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Appendix 2 – Geophysics Survey Logistics Report

Technical Report

High resolution helicopter magnetic gradient survey over the Sylvanite property in Ontario

for

Exiro Minerals

High resolution helicopter magnetic gradient survey over the Sylvanite property in Ontario

Sander Geophysics Limited
260 Hunt Club Road
Ottawa, ON Canada K1V 1C1

Tel: +1 613.521.9626
Fax: +1 613.521.0215
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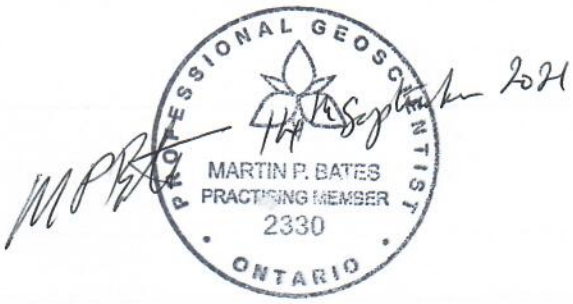

Martin Bates, Ph.D., P.Geo.

Krista Kaski, M.Sc., P.Geo.

High resolution helicopter magnetic gradient survey over the Sylvanite property in Ontario

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APPENDICES

1. EXECUTIVE SUMMARY

Sander Geophysics Limited (SGL) conducted a high resolution airborne magnetic gradient survey over the Sylvanite Property in Ontario for Exiro Minerals Corporation, utilizing a helicopter with towed bird. Please refer to Appendix I for SGL's Company Profile.

The traverse lines were oriented north-south and spaced at 50 m, while the control lines were oriented east-west and spaced at 500 m. The survey was flown in radar terrain-following mode with a target clearance of 64 m above the tree tops for the helicopter, corresponding to a tree-top clearance of 40 m for the bird. The target average ground speed was 30 m/s.

The survey was flown using SGL's Airbus Helicopter AS350 B3, registration C-GSGH operating from Chapleau Municipal Airport (CYLD). Production flights commenced on April 18, 2021 and data acquisition was completed on May 15, 2021. A total of 26 flights were carried out during the survey to complete the planned 7,233 line kilometres, and a total of four SGL staff were employed on the field operations. The survey was completed without significant incident.

Final processing of the data was completed at SGL's headquarters in Ottawa, Canada. A total of two SGL staff were involved in the data reduction.

Survey aircraft, Airbus Helicopter AS350 B3 at the Chapleau Municipal Airport

2. INTRODUCTION

This report describes the airborne survey of the Sylvanite Property east of Chapleau, Ontario, that Sander Geophysics Limited (SGL) flew for Exiro Minerals Corp. in the spring of 2021. Three-sensor magnetic data were gathered during this survey.

The instruments used to collect the data are described in Section 5. SURVEY EQUIPMENT, and the tests performed to calibrate instruments and to ensure optimal data quality are found in Section 6. SYSTEM TESTS.

Information relating field operations at the survey location including the airport used, reference stations established and any logistical problems encountered during the survey are provided in Section 7. FIELD OPERATIONS. Re-flights are listed as well as the field crew members who participated in the survey.

Details of data processing performed from data acquisition to final product creation are described in Section 8. DIGITAL DATA COMPILATION.

A full description of the data formats delivered to the client are described in Section 9. FINAL PRODUCTS.

Scenery near the survey area after a snowfall

The project brief in *Table 1* gives a quick reference of the details of the survey.

Project Brief

Table 1: Project brief

Survey Title	High Resolution Helicopter Magnetic Gradient Survey over the Sylvanite Property in Ontario
Client	Exiro Minerals Corporation
Survey Location	Sylvanite property, about 40 km east of Chapleau, Ontario

Survey Start Date	18 April 2021
Survey End Date	15 May 2021
Contact	Bill Spicer (Bill.Spicer@exirominerals.com)
Technical Inspector	Simon Crosato (simon.crosato@newcrest.com.au)
Field Office Location	Moose Horn Lodge near Chapleau, ON
Airport Used	Chapleau Municipal Airport (CYLD/YLD), Ontario
Aircraft Type	Airbus Helicopters AS350 B3 (C-GSGH)
Total line kilometres	7,233 km
Survey Flying Particulars	
Traverse Lines	
Line numbers (Blocks 1 & 2)	1001-1400, 2001-2047
Line direction	0°/180° (north-south)
Line spacing	50 m
Control Lines	
Line numbers (Blocks 1 & 2)	101-141, 208-218
Line direction	90°/270° (east-west)
Line spacing	500 m
Survey Altitude	64 m above tree tops (helicopter)
Digital Terrain Source:	SRTM
Number of Flights (numbers)	26 (1001-1025, 2009)
Aircraft Target Ground Speed	30.8 m/s (60 knots)
Data	
Local Geomagnetic Declination/Inclination/Intensity	-8.877° / 72.737° / 55480 nT
Survey Base Parking Location (datum WGS-84)	N 47:49:07.70, W 83:21:30.62, Height 410.82 m
Data Delivery Datum	NAD-83
Data Delivery Projection	UTM 17N

