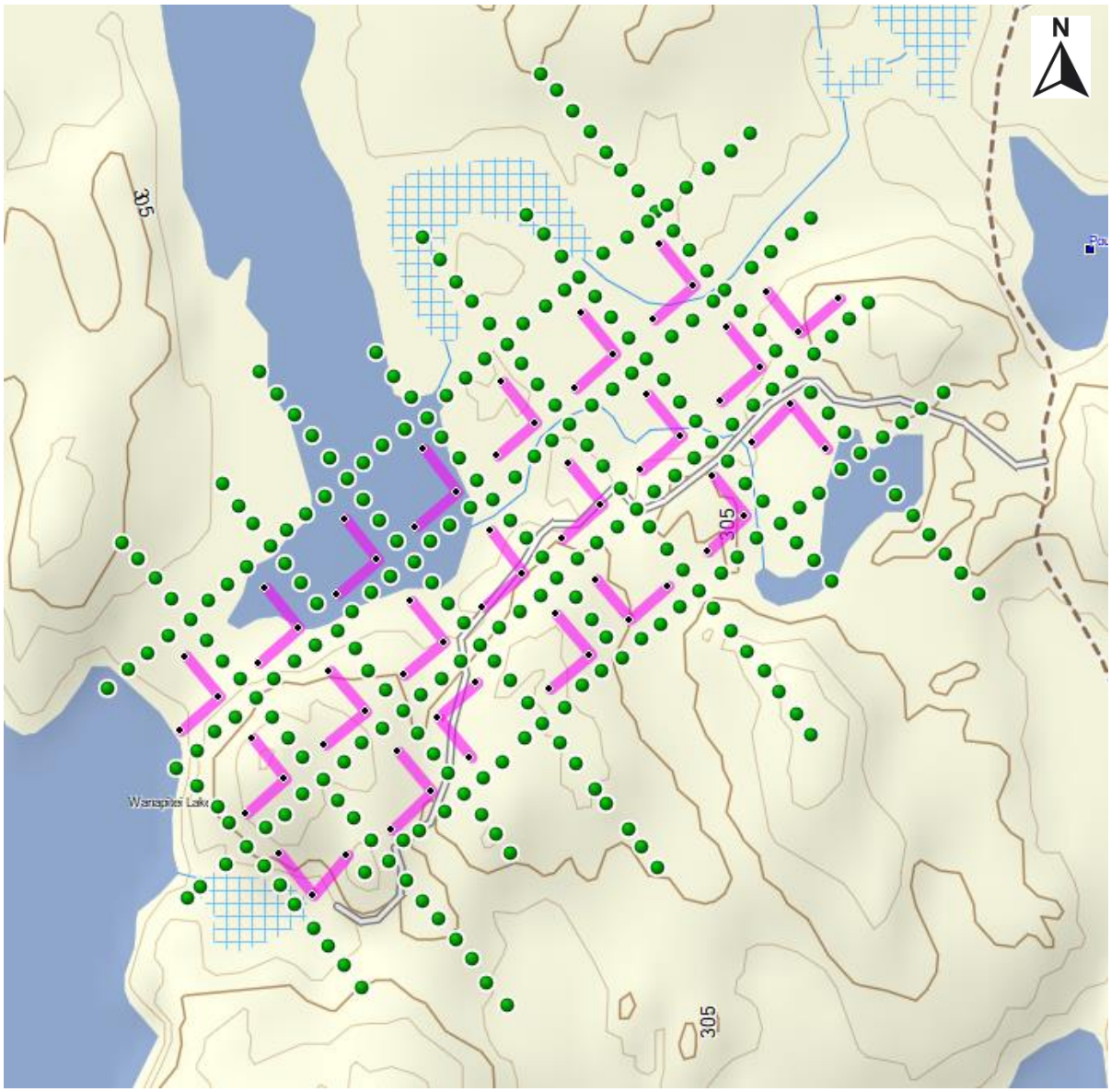


Figure 7: Actual Field Survey Layout with Injection Sites (green dots) in Mapsource

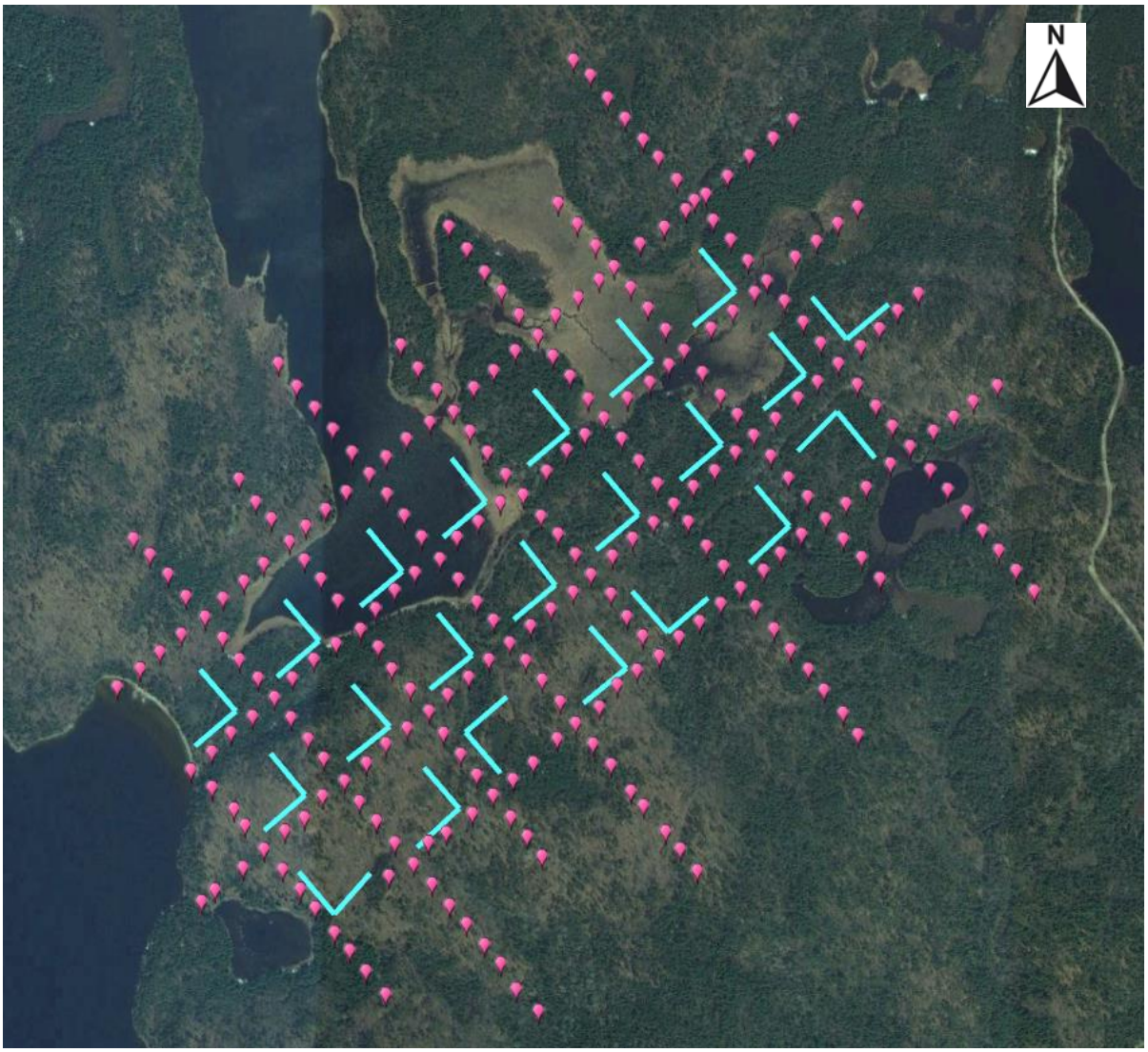


Figure 8: Receiver Dipole Orientations on Google Earth (©2022Google, Image ©2022Maxar Technologies)

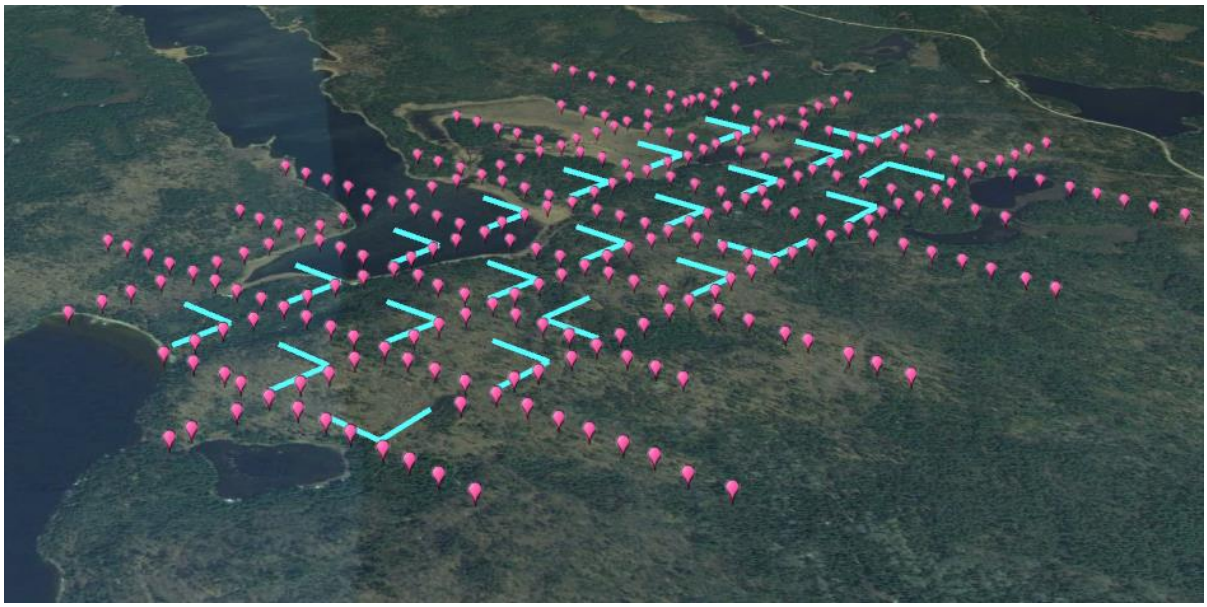


Figure 9: Topographical Relief with the Survey Deployment Looking Southeast (Image ©2022 Maxar Technologies, ©2022 Google)

4.5 SURVEY LOG

3D IP Survey Log					
Date	**Description**	**Line**	**Min Extent**	**Max Extent**	**Total Survey (m)**
March 21, 2022	Mobilize to Sudbury, then to the grid area. Check ice thickness for test lines.	-	-	-	-
March 22, 2022	Establish infinite and test holes.	-	-	-	-
March 23, 2022	Read test line 2.	Test Line 2	1000S	1000N	2000
March 24, 2022	Read test line 1	Test Line 1	1000S	1000N	2000
March 25, 2022	Setup up logger sites	-	-	-	-
March 26, 2022	Complete setting up log-ger sites., Read the lines	0E	350S	200N	550
		200E	550S	600N	1150

3D IP Survey Log					
Date	**Description**	**Line**	**Min Extent**	**Max Extent**	**Total Survey (m)**
	0E, 200E and partial line 400E.	400E	200N	550N	350
	42 Injections and 2.05 km				
March 27, 2022	Continue survey. Complete line 400E and read lines 600E, 800E and 1000E.	400E	350S	200N	550
		600E	550S	650N	1200
		800E	150S	550N	700
		1000E	550S	650N	1200
	77 Injections and 3.65km				
March 28, 2022	Continue survey. Read lines 1200E, 1400E, 400N and partial line 200N.	1200E	350S	550N	550
		1400E	550S	750N	750
		400N	0E	1600E	1600
		200N	0E	800E	800
	86 Injections and 4.6km				
March 29, 2022	Continue survey. Complete line 200N and read lines 0N and 200S.	200N	800E	1600E	800
		0N	150W	1600E	1750
		200S	150E	1600E	1450
	65 Injections and 4km				
March 30, 2022	Recover logger sites and infinite	-	-	-	-
April 1, 2022	Demob from Sudbury to Larder Lake	-	-	-	-
Total	**14.3 Line Kilometres / 270 Injections**				

Table 4: 3D IP Survey Log

4.6 PERSONNEL

Crew Member	Position	Resident	Province
Bruce Lavalley	Crew Chief	Britt	Ontario
Claudia Moraga	IP Technician	Britt	Ontario
Richard Bates	Transmitter Operator	Virginiatown	Ontario
Cameron Hansen	IP Technician	Larder Lake	Ontario
Gunhee You, GIT	IP Technician	Calgary	Alberta
Mike Sheldon	IP Technician	Larder Lake	Ontario
Giancarlo Smith	IP Technician	Virginiatown	Ontario
Five on Line Contracting	Line Cutters	Belleterre	Quebec
C Jason Ploeger	Senior Geophysicist	Larder Lake	Ontario

Table 5: CXS Induced Polarization Personnel

4.7 FIELD NOTES: CONDITION AND CULTURE

The average weather over the eleven field days was -4°C and lows down to -17.7°C and daytime highs up to 7.5°C. Rain/snow was reported during the 11 day project with an extremely heavy precipitation on March 30 and March 31.

No culture was observed over the course of the survey that would impact the data.

Topographical features and ground characteristics along the read dipoles and current injection lines are noted in the following two tables (Table 6 & 7, respectively).

Logger Field Notes (Soil/Topography/Vegetation/Culture notes on dipoles and corresponding electrodes P1/P2/P3)		
402	**Soil**	P1 - Loam, P2 - Soil, P3 - Rocky loam
	Topo	P1 - Uphill, P3 Downhill
	Veg	P1 and P2 - Mixed, P3 - Spruce
403	**Soil**	P1 - Lake, P2 and P3 - Soil
	Topo	P1, P2 and P3 - Flat,
	Veg	P1 - Lake, P2 and P3 - Mixed
404	**Soil**	P1, P2 and P3 - Lake
	Topo	P1, P2 and P3 - Flat
	Veg	P1, P2 and P3 - Lake
405	**Soil**	P1 and P3 - Lake, P2 - Mud

Logger Field Notes (Soil/Topography/Vegetation/Culture notes on dipoles and corresponding electrodes P1/P2/P3)		
	Topo	P1, P2 and P3 - Flat
	Veg	P1, P2 and P3 - Lake
406	**Soil**	P1 & P2 - Rocky Sand, P3 - Soil
	Topo	P1 - Sidehill, P2 and P3 - Flat
	Veg	P1 - Red Pine / Spruce, P2 and P3 - Mix
407	**Soil**	P1, P2 and P3 - Swamp
	Topo	P1, P2 and P3 - Flat
	Veg	P1, P2 and P3 - Alder
408	**Soil**	P1, P2 and P3 - Swamp
	Topo	P1, P2 and P3 - Flat
	Veg	P1 and P2 - Mixed, P3 - Alder
409	**Soil**	P1, P2 and P3 - Soil
	Topo	P1 - Slight uphill, P3 - Slight downhill
	Veg	P1, P2 and P3 - Pine
410	**Soil**	P1, P2 and P3 - Soil
	Topo	P1 - Downhill, P2 and P3 - Flat
	Veg	P1, P2 and P3 - Pine
411	**Soil**	P1 and P3 - Rocky loam, P2 - Rocky sand
	Topo	P1 - Downhill, P2 - Sidehill, P3 - Uphill
	Veg	P1, P2 and P3 - Mixed
412	**Soil**	P1, P2 and P3 - Rocky sandy loam
	Topo	P1 and P3 - Uphill
	Veg	P1, P2 and P3 -Mixed
413	**Soil**	P1 - Sandy, P2 Rocky loam, P3 Rocky
	Topo	P1 - Flat, P3 - Downhill
	Veg	P1, P2 and P3 - Mixed
414	**Soil**	P1 - Rocky, P2 and P3 - Mud
	Topo	P1 - Sidehill, P2 and P3 - Flat
	Veg	P1, P2 - Mixed, P3 - Spruce
415	**Soil**	P1 and P3 - Rocky, P2 - Rocky sand