Typical view in the area in the middle of May

3. SURVEY AREA

The survey area covers the Sylvanite property, located 28 to 48 km east of Chapleau Municipal Airport, where flight operations were based. The terrain in the area is undulating hills covered by a mixture of evergreen and deciduous forest as well as numerous lakes. The survey area is devoid of human infrastructure except for a number of logging roads. The altitude of the terrain varies from 374 m to 478 m above mean sea level (MSL).

Scenery in the area

Daytime temperatures during the survey period ranged from about -3 to 20 degrees Celsius. The winter's snow had already melted at the beginning of survey operations and the lakes were ice free, owing to an early spring, hence most survey flights were conducted with no snow cover present. However there were a few days of significant snowfall during the period of survey operations, so for a few survey flights the ground was covered with snow. Some flights were conducted during strong winds from a westerly direction.

The survey area consists of the original block, Block 1, and a small contiguous extension area to the southwest, Block 2, which was added while the survey was already ongoing.

Figure 1 shows the geographical location of the survey area. The two blocks are bounded by the coordinates provided in *Table 2* and *3*. Block 1 contained numerous enclaves that did not form part of the survey area, however all but one of them were too small to be excluded from the survey, meaning that survey lines passing through them were planned as continuous lines without gaps. The boundary coordinates of the larger exclusion area that was not entirely transected by traverse lines are listed in *Table 4*. All control lines passing through this area were planned and flown as continuous lines.

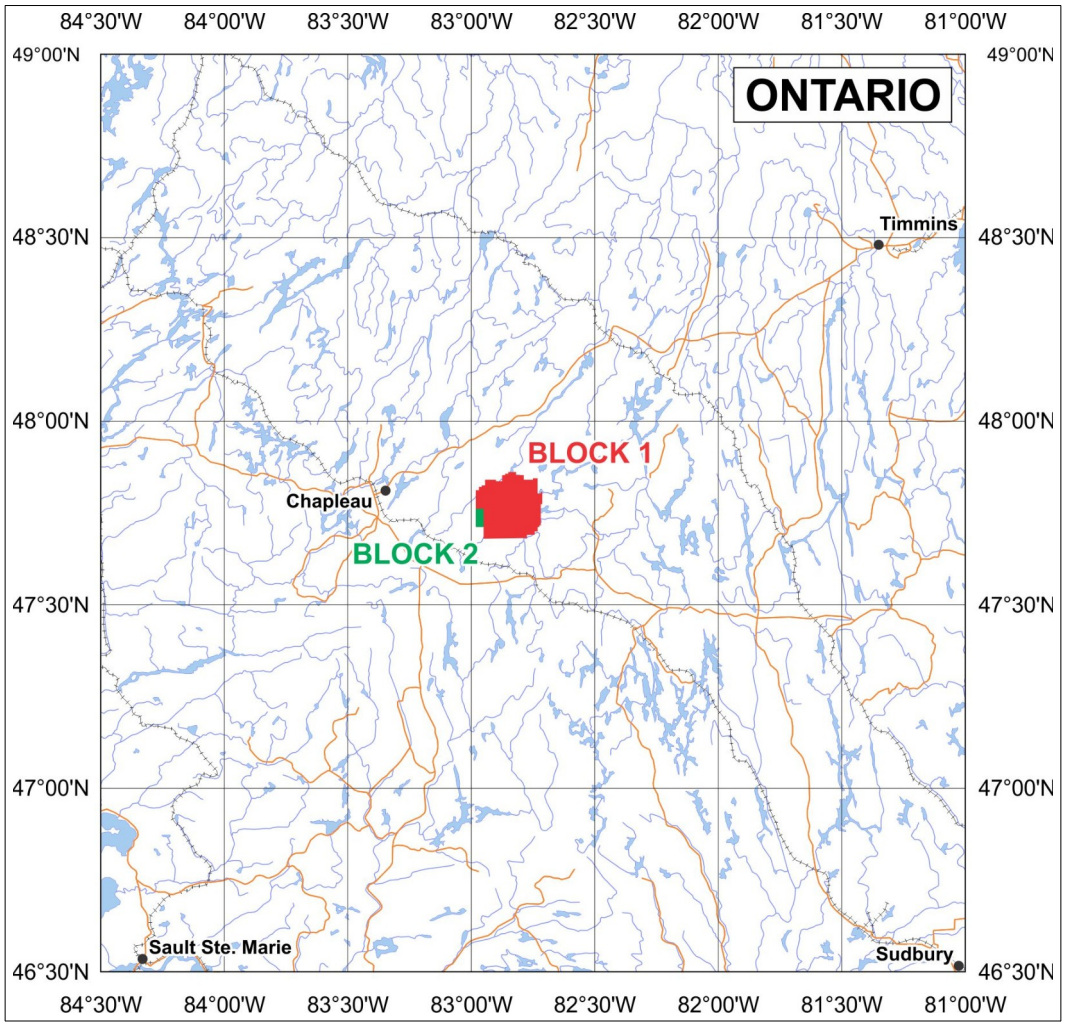


Figure 1: The geographical location of the survey area.

Except for the majority of the control lines, Blocks 1 and 2 were flown as separate blocks due to the fact that at the time when the extension area was added, all matching traverse lines and three of the matching control lines of Block 1 had already been flown. The planned survey lines are illustrated in *Figure 2* and listed in Appendix II.