Logger Field Notes (Soil/Topography/Vegetation/Culture notes on dipoles and corresponding electrodes P1/P2/P3)		
	Topo	P1 and P3 - Sidehill, P2 - Flat
	Veg	P1, P2 and P3 - Mixed
416	**Soil**	P1 - Swamp, P2 and P3 - Sandy loam
	Topo	P1 - Downhill, P3 - Sidehill
	Veg	P1, P2 and P3 - Mixed
417	**Soil**	P1 - Rocky sand, P2 and P3 - Rocky sandy loam
	Topo	P1 - Sidehill, P3 - Uphill/Sidehill
	Veg	P1, P2 and P3 - Mixed
418	**Soil**	P1 and P2 - Soil, P3 - Swamp
	Topo	P1 - Flat, P3 - Uphill
	Veg	P1 and P3 - Mixed, P3 -Spruce
419	**Soil**	P1, P2 and P3 - Rocky loam
	Topo	P1 and P3 - Uphill, P2 - Sidehill
	Veg	P1, P2 and P3 - Mixed
420	**Soil**	P1, P2 and P3 - Rocky
	Topo	P1, P2 and P3 - Up and Down
	Veg	P1, P2 and P3 - Mixed
421	**Soil**	P1 and P3 - Loam, P2 - Rocky
	Topo	P1- Flat, P3 - Downhill
	Veg	P1, P2 and P3 - Mixed
422	**Soil**	P1 and P3 - Rocky, P2 - Mud
	Topo	P1 - Sidehill, P2 and P3 - Flat
	Veg	P1, P2 and P3 - Mixed
423	**Soil**	P1, P2 and P3 - Rocky Sand
	Topo	P1 and P2 - Sidehill, P3 - Flat
	Veg	P1, P2 and P3 - Mixed
Infinite	**Soil**	Black mud
	Topo	Low area
	Veg	Mixed
	Culture	

Table 6: Logger Electrode & Dipole Field Notes

Date	Line	Station	UTM X (m)	UTM Y (m)	Inf I (mA)	Injection Electrode Field Notes
26-Mar-22	0E	150N	525775	5178590	220	Uphill Rocky
	0E	100N	525815	5178551	300	Uphill Rocky
	0E	50N	525836	5178521	230	Uphill Rocky
	0E	0N	525871	5178478	220	Uphill Rocky
	0E	50S	525905	5178441	330	Downhill Rocky Moss
	0E	100S	525938	5178405	320	Downhill Rocky
	0E	150S	525966	5178370	300	Flat Rocky
	0E	200S	526001	5178326	590	Flat Rocky Loam
	0E	250S	526029	5178293	160	Flat Rocky
	0E	300S	526060	5178255	300	Flat Rocky
	0E	350S	526096	5178213	160	Uphill Rocky Loam
	200E	550S	526377	5178184	260	Flat Rocky
	200E	500S	526336	5178223	400	Flat Rocky Loam
	200E	450S	526307	5178270	310	Uphill Rocky Sand
	200E	400S	526277	5178304	230	Uphill Rocky Sand
	200E	350S	526244	5178343	280	Uphill Rocky Sand
	200E	300S	526213	5178376	210	Flat Rocky Sand
	200E	250S	526180	5178415	210	Flat Rocky Sand
	200E	200S	526146	5178452	150	Uphill Rocky
	200E	150S	526112	5178490	300	Downhill Rocky Sand
	200E	100S	526078	5178530	280	Flat Rocky
	200E	50S	526046	5178565	430	Flat Loam
	200E	0N	526019	5178603	220	Uphill Rocky Loam
	200E	50N	525980	5178644	220	Downhill Rocky
	200E	100N	525951	5178680	160	Downhill Rocky
	200E	150N	525919	5178718	230	Downhill Rocky
	200E	200N	525889	5178755	150	Downhill Rocky
	200E	250N	525859	5178790	190	Downhill Rocky
	200E	300N	525824	5178824	260	Downhill Rocky
	200E	350N	525793	5178863	120	Flat Rocky
	200E	400N	525761	5178902	250	Uphill Rocky
	200E	450N	525725	5178939	160	Flat Rocky

Date	Line	Station	UTM X (m)	UTM Y (m)	Inf I (mA)	Injection Electrode Field Notes
	200E	500N	525692	5178980	400	Flat Rocky
	200E	550N	525659	5179016	310	Flat Rocky
	200E	600N	525628	5179045	270	Uphill Rocky
	400E	550N	525822	5179155	230	Downhill Rocky
	400E	500N	525853	5179113	110	Flat Rocky
	400E	450N	525882	5179083	140	Downhill Rocky
	400E	400N	525915	5179041	90	Flat Rocky Lakeshore
	400E	350N	525943	5179007	1080	Lake
	400E	300N	525973	5178973	1050	Lake
	400E	250N	526005	5178934	930	Lake
27-Mar-22	400E	200N	526047	5178881	300	Uphill Rocky
	400E	150N	526080	5178848	180	Uphill Rocky
	400E	100N	526105	5178808	290	Uphill Rocky
	400E	50N	526139	5178772	240	Flat Rocky
	400E	0S	526174	5178731	410	Flat Rocky
	400E	50S	526200	5178691	310	Downhill Loam
	400E	100S	526232	5178653	110	Uphill Rocky Loam
	400E	150S	526262	5178615	310	Uphill Rocky Sand
	400E	200S	526292	5178578	230	Downhill Rocky
	400E	250S	526325	5178538	320	Uphill Rocky Loam
	400E	300S	526355	5178503	150	Uphill Rocky
	400E	350S	526383	5178466	150	Downhill Rocky
	600E	550S	526668	5178442	200	Uphill Rocky
	600E	500S	526637	5178481	220	Downhill Rocky Sand
	600E	450S	526610	5178513	150	Downhill Rocky
	600E	400S	526569	5178560	170	Uphill Rocky
	600E	350S	526546	5178587	110	Uphill Rocky
	600E	300S	526509	5178635	130	Downhill Rocky
	600E	250S	526476	5178673	150	Downhill Rocky
	600E	200S	526443	5178711	300	Flat Rocky Loam
	600E	150S	526415	5178750	650	Uphill Rocky Sand
	600E	100S	526381	5178790	150	Flat Rocky
	600E	50S	526351	5178825	340	Downhill Rocky
	600E	0N	526322	5178857	400	Downhill Rocky

Date	Line	Station	UTM X (m)	UTM Y (m)	Inf I (mA)	Injection Electrode Field Notes
	600E	50N	526292	5178898	170	Flat Rocky
	600E	100N	526261	5178932	90	Flat Rocky
	600E	150N	526227	5178974	80	Flat Rocky Lakeshore
	600E	200N	526192	5179010	1120	Lake 2.1m
	600E	250N	526159	5179051	1180	Lake 3.0m
	600E	300N	526126	5179090	960	Lake 4.9m
	600E	350N	526094	5179129	1060	Lake 5.0m
	600E	400N	526062	5179166	1030	Lake 5.0m
	600E	450N	526030	5179205	940	Lake 4.3m
	600E	500N	525994	5179247	850	Lake 4.4m
	600E	550N	525961	5179286	720	Lake 3.9m
	600E	600N	525927	5179325	1000	Lake 0.8m
	600E	650N	525894	5179367	790	Flat Loam
	800E	550N	526119	5179402	180	Flat Rocky
	800E	500N	526151	5179360	730	Flat Rocky Loam
	800E	450N	526185	5179321	600	Flat Swamp
	800E	400N	526217	5179280	1320	Flat Swamp
	800E	350N	526247	5179244	1140	Flat Swamp
	800E	300N	526279	5179206	730	Flat Loam
	800E	250N	526313	5179166	1220	Flat Loam
	800E	200N	526345	5179128	220	Flat Loam
	800E	150N	526378	5179089	90	Uphill Rocky
	800E	100N	526410	5179057	280	Uphill Loam
	800E	50N	526442	5179020	300	Uphill Rocky Loam
	800E	0S	526470	5178983	160	Downhill Rocky
	800E	50S	526507	5178948	290	Flat Rocky Sand
	800E	100S	526537	5178906	310	Flat Rocky Sand
	800E	150S	526566	5178871	460	Downhill Rocky Loam
	1000E	550S	526963	5178692	350	Flat Rocky
	1000E	500S	526935	5178731	470	Flat Rocky Sand
	1000E	450S	526900	5178773	300	Downhill Rocky Sand
	1000E	400S	526871	5178811	280	Flat Rocky Loam
	1000E	350S	526838	5178848	210	Downhill Rocky Sand
	1000E	300S	526808	5178885	150	Downhill Rocky Sand
	1000E	250S	526774	5178925	420	Downhill Loam

Date	Line	Station	UTM X (m)	UTM Y (m)	Inf I (mA)	Injection Electrode Field Notes
	1000E	200S	526746	5178960	160	Uphill Rocky
	1000E	150S	526715	5178999	450	Flat Rocky Sand
	1000E	100S	526683	5179036	240	Uphill Rocky
	1000E	50S	526649	5179080	450	Uphill Rocky Loam
	1000E	0N	526623	5179112	340	Downhill Rocky
	1000E	50N	526592	5179150	300	Flat Rocky Loam
	1000E	100N	526558	5179192	400	Flat Rocky wet
	1000E	150N	526526	5179232	350	Flat Rocky
	1000E	200N	526493	5179270	340	Downhill Rocky
	1000E	250N	526464	5179305	1240	Flat Swamp
	1000E	300N	526430	5179346	550	Uphill Rocky
	1000E	350N	526399	5179383	210	Flat Loam
	1000E	400N	526371	5179420	380	Flat Loam
	1000E	450N	526336	5179458	1070	Flat Swamp
	1000E	500N	526304	5179501	1380	Flat Swamp
	1000E	550N	526272	5179536	80	Flat Rocky Loam
	1000E	600N	526240	5179578	220	Uphill Rocky
	1000E	650N	526206	5179619	230	Flat Rocky
28-Mar-22	1200E	550N	526407	5179663	1020	Flat Swamp
	1200E	500N	526442	5179625	880	Flat Swamp
	1200E	450N	526476	5179585	750	Flat Swamp
	1200E	400N	526510	5179547	1120	Flat Swamp
	1200E	350N	526541	5179509	950	Flat Mud
	1200E	300N	526573	5179471	990	Flat Swamp
	1200E	250N	526606	5179432	740	Flat Swamp
	1200E	200N	526640	5179394	1220	Flat Swamp
	1200E	150N	526674	5179353	600	Flat Swamp
	1200E	100N	526707	5179312	250	Flat Mud
	1200E	50N	526739	5179277	160	Uphill Soil
	1200E	0S	526769	5179239	400	Downhill Soil
	1200E	50S	526800	5179202	330	Flat Soil
	1200E	100S	526833	5179161	470	Uphill Soil
	1200E	150S	526869	5179127	440	Downhill Soil
	1200E	200S	526902	5179087	300	Uphill Soil
	1200E	250S	526935	5179050	370	Flat Loam

Date	Line	Station	UTM X (m)	UTM Y (m)	Inf I (mA)	Injection Electrode Field Notes
	1200E	300S	526968	5179016	310	Flat Soil
	1200E	350S	527002	5178978	1150	Flat Swamp
	1400E	550S	527286	5178956	260	Uphill Soil
	1400E	500S	527253	5178994	330	Flat Soil
	1400E	450S	527221	5179031	350	Uphill Soil
	1400E	400S	527191	5179067	370	Flat Soil
	1400E	350S	527161	5179102	160	Downhill Soil
	1400E	300S	527126	5179142	960	Flat Mud
	1400E	250S	527094	5179178	670	Flat Pond
	1400E	200S	527057	5179220	620	Flat Swamp
	1400E	150S	527024	5179257	840	Flat Swamp
	1400E	100S	526993	5179294	290	Downhill Soil
	1400E	50S	526959	5179333	950	Flat Swamp
	1400E	0N	526924	5179371	200	Uphill Soil
	1400E	50N	526892	5179409	310	Downhill Soil
	1400E	100N	526859	5179447	420	Downhill Soil
	1400E	150N	526825	5179485	480	Flat Swamp
	1400E	200N	526792	5179522	1120	Flat Swamp
	1400E	250N	526757	5179559	840	Flat Swamp
	1400E	300N	526725	5179597	370	Uphill Loam
	1400E	350N	526693	5179633	320	Downhill Soil
	1400E	400N	526658	5179669	520	Flat Swamp
	1400E	450N	526625	5179707	150	Flat Rocky
	1400E	500N	526591	5179748	250	Flat Soil
	1400E	550N	526563	5179780	310	Flat Soil
	1400E	600N	526530	5179819	270	Flat Soil
	1400E	650N	526497	5179856	310	Flat Soil
	1400E	700N	526465	5179897	390	Flat Soil
	1400E	750N	526434	5179925	190	Uphill Soil
	400N	1600E	526839	5179818	230	Flat Soil
	400N	1550E	526802	5179784	270	Downhill Soil
	400N	1500E	526759	5179751	200	Flat Soil
	400N	1450E	526719	5179713	320	Uphill Soil
	400N	1400E	526679	5179680	280	Downhill Soil
	400N	1350E	526642	5179652	110	Uphill Soil

Date	Line	Station	UTM X (m)	UTM Y (m)	Inf I (mA)	Injection Electrode Field Notes
	400N	1300E	526603	5179620	260	Flat Soil
	400N	1250E	526558	5179589	220	Flat Soil
	400N	1150E	526483	5179523	880	Flat Swamp
	400N	1100E	526445	5179490	1140	Flat Swamp
	400N	1050E	526403	5179458	670	Flat Mud
	400N	950E	526329	5179392	390	Uphill Soil
	400N	900E	526290	5179355	170	Flat Soil
	400N	850E	526253	5179324	180	Flat Soil
	400N	750E	526173	5179261	1200	Lake
	400N	700E	526130	5179230	970	Lake 4.5m
	400N	650E	526093	5179197	1060	Lake 5.0m
	400N	550E	526019	5179132	880	Lake 3.8m
	400N	500E	525982	5179100	230	Uphill Soil
	400N	450E	525945	5179069	400	Flat Rocky
	400N	350E	525868	5179000	1290	Flat Soil
	400N	300E	525832	5178968	440	Flat Soil
	400N	250E	525793	5178936	350	Flat Soil
	400N	150E	525717	5178870	150	Downhill Soil
	400N	100E	525678	5178838	210	Downhill Soil
	400N	50E	525642	5178807	360	Downhill Soil
	400N	0E	525599	5178773	540	Lake 0.5m
	200N	0E	525736	5178622	400	Lake
	200N	50E	525774	5178655	310	Uphill Soil
	200N	100E	525809	5178691	110	Uphill Soil
	200N	150E	525849	5178720	380	UphillSand
	200N	250E	525922	5178791	180	DownhillSand
	200N	300E	525961	5178825	220	Downhill Soil
	200N	350E	526002	5178854	160	Downhill Soil
	200N	450E	526074	5178919	300	Downhill Soil
	200N	500E	526109	5178953	340	Lake
	200N	550E	526147	5178985	950	Lake 2.1m
	200N	650E	526224	5179050	1030	Lake 2.1m
	200N	700E	526263	5179079	950	Lake 1.4m
	200N	750E	526303	5179114	870	Flat Swamp
29-Mar-22	200N	850E	526388	5179172	300	Uphill Soil

Date	Line	Station	UTM X (m)	UTM Y (m)	Inf I (mA)	Injection Electrode Field Notes
	200N	900E	526425	5179211	210	Uphill Soil
	200N	950E	526458	5179239	210	Flat Soil
	200N	1050E	526536	5179307	850	Flat Swamp
	200N	1100E	526577	5179336	220	Downhill Soil
	200N	1150E	526612	5179368	1020	Flat Swamp
	200N	1250E	526689	5179435	850	Flat Swamp
	200N	1300E	526730	5179466	1230	Flat Swamp
	200N	1350E	526769	5179501	1170	Flat Swamp
	200N	1450E	526844	5179566	780	Flat Mud
	200N	1500E	526883	5179595	350	Flat Soil
	200N	1550E	526922	5179628	400	Flat Mud
	200N	1600E	526958	5179659	880	Flat Mud
	0N	1600E	527071	5179500	250	Uphill Soil
	0N	1550E	527033	5179469	230	Flat Soil
	0N	1500E	526999	5179436	140	Downhill Soil
	0N	1450E	526965	5179403	390	Flat Soil
	0N	1350E	526886	5179338	280	Downhill Soil
	0N	1300E	526850	5179308	330	Downhill Soil
	0N	1250E	526809	5179270	410	Flat Soil
	0N	1150E	526736	5179208	380	Flat Soil
	0N	1100E	526698	5179174	360	Flat Soil
	0N	1050E	526658	5179145	370	Downhill Soil
	0N	950E	526585	5179079	550	Flat Soil
	0N	900E	526547	5179050	300	Uphill Soil
	0N	850E	526510	5179017	240	Uphill Soil
	0N	750E	526438	5178951	320	Flat Soil
	0N	700E	526397	5178920	240	Uphill Soil
	0N	650E	526360	5178889	240	Uphill Soil
	0N	550E	526283	5178826	320	Flat Soil
	0N	500E	526246	5178794	500	Flat Soil
	0N	450E	526208	5178762	320	Uphill Soil
	0N	350E	526133	5178701	250	Flat Soil
	0N	300E	526094	5178671	180	Flat Soil
	0N	250E	526059	5178636	160	Downhill Soil
	0N	150E	525978	5178575	280	Uphill Soil
	0N	100E	525945	5178535	290	Downhill Soil

Date	Line	Station	UTM X (m)	UTM Y (m)	Inf I (mA)	Injection Electrode Field Notes
	0N	50E	525909	5178511	230	Downhill Soil
	0N	50W	525833	5178443	260	Downhill Soil
	0N	100W	525781	5178403	280	Flat Rocky
	0N	150W	525756	5178381	420	Uphill Soil
	200S	150E	526101	5178429	90	Flat Soil
	200S	250E	526173	5178491	400	Flat Soil
	200S	300E	526206	5178509	300	Downhill Soil
	200S	350E	526254	5178544	520	UphillSand
	200S	450E	526329	5178607	400	Flat Soil
	200S	500E	526366	5178638	880	Flat Loam
	200S	550E	526410	5178682	850	Flat Loam
	200S	650E	526487	5178740	240	Uphill Soil
	200S	700E	526519	5178782	250	Downhill Soil
	200S	750E	526556	5178808	200	Downhill Soil
	200S	800E	526597	5178834	180	Downhill Soil
	200S	850E	526633	5178870	590	Flat Soil
	200S	900E	526671	5178898	610	Flat Soil
	200S	950E	526710	5178931	230	Flat Soil
	200S	1050E	526788	5178992	180	Uphill Soil
	200S	1100E	526819	5179024	120	Flat Soil
	200S	1150E	526858	5179058	430	Flat Swamp
	200S	1250E	526939	5179115	350	Flat Soil
	200S	1300E	526976	5179145	150	Downhill Soil
	200S	1350E	527021	5179188	820	Flat Swamp
	200S	1450E	527100	5179248	320	Flat Soil
	200S	1500E	527137	5179274	290	Flat Soil
	200S	1550E	527173	5179303	140	Flat Sand
	200S	1600E	527217	5179332	80	Flat Rocky

Table 7: Current Injection Field Notes

4.8 SAFETY

Canadian Exploration Services Ltd prides itself in creating and maintaining a safe work environment for its employees. Each crew member is briefed on the job site location, equipment safety, standard operating procedures along with our health and safety manual. An emergency response plan is generated relating to the specific job

and with the jobsite predominantly in the field, which is unpredictable, morning safety briefings are essential. Topics are generally chosen based on jobsite characteristics of the area, weather and crew experience.

Daily topics included:

Date	Safety Topic
March 21, 2022	Awareness in the workplace and surroundings. This can make you aware of new dangers and current working conditions.
March 22, 2022	Working on the ice. Always check ice prior to going on it. Pay attention to spider holes. Mark and notify others of dangerous ice conditions.
March 23, 2022	Slips/trips/falls. Number one cause of loss time in the workplace. 3 Points of contact rule.
March 24, 2022	Power protocol – Always assume power is on. Clear in "Front/Back". Do not clip in/out while transmitting. Always ask TX operator before touching wires.
March 25, 2022	Weather
March 26, 2022	Snowmachine circle checks and proper P.P.E
March 27, 2022	Weekly Review
March 28, 2022	Garbage. Keep the work areas and trucks clean and organized.
March 29, 2022	Communication is key to safety. Listen for the power protocols and check in regularly when alone.
March 30, 2022	Weather - Special Weather Warning. Pay attention to and dress for the conditions. Be prepared for rapid changes in the conditions.
April 1, 2022	Trucks/Trailers circle checks, check load several times during trip to ensure, No flat tires, leaf springs, straps etc.

Table 8: Daily Safety Topics

5. INSTRUMENTATION & METHODS

5.1 INSTRUMENTATION[1]

Twenty two 2-channel Full Waver IP receivers were employed for the 3D IP survey. The transmitter consisted of a GDDII (5kW) with a Honda 6500 as a power plant. Two current monitors were connected to the transmitter to record the current transmitted; one to record each 90s transmit and the second to continuously record throughout the day, as a backup.

Time domain IP surveys involve measurement of the magnitude of the polarization voltage that results from the injection of pulsed current into the ground. Apparent resistivity and chargeability are the parameters of interest measured through this procedure.

5.2 THEORETICAL BASIS

Time domain IP (TD-IP) surveys involve measurement of the magnitude of the polarization voltage that results from the injection of pulsed current into the ground.

Two main mechanisms are known to be responsible for the IP effect although the exact causes are still poorly understood. The main mechanism in rocks containing metallic conductors is electrode polarization (overvoltage effect). This results from the buildup of charge on either side of conductive grains within the rock matrix as they block the flow of current. On removal of this current the ions responsible for the charge slowly diffuse back into the electrolyte (groundwater) and the potential difference across each grain slowly decays to zero.

The second mechanism, membrane polarization, results from a constriction of the flow of ions around narrow pore channels. It may also result from the excessive build up of positive ions around clay particles. This cloud of positive ions similarly blocks the passage of negative ions through pore spaces within the rock. On removal of the applied voltage the concentration of ions slowly returns to its original state resulting in the observed IP response.

In TD-IP, the current is usually applied in the form of a square waveform, with the polarization voltage being measured over a series of short time intervals after each current cut-off, following a short delay of approximately 0.5s. These readings are integrated to give the area under the decay curve. The integral voltage is divided by the observed steady voltage (the voltage due to the applied current, plus the polarization voltage) to give the apparent chargeability (Ma) measured in milliseconds.

[1] Refer to appendix B for instrument specifications.

For a given charging period and integration time the measured apparent chargeability provides qualitative information on the subsurface geology.

The polarization voltage is measured using a pair of non-polarizing electrodes like those used in spontaneous potential measurements and other IP techniques.

5.3 Survey Specifications

3D Distributed Induced Polarization Array

The 3D Distributed Induced Polarization array configuration was used for this survey. This array consisted of 66 mobile stainless steel read electrodes and two current electrodes. 22 portable receivers were each connected to 3 read electrodes (P1, P2, and P3) to create 2 orthogonal components with 100m dipole spacing. The power location CA was chosen based on field conditions but placed throughout the survey area (randomly or in a grid-like manner). In this case, there were 8 northwest-southeast, spaced at 200m intervals and 4 northeast-southwest lines, also spaced at 200m, used for power locations. A road was also used for current locations. Along each line the power transmits were injected at approximately every 50m. The transmitter operator controlled which remote electrode was being used. The infinite was located approximately 5 kilometers north-northeast of the survey area at 525280E and 5184071N. The infinite was placed in their locations to achieve a pole-dipole array configuration. The maximum theoretical depth obtained was approximately 380 metres. A two second transmit cycle time was used for a duration of 90 seconds for approximately 12 stacks.

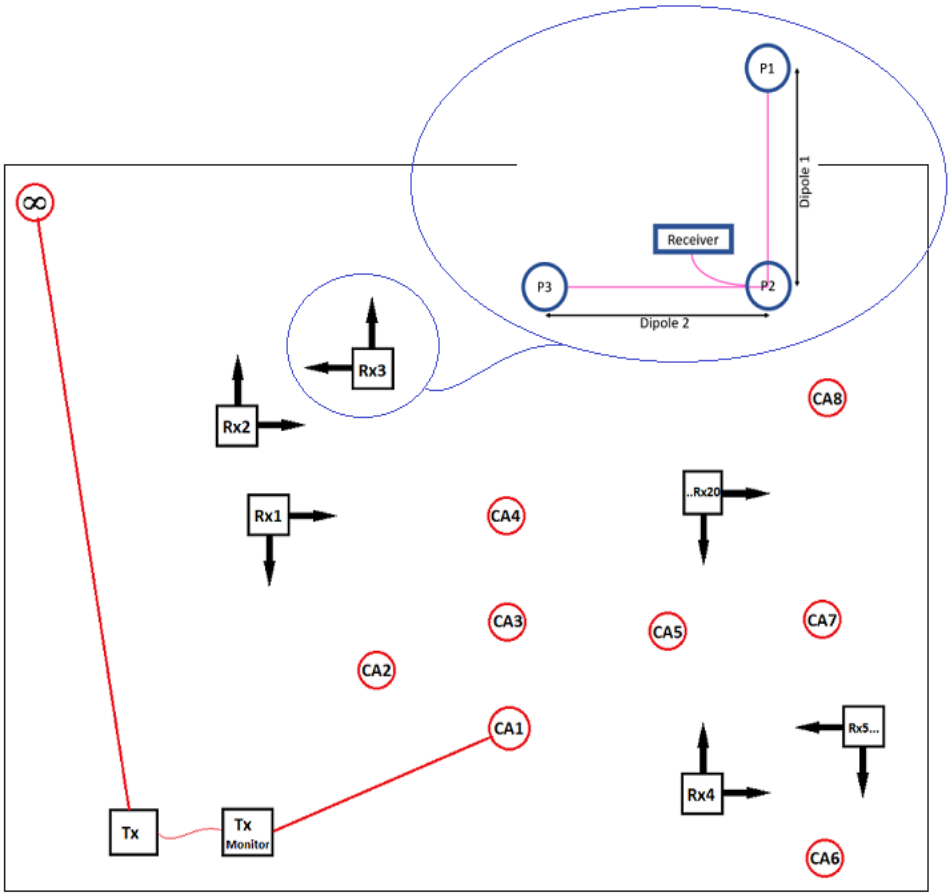


Figure 10: 3D Distributed IP Configuration

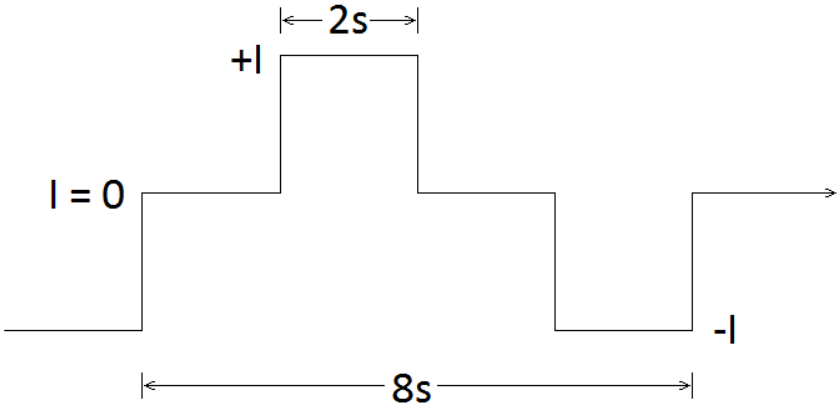


Figure 11: Transmit Cycle Used

6. QUALITY CONTROL & PROCESSING

6.1 FIELD QUALITY CONTROL

Daily field quality control steps consisted of the following:

1. Resistivity checks – the resistivity of each dipole was recorded in the field pre- and post-acquisition to ensure dipoles were connected to the receiver properly and the electrode was well contacted with the ground.

2. GPS checks – internal GPS of each receiver was checked that they were placed in the proper position. GPS and injection file time stamps were compared to confirm correlation.

3. Data check – data was dumped daily and confirmed that the number of GPS points matched the number of injection files.

4. Backup – a second current monitor recorded the transmit cycles continuously throughout every acquisition day. If necessary, the backup was used.

5. Repeats – repeats of lines/data were taken if necessary.

6.2 PROCESSING

In the office, processing of the data and quality control was done interchangeably. The steps included:

1. Import positions – GPS coordinates were imported into each corresponding current injection file (IAB) and receiver file (VMN) using the Fullwave Viewer Software.

2. GPS check – the imported positions were confirmed on Google Earth.

3. Synchronization check – in case of GPS lags or different time settings the synchronization of the files was checked to determine they match (Figure 12).

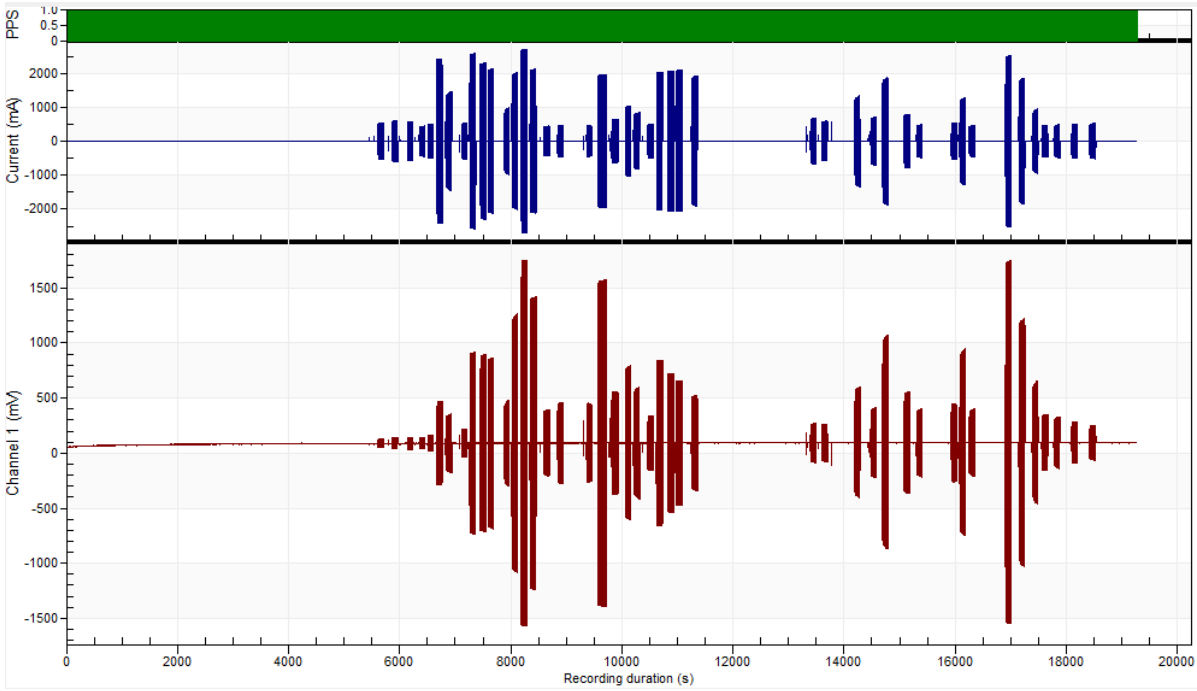


Figure 12: Receiver recordings (red) synchronized with the current injections (blue)

4. Prosys output – a complete .bin file was output from the Fullwave Viewer software.

5. Data quality control – values were viewed in the complete .bin file. Accepted values with a normal M1-M20 range would have a proper transmit cycle, a smooth curve, and a high amplitude low frequency narrow peak (Figure 13). Unaccepted values with an abnormal M1-M20 range (Figure 14, red circle) would not have proper signals (Figure 15). These abnormal values could be due to a few different things or a combination of the following; the dipole being too far from the current injected, the background noise being greater than that of the current injected, poor dipole coupling, and/or cultural features on surface causing coupling or a significant background noise interference. These were removed in the following step.