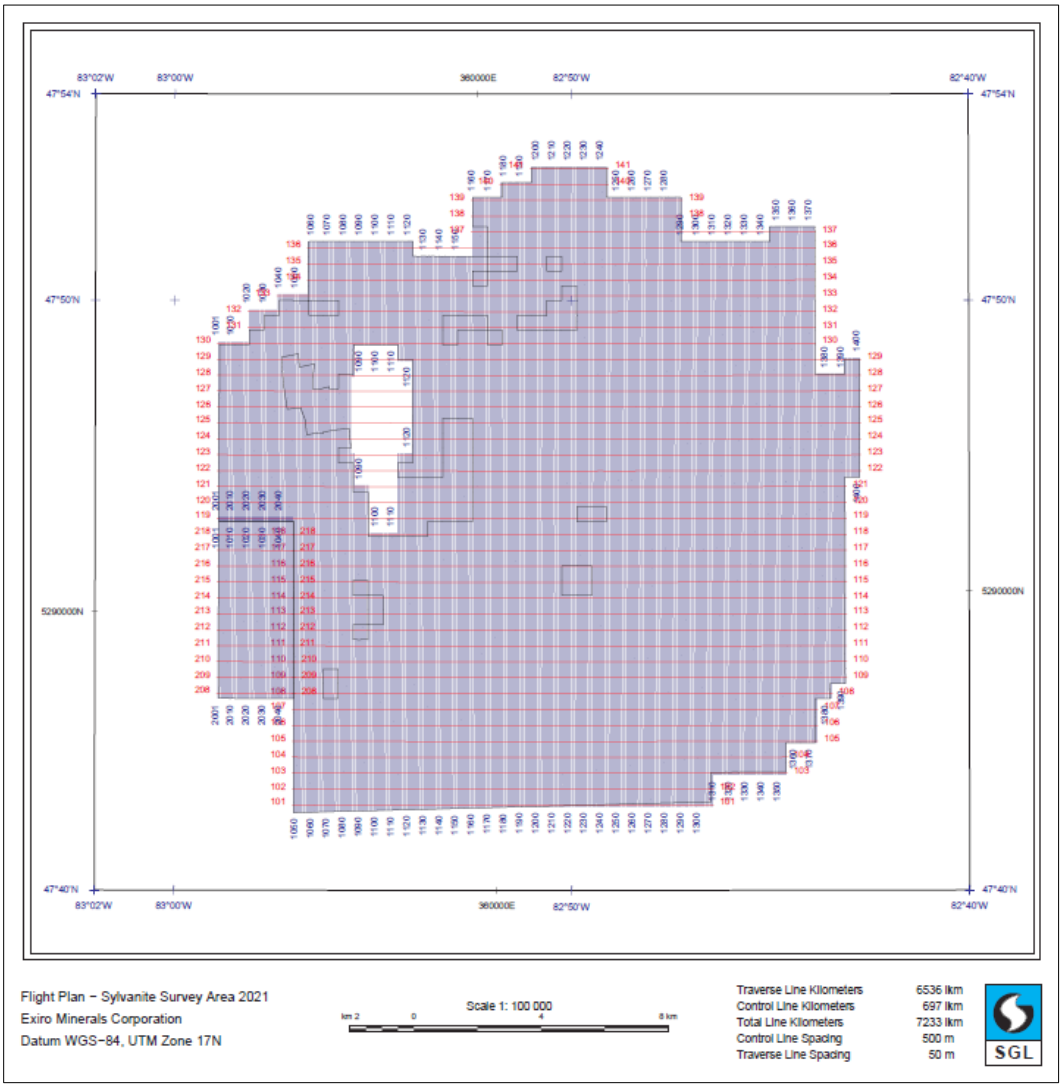


Figure 2: Planned Survey Lines

Table 2: Main block, Block 1 survey boundary (WGS-84, latitude/longitude).

Latitude (dd° mm' ss.ssss")	Longitude (dd° mm' ss.ssss")
N 47° 50' 00.0327"	W 82° 56' 37.5179"
N 47° 50' 00.0327"	W 82° 57' 00.0179"
N 47° 50' 00.0327"	W 82° 57' 22.5179"
N 47° 49' 45.0327"	W 82° 57' 22.5179"
N 47° 49' 45.0327"	W 82° 57' 45.0179"
N 47° 49' 30.0327"	W 82° 57' 45.0179"
N 47° 49' 30.0327"	W 82° 58' 07.5179"

Latitude (ddº mm' ss.ssss")	Longitude (ddº mm' ss.ssss")
N 47º 49' 15.0327"	W 82º 58' 07.5179"
N 47º49' 15.0327"	W 82º 58' 30.0179"
N 47º 49' 15.0327"	W 82º 58' 52.5180"
N 47º 49' 00.0327"	W 82º 58' 52.5180"
N 47º 48' 45.0327"	W 82º 58' 52.5179"
N 47º 48' 30.0327"	W 82º 58'52.5179"
N 47º 48' 15.0327"	W 82º 58' 52.5179"
N 47º 48' 00.0327"	W 82º 58' 52.5179"
N 47º 47' 45.0327"	W 82º 58' 52.5179"
N 47º 47' 30.0327"	W 82º 58' 52.5179"
N 47º 47' 15.0327"	W 82º 58' 52.5179"
N 47º 47' 00.0326"	W 82º 58' 52.5179"
N 47º 46' 45.0327"	W 82º 58' 52.5179"
N 47º 46' 30.0327"	W 82º 58' 52.5179"
N 47º 46' 15.0326"	W 82º 58' 52.5179"
N 47º 46' 15.0326"	W 82º 58' 30.0179"
N 47º 46' 15.0326"	W 82º 58' 07.5179"
N 47º 46' 15.0326"	W 82º 57' 45.0179"
N 47º 46' 15.0326"	W 82º 57' 22.5179"
N 47º 46' 15.0326"	W 82º 57' 00.0179"
N 47º 46' 00.0327"	W 82º 57' 00.0179"
N 47º 45' 45.0327"	W 82º 57' 00.0179"
N 47º 45' 30.0326"	W 82º 57' 00.0179"
N 47º 45' 15.0327"	W 82º 57' 00.0179"
N 47º 45' 00.0326"	W 82º 57' 00.0179"
N 47º 44' 45.0326"	W 82º 57' 00.0179"
N 47º 44' 30.0327"	W 82º 57' 00.0179"
N 47º 44' 15.0326"	W 82º 57' 00.0179"
N 47º 44' 00.0326"	W 82º 57' 00.0179"
N 47º 43' 45.0326"	W 82º 57' 00.0179"
N 47º 43' 30.0326"	W 82º 57'00.0179"
N 47º 43' 15.0326"	W 82º 57'00.0179"
N 47º 43' 00.0326"	W 82º 57' 00.0179"
N 47º 42' 45.0326"	W 82º 57' 00.0179"
N 47º 42' 30.0326"	W 82º 57' 00.0179"
N 47º 42' 15.0326"	W 82º 57' 00.0179"
N 47º 42' 00.0326"	W 82º 57' 00.0179"
N 47º 41' 45.0326"	W 82º 57' 00.0179"
N 47º 41' 30.0326"	W 82º 57' 00.0179"
N 47º 41' 18.9513"	W 82º 56' 59.7781"
N 47º 41' 30.0327"	W 82º 46' 30.0177"