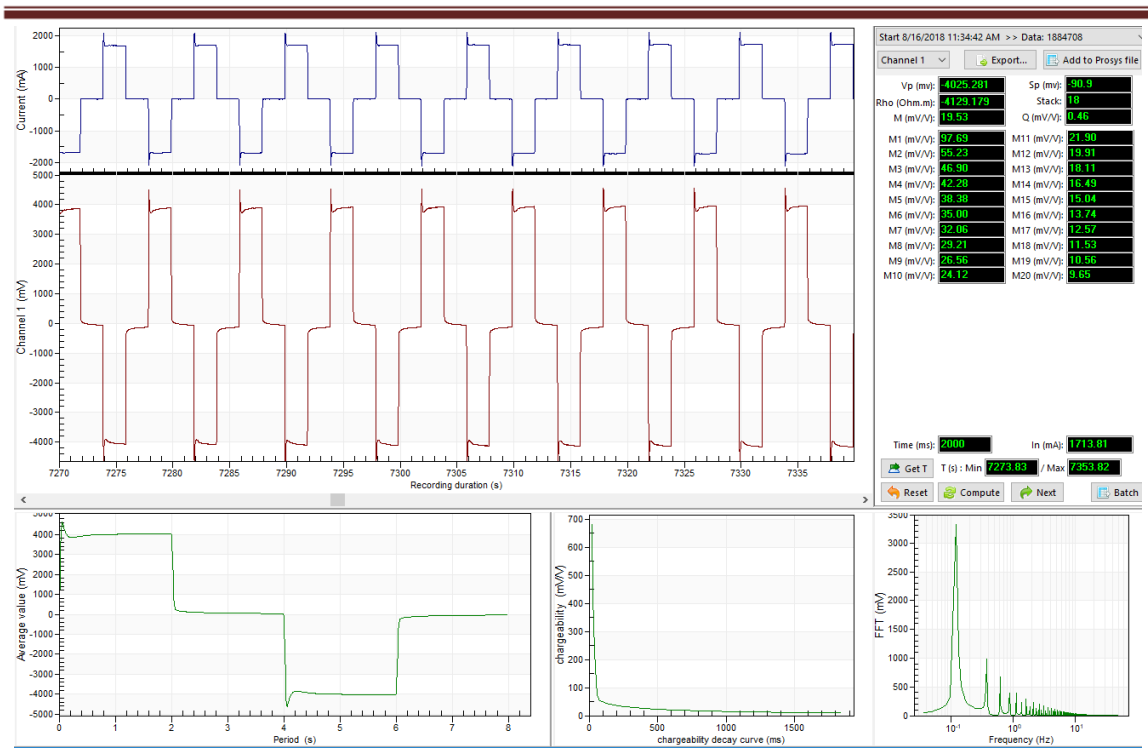


Figure 13: Good 90 second transmit/read pair. Injection (blue), read signal (red), transmit signal (bottom left), decay curve (bottom centre), FFT (bottom right).

M1 (...	M2 (...	M3 (...	M4 (...	M5 (...	M6 (...	M7 (...	M8 (...
69.11	45.44	39.99	36.58	33.48	30.76	28.53	26.05
75.78	48.86	41.69	37.53	34.34	31.16	27.97	25.89
75.73	50.14	43.65	39.60	36.34	33.18	30.49	27.90
81.56	54.13	46.51	41.97	38.16	34.65	31.68	28.80
69.46	44.71	38.75	35.17	32.20	29.45	27.06	24.76
94.25	66.44	57.79	52.34	47.77	43.66	40.14	36.61
128554.88	-11085.17	-14311.44	-14973.24	-16379.58	-4281.03	4318.25	-3929.44
67.53	41.83	35.53	32.24	29.36	26.85	24.26	22.33
65.87	42.73	37.79	34.62	31.80	29.44	27.04	24.97
91.27	62.90	54.94	49.39	45.30	41.31	37.83	34.67
91.55	63.34	55.08	50.01	45.57	41.54	38.07	34.83
124.30	92.27	80.17	72.73	66.38	61.02	56.01	50.97
66.66	44.00	37.08	32.36	29.95	27.68	24.13	22.05

Figure 14: Output .bin file viewed in Prosys. Larger abnormal M values circled in red.

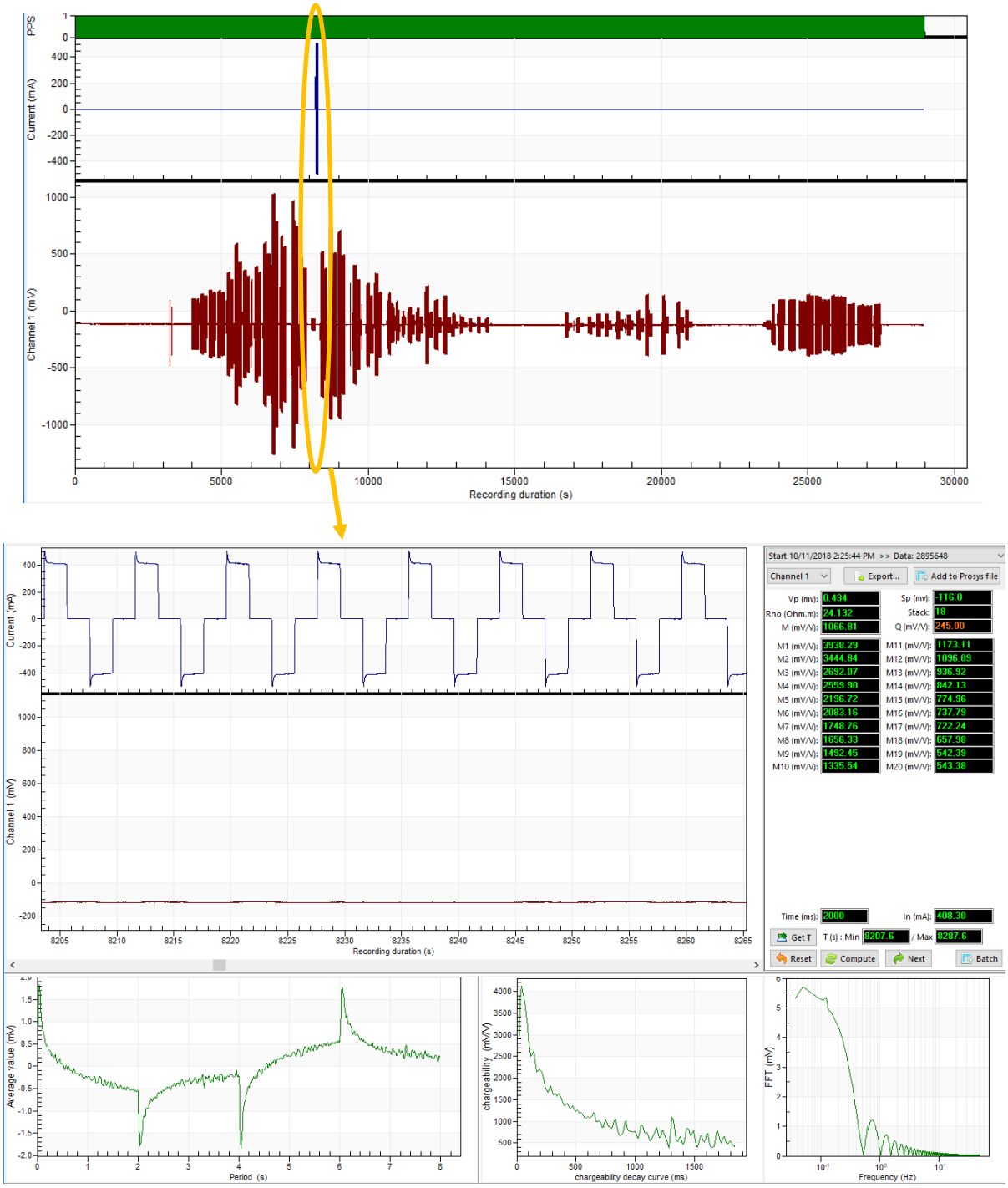


Figure 15: Signal, cycle, and curves of abnormal unaccepted M values.

6. Filtering – Values with unrealistic resistivities and chargeabilities, high standard deviations, large geometric factors, and that are oversaturated were filtered out (Figure 16).

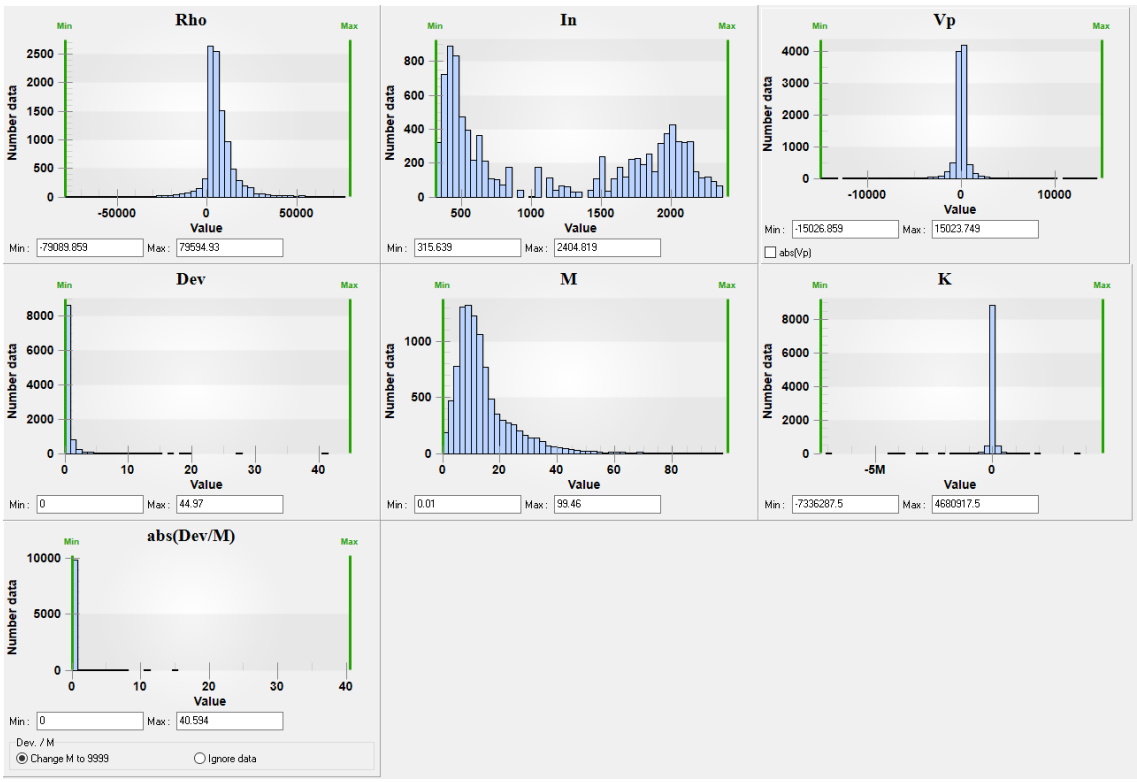


Figure 16: Filtering options

3D viewing of the raw calculated chargeability and resistivity results was observed in Geosoft Oasis (Figures 17-20; Y=North). Calculated report points from acquisition were recorded at a maximum depth of approximately 700 metres depth.

A total of 10570 filtered data points was collected from this 3D IP survey configuration over a period of 4 survey days of reading.

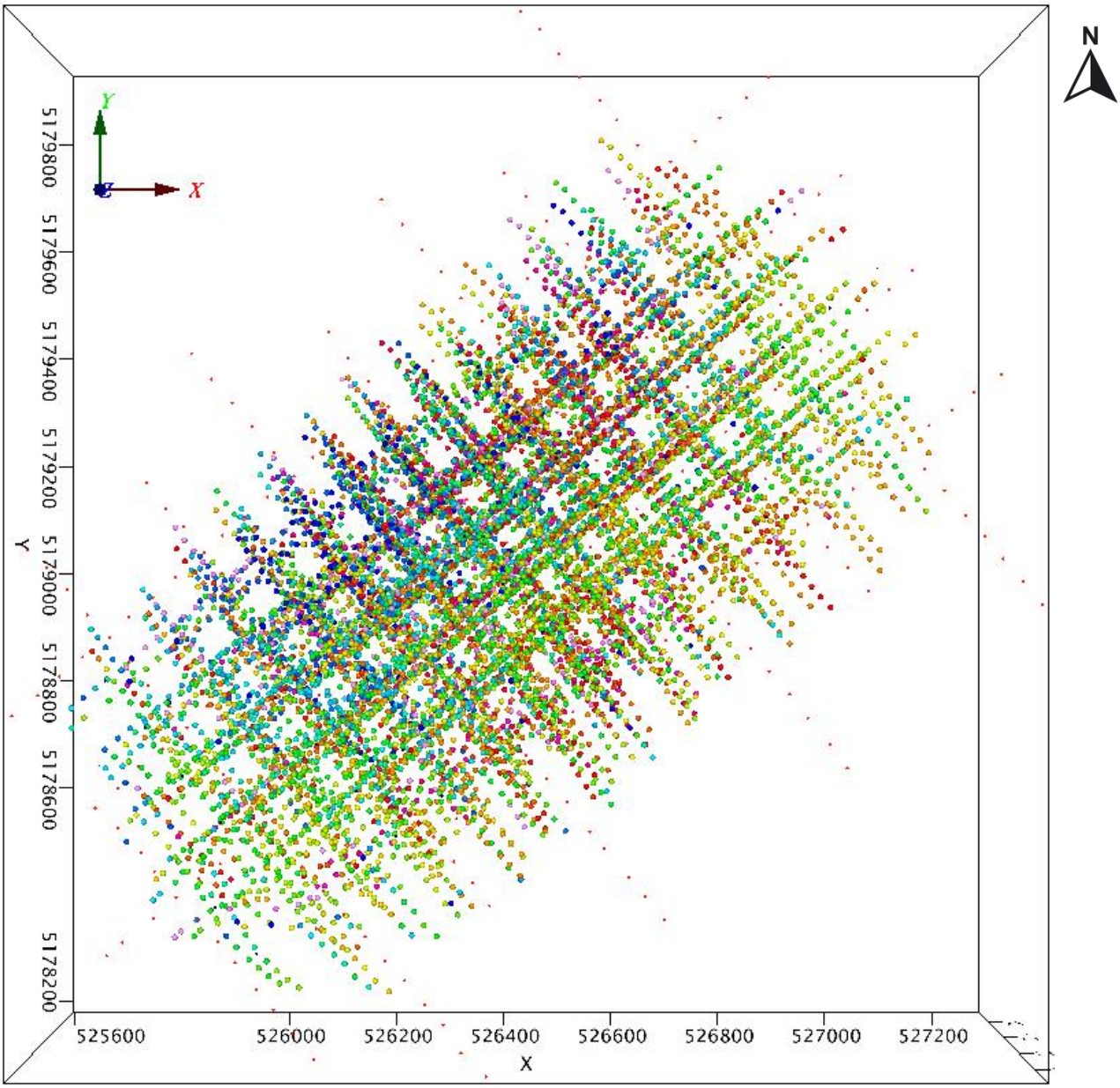


Figure 17: Measured chargeability data points with transmit locations (red dots) looking down.

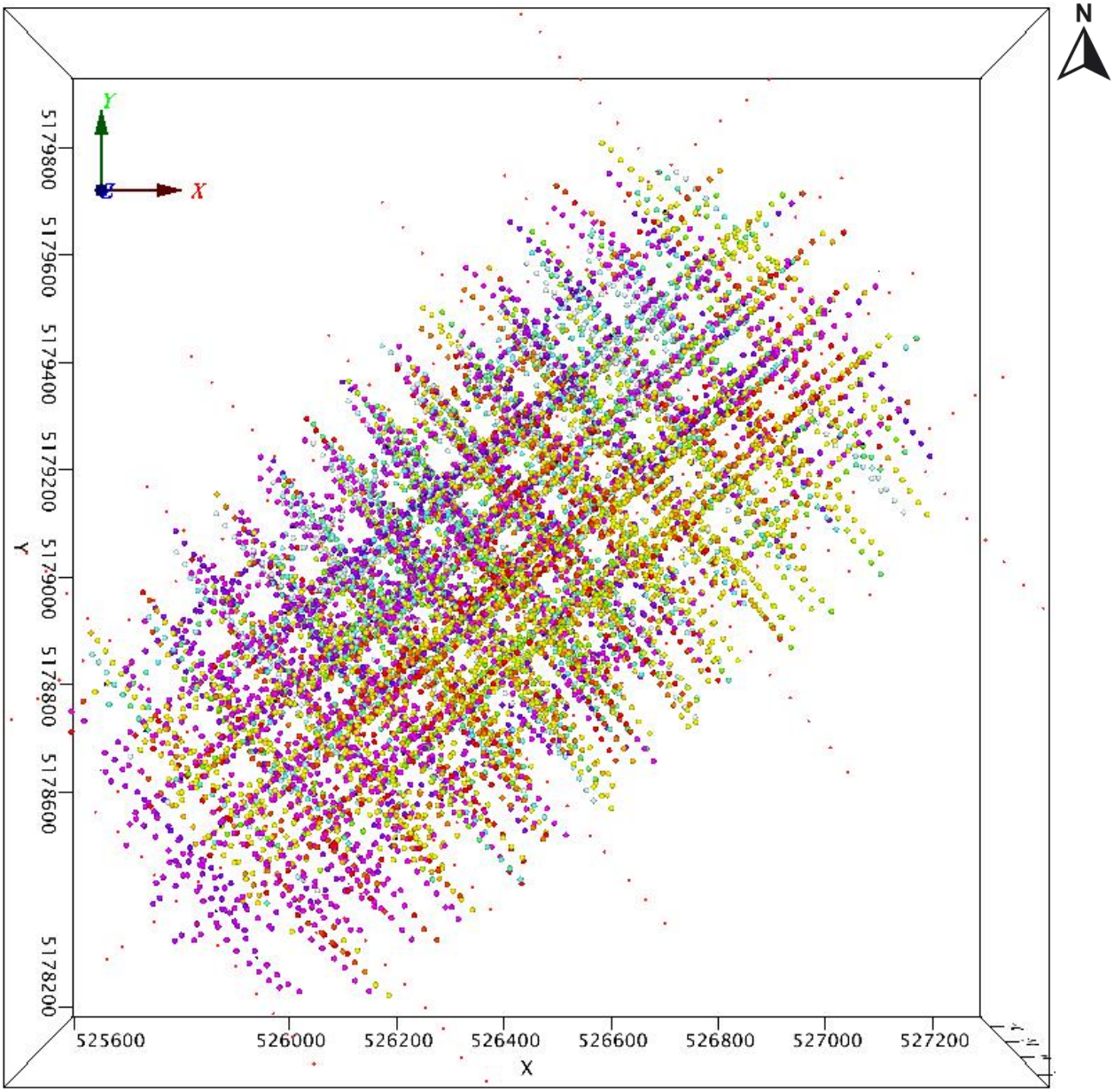


Figure 18: Top view of the complete set of measured resistivity data points

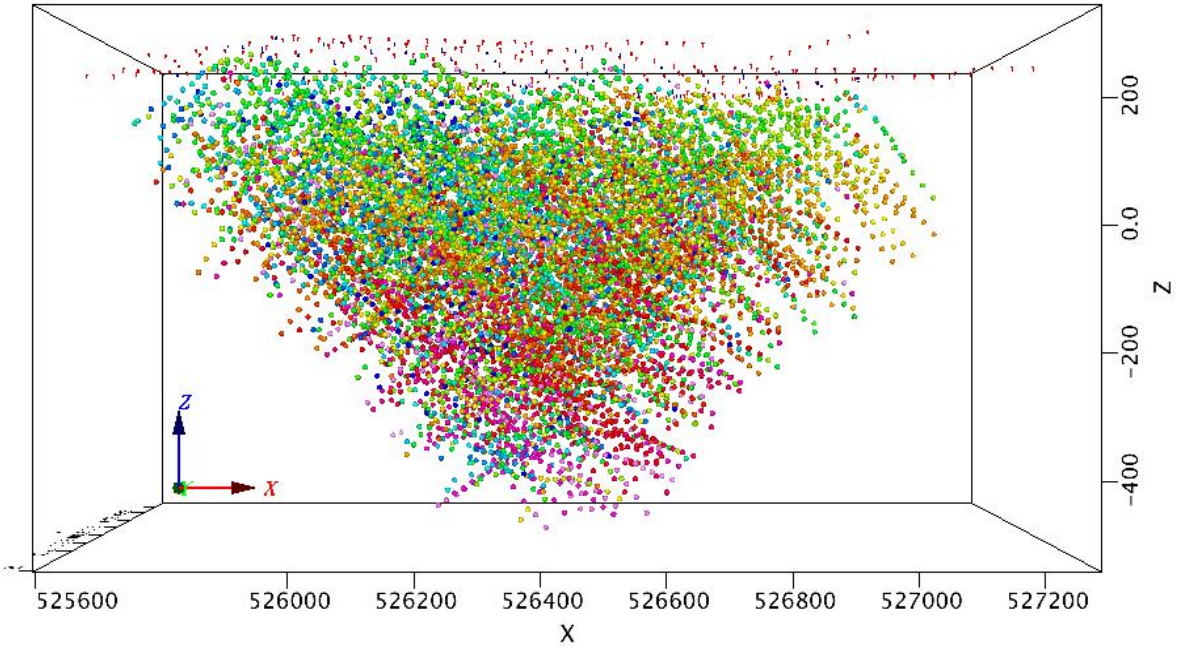


Figure 19: Side view of the complete measured chargeability dataset facing north

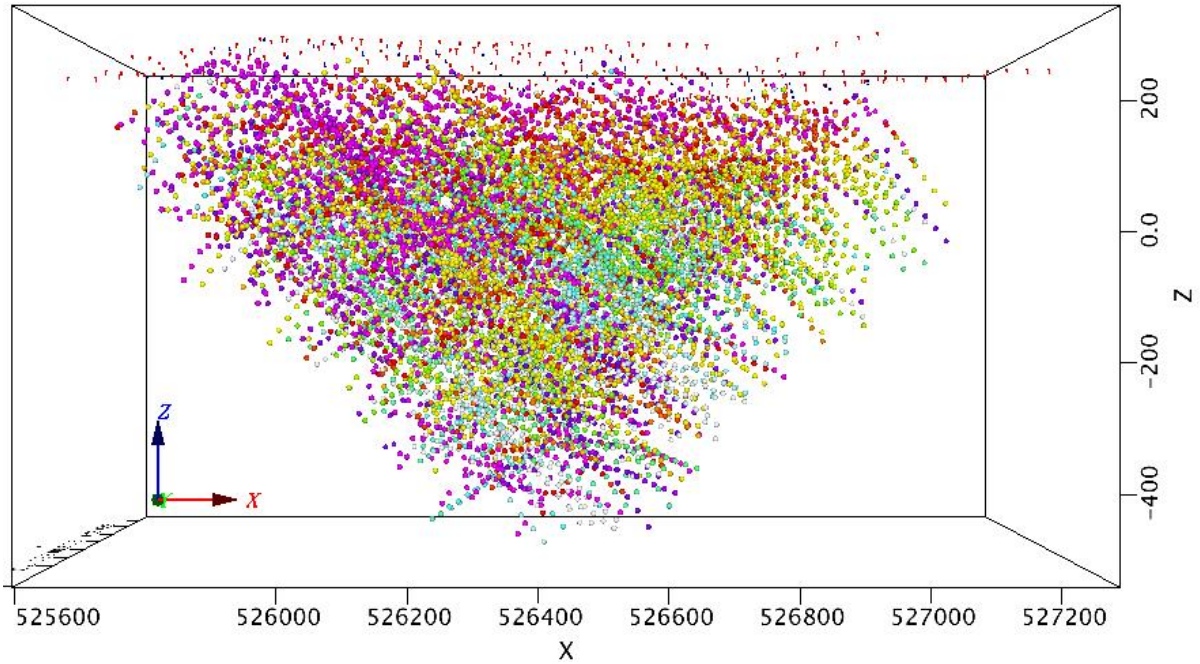


Figure 20: Side view of the complete measured resistivity dataset facing north

6.3 INVERSION

Inversions of the filtered data was done in RES3DINV Professional version 3.18.4. RES3DINV is a 3D inversion software specifically used for resistivity and induced polarization data. From the finalized Prosys file an export to a RES3DINV format was created with specific selections depending on the survey type completed. The selections seen in Figure 21 are standard 3D distributed IP array settings. Depending on the intended survey array type, including the remote may or may not be used. The topography was included in the dataset for inversion.

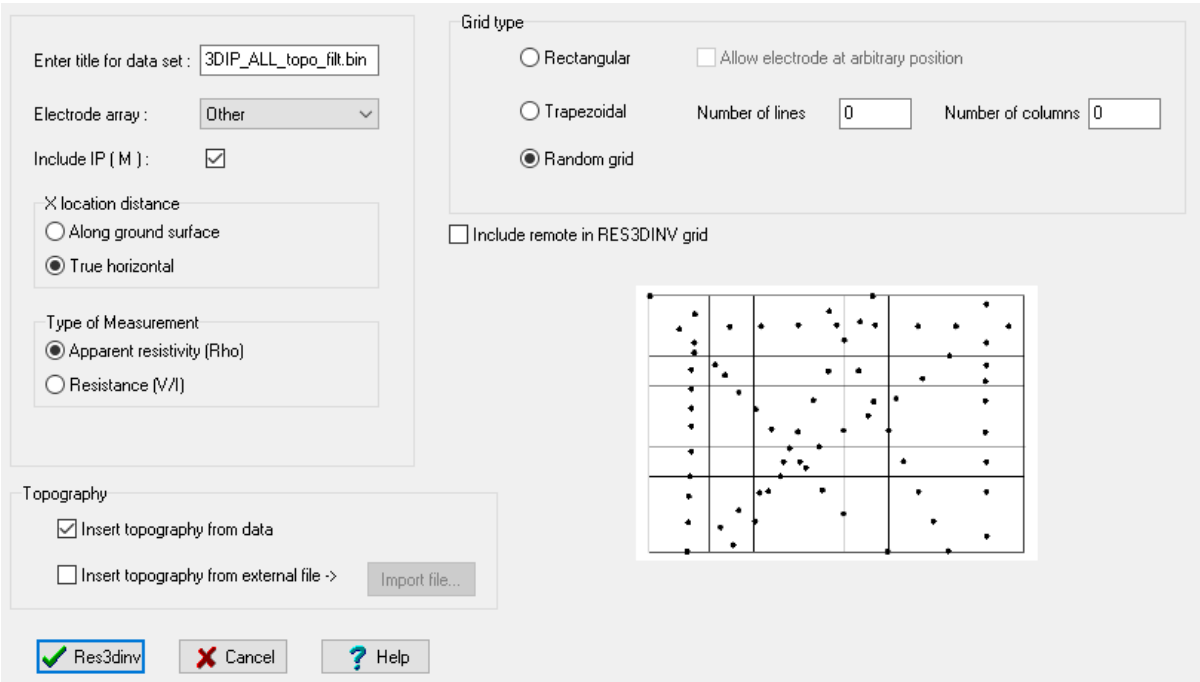


Figure 21: Export settings selection from Prosys to RES3DINV

Model grid settings were chosen based on the infinite locations and the dipole lengths. A uniform cell size was chosen to be ¼ or 1/5 of the dipole length, in this survey case a cell size of 25m was used. To reduce edge artifacts a few cells extension was added. Manual edits to the cell uniformity may be necessary depending on the location of the infinite. In this case manual edits were not made as the two remote electrodes were close to the survey layout. Both remotes were included in the inversion.

The theoretical maximum depth obtained from the Fullwaver Designer was 380 metres. Calculated report points from acquisition were recorded at a maximum depth of approximately 600 metres depth. However, a maximum depth of 400 metres was used because resolution and sensitivity decrease as depth increases. Sensitivity

values represent how well the model is constrained, with higher sensitivities providing less uncertainty and greater validity. To constrain and optimize both the resolution and sensitivity of the inversion a maximum depth of 725m was used.

Important inversion parameters used for the creation of the model are described in Table 9[2].

Parameter	Description
Refined Topography	Estimates topography of each interior node individually to take non-linear topography variations within each model block into account.
Higher Damping of 1st layer	Useful to avoid unusually large resistivity variations in the top layer (Loke and Dahlin 2010).
Diagonal Filter Components	Reduces effects of produced structures with boundaries aligned along the horizontal and vertical directions.
Robust Data Constraint	Attempts to minimize the absolute difference between the measured and calculated apparent resistivity values (Claerbout and Muir 1971). Less sensitive to very noisy data point.
Robust Model Constraint	Produces models with regions of more uniform resistivity values with sharper boundaries.
Incomplete Gauss-Newton	An approximate solution of the least-squares equation that uses an iterative linear conjugate-gradient method.
Reference Model	An additional constraint on the model to limit the deviation of the model resistivity from a homogenous reference model. This is normally the average of the apparent resistivity values.
Logarithm of Apparent Resistivity	In 2D systems it is ~impossible to determine whether the measured potential has the same sign as the transmitted current, thus it was assumed apparent resistivity is always positive and the logarithm is used. However, negative apparent resistivity values not caused by noise are observed in 3D distributed IP systems, especially with near-surface large resistivity contrasts and topography. Thus, the logarithm of apparent resistivity is not used because negative apparent resistivity values are real and kept throughout the inversion for a more accurate model. (Loke, 2018)
Forward Modeling Method	The finite-element method with a medium extended 4 horizontal node mesh between electrodes is used for datasets with topography and for improved accuracy.
Non-Linear IP Complex Method	The non-linear method calculates apparent IP using a complex resistivity formula. This method treats the conductivity as a complex quantity with real and imaginary components (Kenma et al. 2000). The complex conductivity and complex potential are calculated. These components are calculated in a two-step inversion process during each iteration. First the resistivity model is calculated, then the IP model is calculated.

[2] Refer to the RES3DINV manual and tutorial by Dr. M.H. Loke.

IP Model Transformation	The “range-bound” transformation method is used to ensure the model IP values produced by the inversion program does not exceed the lower or upper limits of 0-800 mV/V.

Table 9: Inversion Parameter Descriptions (© (1996-2018) M.H.Loke)

7. RESULTS, INTERPRETATION & CONCLUSIONS

7.1 RESULTS

The inversion was run through many iterations, until an error convergence of less than 1% was achieved. Iteration 6 was the chosen version. Eight of the twelve depth sections of the IP and resistivity from the RES3DINV viewer of iteration 5 is shown in the next two figures, respectively. From top left to top right and bottom left to bottom right the blocks are at depths: 0-25m, 25-53.8m, 53.8-86.8m, 86.8-124.8m, 124.8-168.6m, 168.2-218.8m, 218.8-276.7m, and 276.7-343.2m.

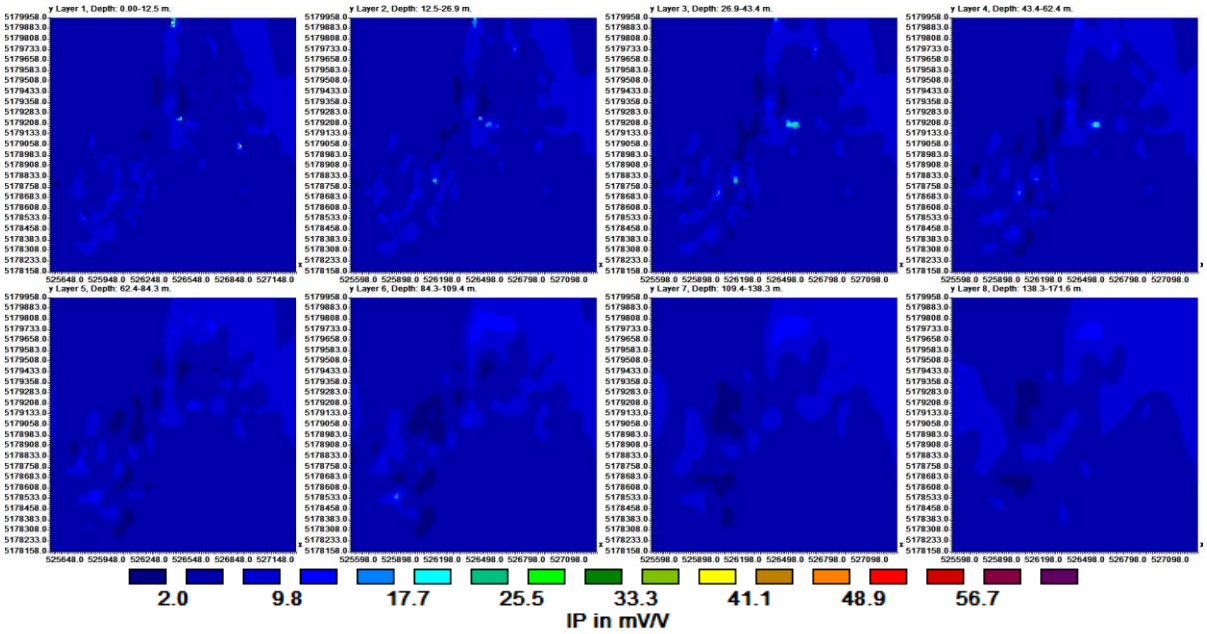


Figure 22: 8 IP depth sections ranging from 0-171.6m as viewed in RES3DINV

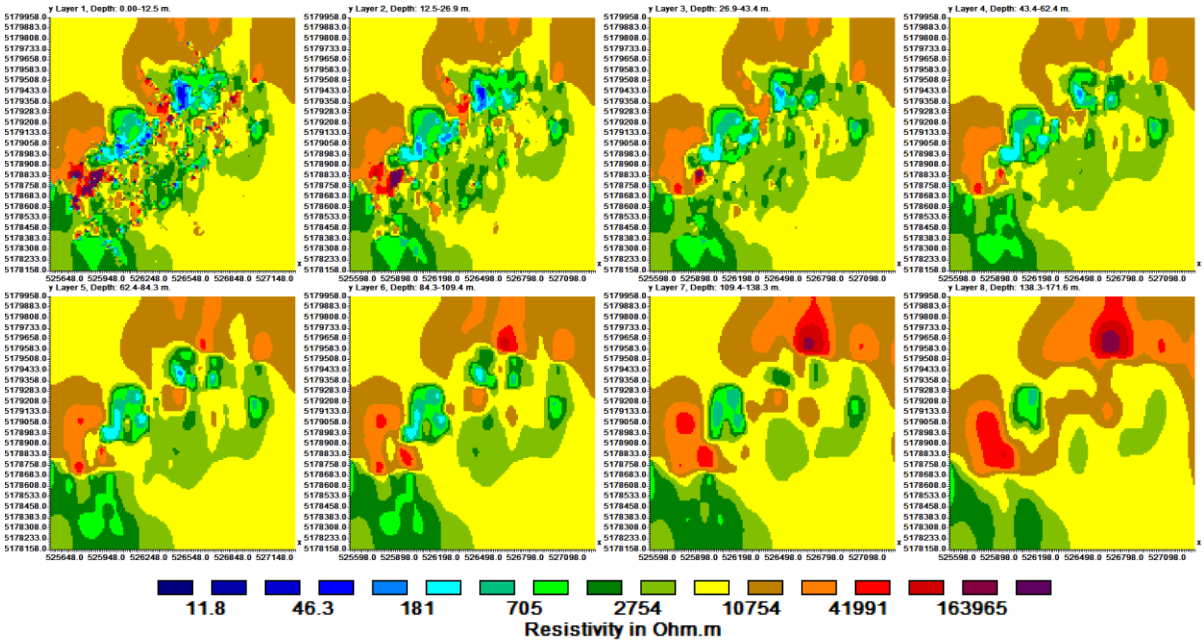


Figure 23: 8 resistivity depth sections ranging from 0-171.6m as viewed in RES3DINV

A final XYZ was output from the inversion iteration 6 and provided the resistivity, conductivity, chargeability, and sensitivity values at the centre and the corner of the model blocks. In this case, resolution was also calculated. This was imported and modelled in Geosoft Oasis.

A horizontal slice of the chargeability and resistivity from the final inversion model overlaid in Google Earth is seen in the following two figures.

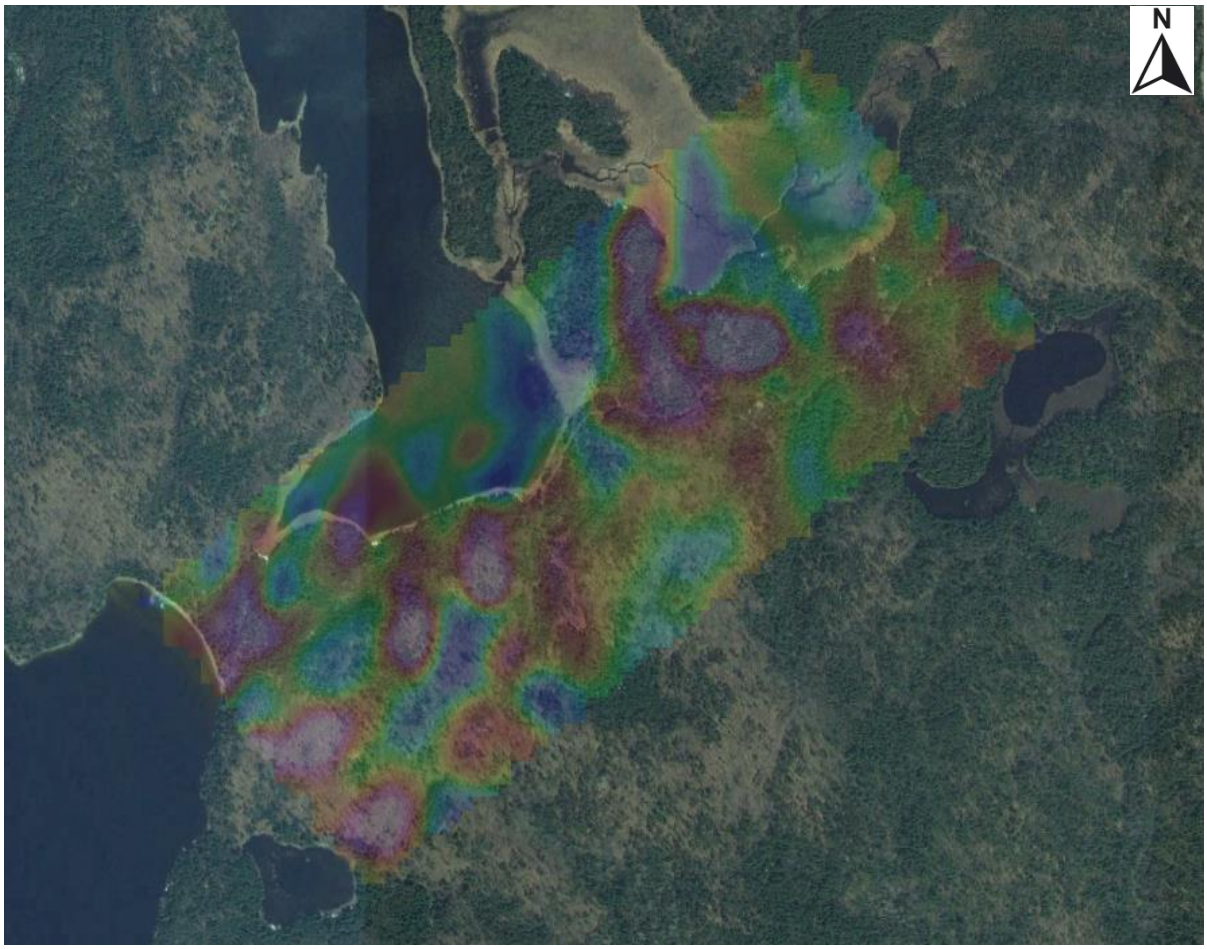


Figure 24: Chargeability grid (250m MSL) overlaying Google Earth. (©2023 Google, Image ©2023 Maxar Technologies)

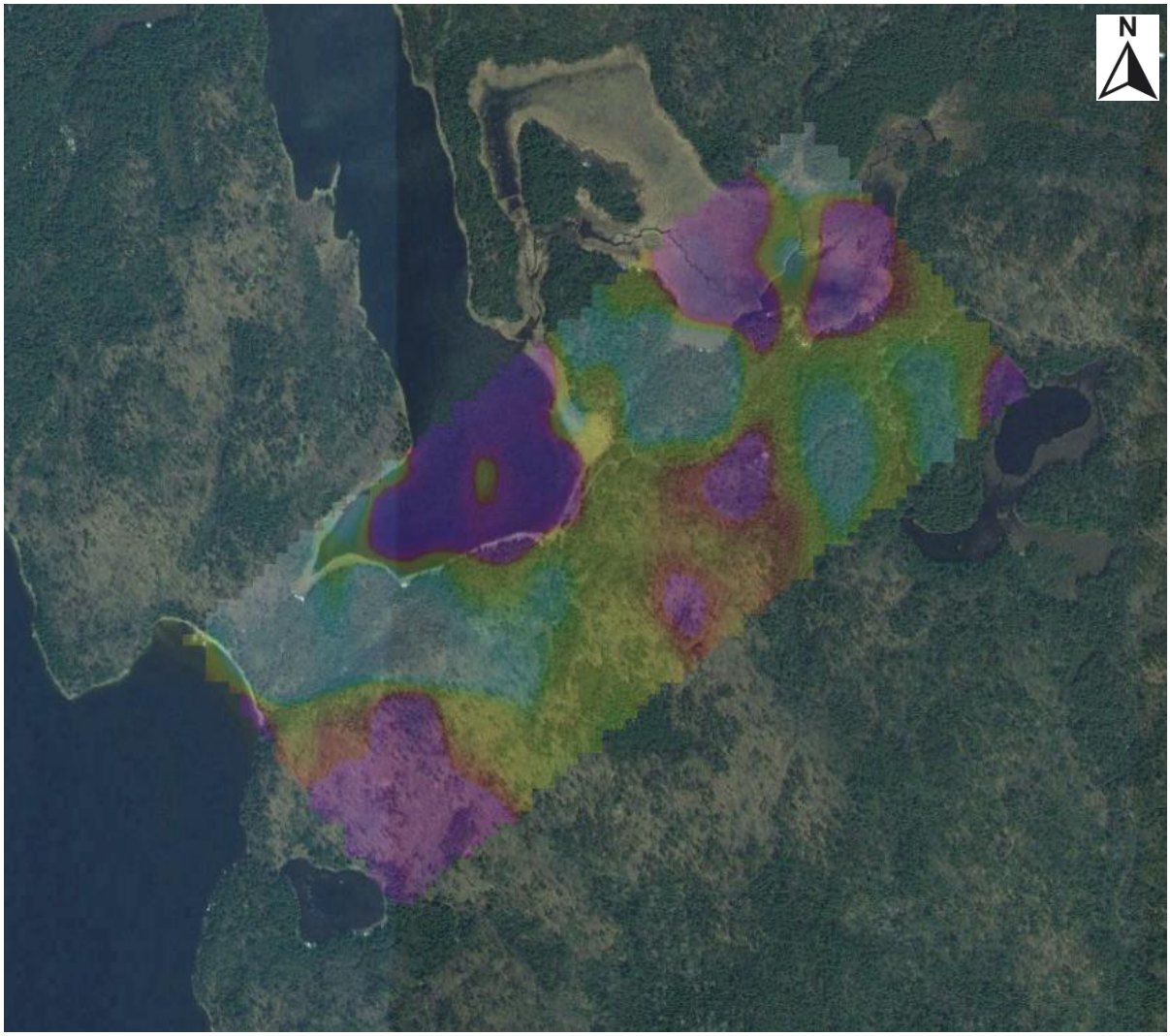


Figure 25: Resistivity grid (250m MSL) overlaying Google Earth. (©2023 Google, Image ©2023 Maxar Technologies)

7.2 INTERPRETATIONS[3]

Targeting of the survey revolved around the location of historical mineralization. The survey was designed to assist in delineating and defining the mineralization along with exploring the remainder of the area for additional mineralization.

Figures 25 and 26 are examples of the 3D chargeability model at 18mV/V superimposed on a 100 metre MSL chargeability slice. Numerous chargeability anomalies appear within the model.

[3] Note for all interpretation figures North is in the Y-direction.

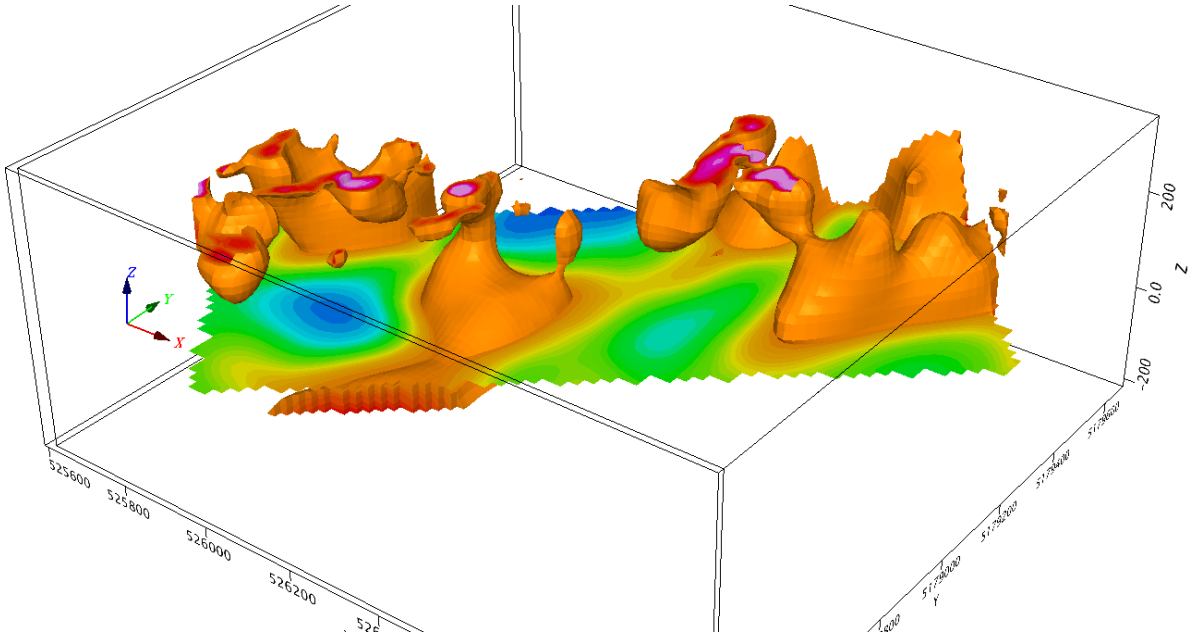


Figure 26: 3D chargeability voxel looking northwest with 50m MSL slice (purple voxel = >7mV/V)

Generally, the chargeability appears weak within the survey area with the maximum chargeability, from the inversion results, falling in the range of 25mV/V. These elevated chargeability responses fall at 526610E 51791200N (anomaly A), 526493E 5179250N (anomaly B) and 526171E 5178810N (anomaly C). These sites should be investigated through prospecting.

One of these chargeability trends extends from 526320E 5178695N to 526278E 5179000N (anomaly D) with a weaker region closer to the north end. A second trend extends from 526625E 5178900N to 526595E 5179075N then appears to offset to the west and increase in chargeability and extend from 526475E 5179100N to 526400E 5179375N (anomaly E). The 526475E 5179100N to 526400E 5179375N anomaly may also be related to a contact.

Three additional chargeability trends begin to emerge at approximately 200 meters depth. These three trends appear to strike at approximately 60 degrees and can be seen at 526725E 5179185N to 526817E 5179344N and 526161E 5178856N to 526425E 5179097N and 525787E 5178756N to 525885E 5178919N.

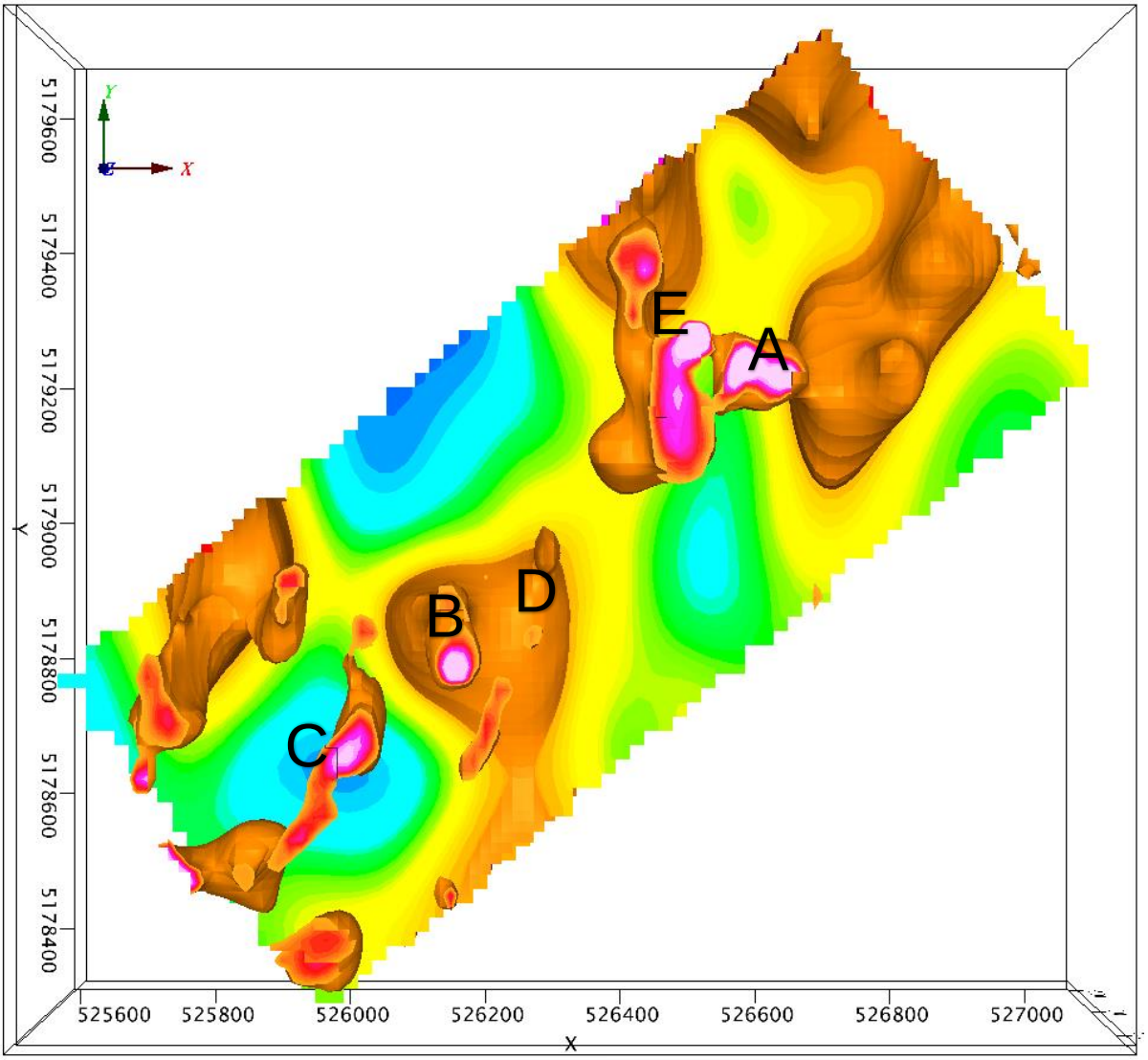


Figure 27: Top view of the 3D chargeability voxel with 50m MSL slice (purple voxel = >7mV/V)

Figure 29 shows the resistivity model of less than 250 ohm.meters on the resistivity 150m MSL plane. It was found that the ground below 158MSL was less resistive, and this may indicate a change in geological units.

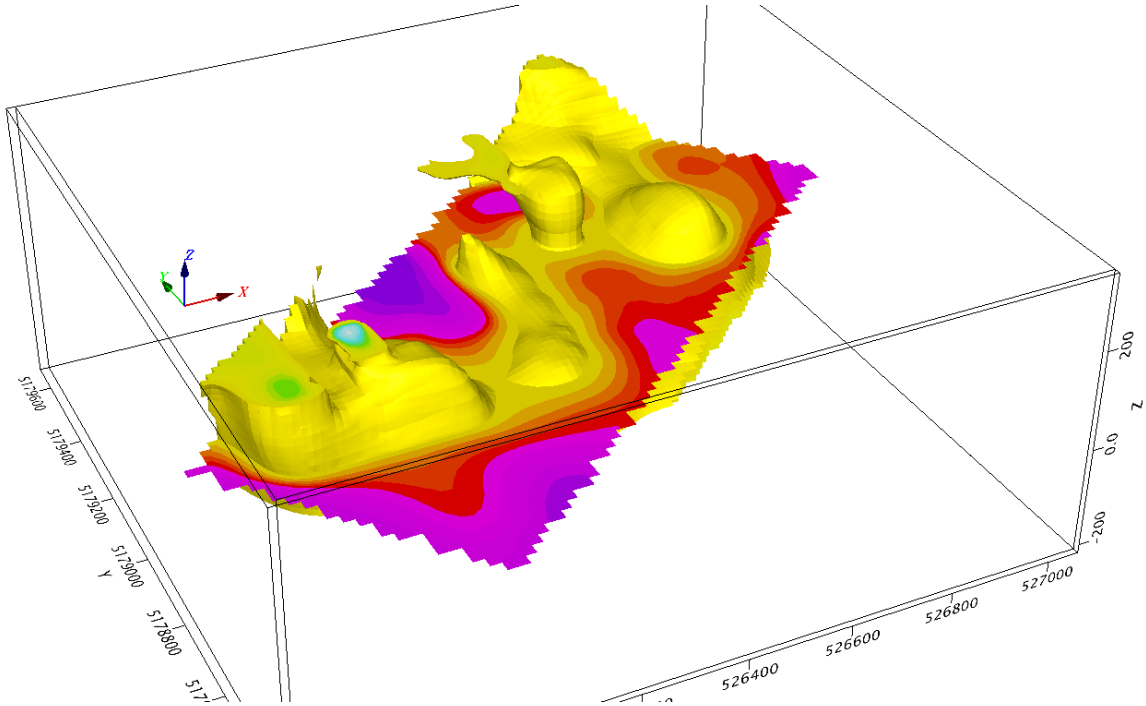


Figure 28: 3D resistivity voxel with 100m MSL slice (purple voxel = >15000 ohm.meters)

The resistivity data suggests that the eastern part of the survey area is underlain by a more resistive feature at depth. This may indicate a more resistive bed of the Huronian Supergroup unit exists at 200-300m depth.

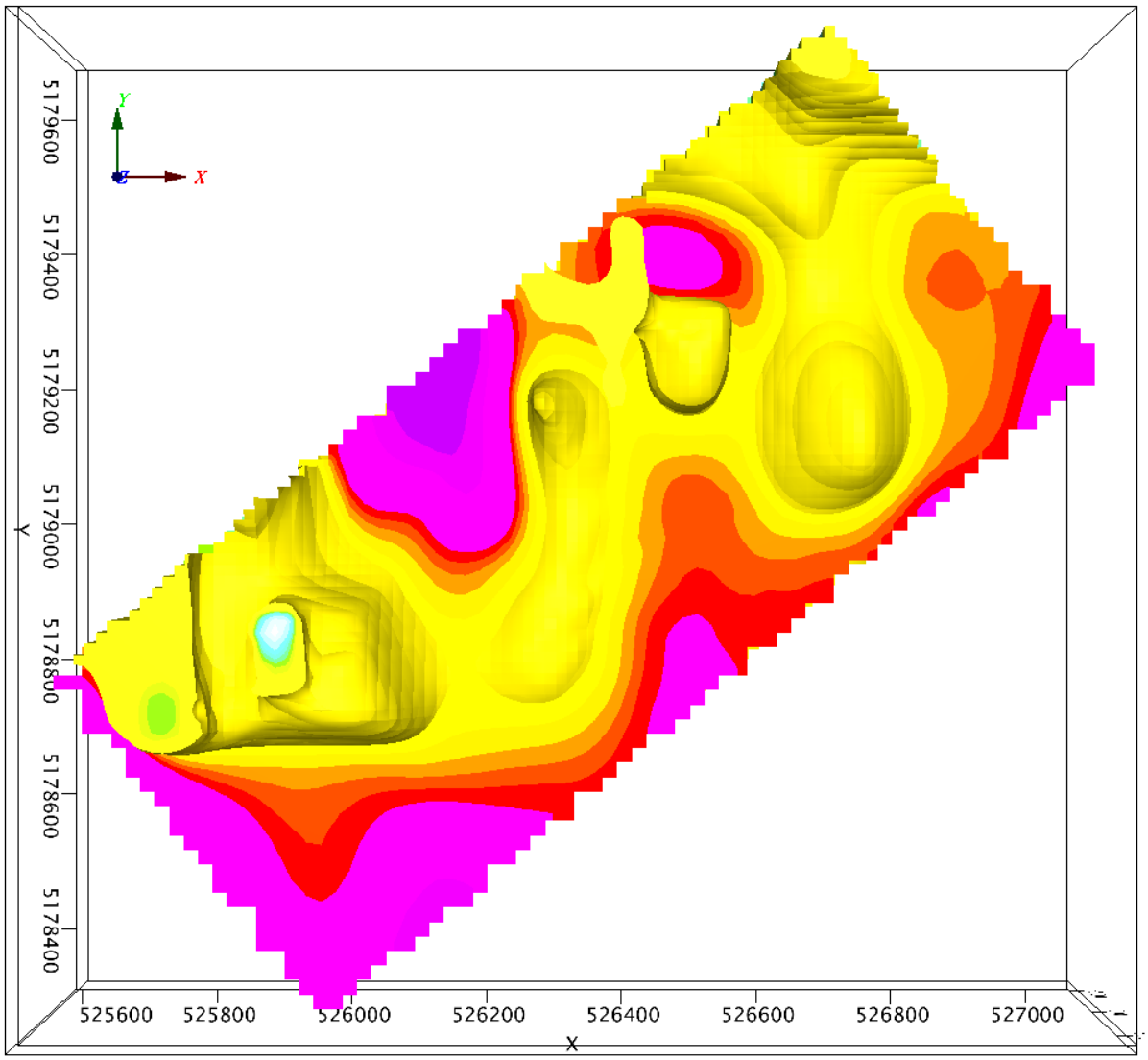


Figure 29: Resistivity model (purple <250 ohm.meters) on a resistivity 150m MSL plane

The resistivity and chargeability data indicate the area is most likely covered by two geological units. The southern unit appears to be represented by varying chargeability signatures which strike in various directions. This same pattern can be seen in the north which indicates that the southern unit most likely plunges and is overprinted. The southern unit most likely represents the Nipissing Diabase sill with the northern unit representing part of the Huronian Supergoup.

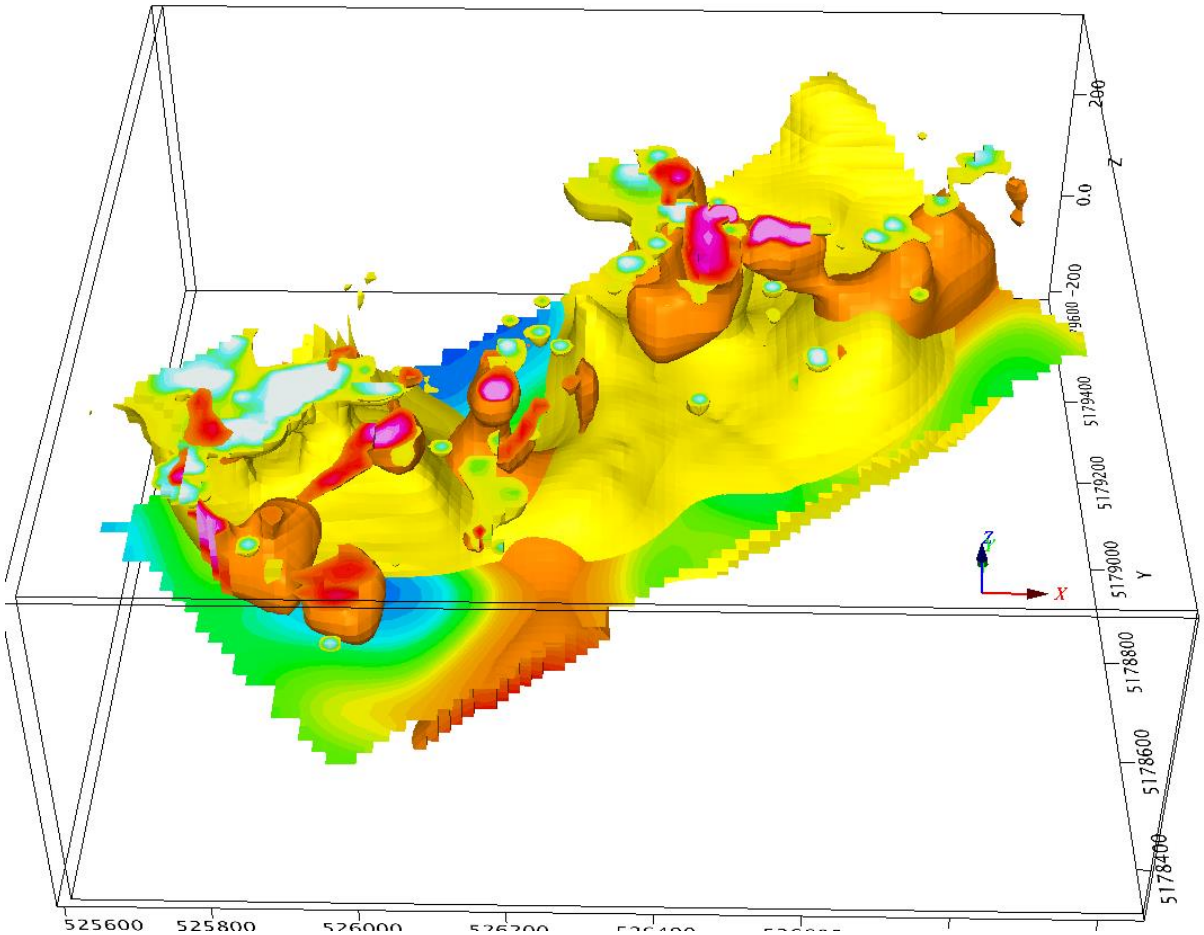


Figure 30: 3D chargeability voxel with 50m MSL chargeability slice (pink voxel = >7mV/V, purple voxel = >15000ohm.meter)

The resistivity model indicates a possible flat/shallow dipping geological interface occurring near 150MSL. The geology map for the area indicates that the survey was performed within the Lorrain Formation. This geological interface may indicate the contact between the Lorrain and Gowganda or may represent an unconformity with the basement. The low resistivity of this area did not allow for the resistivity model to extend below it. The chargeability model appears to cross this low resistivity interface. The model below this indicates a southward plunge on the anomalies.

7.3 RECOMMENDATIONS

It is recommended that historic work be compiled with current drilling data, to build a 3D model. Incorporating the 3DIP survey with the compilation and 3D drilling model may indicate sources of the anomalies and allow for better identification and correlation to the expected geophysical signatures.

Three areas appear with the strongest chargeability response. These are at 526610E 51791200N, 526493E 5179250N and 526171E 5178810N. Chargeability trends also occur from 526320E 5178695N to 526278E 5179000N, 526625E 5178900N to 526595E 5179075N and 526475E 5179100N to 526400E 5179375N. These areas should be prospected to find evidence of the source of the anomalies.

7.4 CONCLUSIONS

The 3D IP survey highlighted multiple features that should be further investigated. Generally, the chargeability signature was low, however some chargeability trends were identified for additional work.

APPENDIX A

STATEMENT OF QUALIFICATIONS

I, C. Jason Ploeger, hereby declare that:

1. I am a professional geophysicist with residence in Larder Lake, Ontario and am presently employed as a Geophysicist and Geophysical Manager of Canadian Exploration Services Ltd. of Larder Lake, Ontario.

2. I am a Practicing Member of the Association of Professional Geoscientists, with membership number 2172.

3. I graduated with a Bachelor of Science degree in geophysics from the University of Western Ontario, in London Ontario, in 1999.

4. I have practiced my profession continuously since graduation in Africa, Bulgaria, Canada, Mexico and Mongolia.

5. I am a member of the Ontario Prospectors Association, a Director of the Northern Prospectors Association and a member of the Society of Exploration Geophysicists.

6. I do not have nor expect an interest in the properties and securities of **Inventus Mining Corp.**

7. I am responsible for the final processing and validation of the survey results and the compilation of the presentation of this report. The statements made in this report represent my professional opinion based on my consideration of the information available to me at the time of writing this report.

C. Jason Ploeger, P.Geo., B.Sc.
Geophysical Manager
Canadian Exploration Services Ltd.

Larder Lake, ON
January 24, 2023

I, Claudia Moraga Millán, hereby declare that:

1. I am a soon-to-be a Professional Geoscientist with residence in Dobie, Ontario and am presently employed as a Field Geophysicist with Canadian Exploration Services Ltd. of Larder Lake, Ontario.

2. I graduated with a Bachelor of Science degree in Physics specialization in Geophysics from the University of Santiago of Chile, in Santiago, Chile, in 1993.

3. I have practiced my profession continuously since graduation in Chile, Argentina, Bolivia, Colombia, Mexico, United State, South Africa, Botswana, Bulgaria, Serbia, and Indonesia.

4. I am going to be doing the application process to register as a Professional Geoscientist to later become a practicing member of the Association of Professional Geoscientists.

5. I do not have nor expect an interest in the properties and securities of **Inventus Mining Corp.**

6. I am responsible for assisting with the final processing and validation of the survey results and the compilation of the presentation of this report. The statements made in this report represent my professional opinion based on my consideration of the information available to me at the time of writing this report.

Claudia Moraga Millán, B.Sc.
Field Geophysicist
(non-Professional)

Larder Lake, ON
January 24, 2023

APPENDIX B

IRIS V-FullWaver Receiver[4]

2 CHANNELS IP FULL WAVE RECORD

- 2 simultaneous dipoles
- Several weeks recording
- Time stamped data

V-Full Waver: this logger for electrical signal is a new concept of compact and low consumption unit designed for advanced Time Domain Induced Polarization, Resistivity and SP measurements. It can work in all field conditions, small, discrete, autonomous and can record continuously without operator.

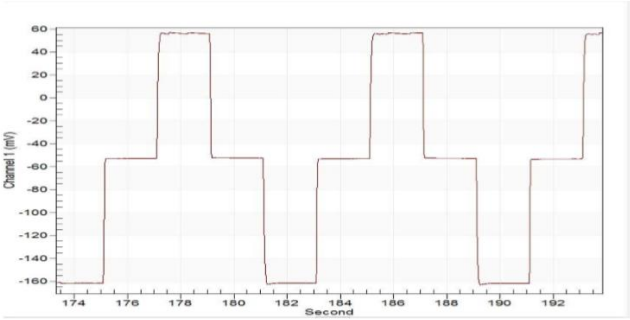
Compactness: light, discrete and easy to setup on the field, even on remote areas. Autonomous two dipoles logger, no need of the operator during acquisition. V-Full Waver allows a high productivity for dipole-dipole, gradient, extended pole-pole and other arrays. A network of several tens of channels can be quickly installed on the field for deep exploration and advanced processing (perpendicular dipoles, remote reference...)

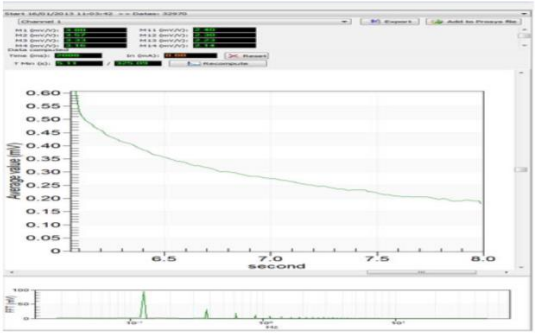
Internal GPS: an integrated GPS, very accurate and providing PPS signal (one pulse per second) allows to store all time series with time information. This is crucial to process data from several V-Full Waver loggers installed in a same area. This is also useful to correlate with injection dipole waveform, in case this has also been recorded with a I-Full Waver logger.

[4] Information obtained from http://www.iris-instruments.com/Pdf_file/V_fullwaver.pdf

High resolution: samples are recorded every 10 (ten) milliseconds (100 Hz sampling frequency). Data from several recorders can be merged and processed together with the Full Wave Viewer program delivered with the system. All data is synchronized through the GPS-PPS time stamping. A post acquisition processing permits to improve the signal-to-noise ratio. This also allows good quality IP data for deep investigations and for noisy areas.

Internal memory: the memory can store up to one month recording time. Then data can directly be transferred to a USB key in a few seconds.





TECHNICAL SPECIFICATIONS

• Max. input voltage: 15 V
• Protection: up to 1 000 V
• Accuracy: 0.2 % typical
• Resolution: 10 µV
• Sampling rate: 10 milli seconds (100 Hz)
• Induced Polarization (chargeability) measured every 10 milliseconds (200 IP windows for a 2 sec pulse)
• Input impedance: 100 MΩ
• Low pass filter Cut off frequency: 10 Hz
• Upper frequency which can be resolved: 50 Hz
• Frequency resolution: up to 34 micro Hz
• Internal GPS with PPS (one pulse per second)
• Time resolution: 250 micro seconds (time stamped samples)
• Battery test
• Contact resistance check

GENERAL SPECIFICATIONS

• LCD display, graphic and alpha numeric with 16 lines of 40 characters
• Data flash memory: one-month recording
• After acquisition: possibility of data storage on a USB key (8 GB or more).
• Power supply: internal Li-Ion rechargeable battery; optional external 12V standard car battery can be also used

- Autonomy: 20 operating hours with the internal Li-Ion battery
- Weather proof IP 67
- Shock resistant resin NK-7, case with handle
- Operating temperature: -20 °C to +70 °C
- Dimensions: 31 x 25 x 15 cm
- Weight: 2.8 kg

APPENDIX B

IRIS I-FullWaver Current Monitor[5]

IP Fullwave Record

- Recording injected current
- Several weeks recording
- Time stamped data

Fullwaver: this logger for electrical signal is a new concept of compact and low consumption unit designed for advanced Time Domain Induced Polarization, Resistivity and SP measurements. It can work in all field conditions, small, discrete, autonomous and can record continuously without operator. I-Fullwaver is connected in series on the AB injection line, it measures and logs very accurately the injected current IAB.

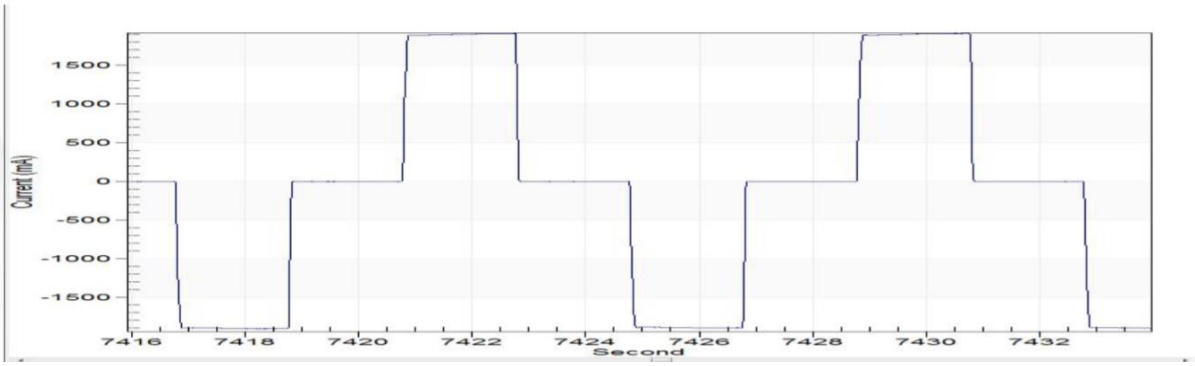
Compactness: light, discrete and easy to setup on the field, even on remote areas. This autonomous logger does not need any operator during the acquisition. I-Fullwaver is connected close to the transmitter or close to any injection electrode

Integrated GPS: an integrated gps, very accurate and providing PPS signal (one pulse per second) allows to store all time series with time information. This is crucial to correlate and process data with V-Fullwaver receiver loggers installed in a same area. This information displays the behaviour of the transmitter, its regulation specifications and the value of Iab in order to compute accurately the apparent resistivity.

[5] Information obtained from http://www.iris-instruments.com/Pdf_file/I_fullwaver.pdf

High resolution: samples are recorded every 10 (ten) milliseconds (100 Hz sampling frequency). Data from several recorders (for current and received voltages) can be merged and processed together with the FullWaveViewer program delivered with the system. All data is synchronized through the GPS-PPS time stamping. A post acquisition processing allows to improve the signal-to-noise ratio, giving good quality IP data for deep investigations in noisy areas.

Internal memory: the memory can store up to three months recording time. Then data can directly be transferred to a USB key in a few seconds.



TECHNICAL SPECIFICATIONS

- Current range: +/- 25 000 mA
- Current resolution: 0.1 mA
- Accuracy: +/- 1 mA
- Protection: up to 50 A and 3 000 V
- Magnetic sensor
- Magnetization offset (offset memory): up to 0.05%
- Offset calibration
- Sampling rate: 10 milliseconds (100 Hz)
- Integrated GPS with PPS (one pulse per second)
- Time resolution: 250 micro seconds (time stamped samples)
- Battery test

GENERAL SPECIFICATIONS

- LCD display, alpha numeric with 4 lines of 20 characters
- Data flash memory: three months recording
- After acquisition: possibility of data storage on a USB key (8 Gb or more).
- Power supply: internal Li-Ion rechargeable battery; optional external 12V standard car battery can be also used
- Autonomy: 20 operating hours with the internal Li-Ion battery.
- Weather proof IP 67
- Shock resistant resin NK-7, case with handle
- Operating temperature: -20 °C to +70 °C
- Dimensions: 31 x 25 x 15 cm
- Weight: 3.0 kg

APPENDIX B

GGD II 5kW

SPECIFICATIONS

- Protection against short circuits even at 0 ohms
- Output Voltage range: 150V to 2400V in 14 steps
- Power source is a standard 220/240V, 20/60 Hz source
- Displays electrode contact, transmitting power and current

ELECTRICAL CHARACTERISTICS

- Standard Time Base of 2 seconds for time domain – 2 seconds on, 2 seconds' off
- Optional Time Base of DC, 0.5, 1, 2, 4 or 8 seconds
- Output Current Range, 0.030 to 10A
- Output Voltage Range, 150 to 2400V in 14 steps
- Ability to Link 2 GDD transmitters to double power output

CONTROLS

- Switch ON/OFF
- Output Voltage Range Switch: 150V, 180V, 350V, 420V, 500V, 600V, 700V, 840V, 1000V, 1200V, 1400V, 1680V, 2000V and 2400V

DISPLAYS

- Output Current LCD: reads +- 0.0010A

- Electrode Contact Displayed when not Transmitting
- Output Power Displayed when Transmitting
- Automatic Thermostat controlled LCD heater for LCD
- Total Protection Against Short Circuits
- Indicator Lamps Indicate Overloads
-

GENERAL SPECIFICATIONS

- Weather proof
- Shock resistant pelican case
- Operating temperature: -40 °C to +65 °C
- Dimensions: 26 x 45 x 55 cm
- Weight: 40 kg

APPENDIX C

REFERENCES

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APPENDIX D

DIGITAL DATA

The digital data contains

- PDF copy of this report
- PDF copy of the maps
- Raw data in binary format
- Raw data in CSV format
- Ascii XYZ of inversion results
- Packed Oasis maps
- Oasis databases
- 3D Oasis voxels created

APPENDIX E

LIST OF MAPS (IN MAP POCKET)

Grid Sketch (1:5000)

1) Q2963-Inventus-Rathbun-3DIP-Layout-Claims

IP Plan Map (1:5000)

2) Q2963-Inventus-Rathbun-3DIP-Chr-300MSL
3) Q2963-Inventus-Rathbun-3DIP-Chr-250MSL
4) Q2963-Inventus-Rathbun-3DIP-Chr-200MSL
5) Q2963-Inventus-Rathbun-3DIP-Chr-150MSL
6) Q2963-Inventus-Rathbun-3DIP-Chr-100MSL
7) Q2963-Inventus-Rathbun-3DIP-Chr-50MSL
8) Q2963-Inventus-Rathbun-3DIP-Chr-0MSL
9) Q2963-Inventus-Rathbun-3DIP-Res-300MSL
10) Q2963-Inventus-Rathbun-3DIP-Res-250MSL
11) Q2963-Inventus-Rathbun-3DIP-Res-200MSL
12) Q2963-Inventus-Rathbun-3DIP-Res-150MSL
13) Q2963-Inventus-Rathbun-3DIP-Res-100MSL
14) Q2963-Inventus-Rathbun-3DIP-Res-50MSL
15) Q2963-Inventus-Rathbun-3DIP-Res-0MSL

TOTAL MAPS = 15