Latitude (ddº mm' ss.ssss")	Longitude (ddº mm' ss.ssss")
N 47º 41'45.0326"	W 82º 46' 30.0177"
N 47º 42' 00.0327"	W 82º 46' 30.0177"
N 47º 42' 00.0327"	W 82º 46' 07.5176"
N 47º 42' 00.0327"	W 82º 45' 45.0176"
N 47º 42' 00.0327"	W 82º 45' 22.5176"
N 47º 42' 00.0327"	W 82º 45' 00.0176"
N 47º 42' 00.0327"	W 82º 44' 37.5176"
N 47º 42' 15.0327"	W 82º 44' 37.5176"
N 47º 42' 30.0327"	W 82º 44' 37.5176"
N 47º 42' 30.0327"	W 82º 44' 15.0176"
N 47º 42' 30.0327"	W 82º 43' 52.5176"
N 47º 42' 45.0327"	W 82º 43' 52.5176"
N 47º 43' 00.0327"	W 82º 43' 52.5176"
N 47º 43' 15.0327"	W 82º 43' 52.5176"
N 47º 43'15.0327"	W 82º 43' 30.0176"
N 47º 43' 23.9041"	W 82º 43' 30.0176"
N 47º 43' 25.0020"	W 82º 43' 30.0176"
N 47º 43' 30.0327"	W 82º 43' 30.0176"
N 47º 43' 30.0327"	W 82º 43' 07.5176"
N 47º 43' 45.0327"	W 82º 43' 07.5176"
N 47º 44' 00.0327"	W 82º 43' 07.5176"
N 47º 44' 45.0327"	W 82º 43' 07.5176"
N 47º 45' 00.0327"	W 82º 43' 07.5176"
N 47º 45' 15.0327"	W 82º 43' 07.5176"
N 47º 45' 30.0327"	W 82º 43' 07.5176"
N 47º 45'45.0327"	W 82º 43' 07.5176"
N 47º 46' 00.0327"	W 82º 43' 07.5176"
N 47º 46' 15.0327"	W 82º 43' 07.5176"
N 47º 46' 30.0327"	W 82º 43' 07.5176"
N 47º 46' 45.0327"	W 82º 43' 07.5176"
N 47º 47' 00.0327"	W 82º 43' 07.5176"
N 47º 47' 00.0327"	W 82º 42' 45.0176"
N 47º 47' 15.0327"	W 82º 42' 45.0176"
N 47º 47' 30.0327"	W 82º 42' 45.0176"
N 47º 47' 45.0327"	W 82º 42' 45.0176"
N 47º 48' 00.0327"	W 82º 42' 45.0176"
N 47º 48' 15.0327"	W 82º 42' 45.0176"
N 47º 48' 30.0327"	W 82º 42' 45.0176"
N 47º 48' 45.0327"	W 82º 42' 45.0176"
N 47º 49' 00.0327"	W 82º 42' 45.0176"
N 47º 49' 00.0327"	W 82º 43' 07.5176"

Latitude (ddº mm' ss.ssss")	Longitude (ddº mm' ss.ssss")
N 47º 48' 45.0327"	W 82º 43' 07.5176"
N 47º 48' 45.0327"	W 82º 43' 30.0176"
N 47º 48' 45.0327"	W 82º 43' 52.5177"
N 47º 49' 00.0327"	W 82º 43' 52.5177"
N 47º 49' 15.0327"	W 82º 43' 52.5177"
N 47º 49' 30.0327"	W 82º 43' 52.5177"
N 47º 49' 45.0327"	W 82º 43' 52.5177"
N 47º 50' 00.0327"	W 82º 43' 52.5177"
N 47º 50' 15.0327"	W 82º 43' 52.5177"
N 47º 50' 30.0328"	W 82º 43' 52.5177"
N 47º 50' 45.0327"	W 82º 43' 52.5177"
N 47º 51' 00.0327"	W 82º 43' 52.5177"
N 47º 51' 15.0328"	W 82º 43' 52.5177"
N 47º 51' 15.0328"	W 82º 44º 15.0177"
N 47º 51' 15.0328"	W 82º 44' 37.5177"
N 47º 51' 15.0328"	W 82º 45' 00.0177"
N 47º 51' 00.0327"	W 82º 45' 00.0177"
N 47º 51' 00.0327"	W 82º 45' 22.5177"
N 47º 51' 00.0327"	W 82º 45' 45.0177"
N 47º 51' 00.0327"	W 82º 46' 07.5177"
N 47º 51' 00.0327"	W 82º 46' 30.0177"
N 47º 51' 00.0327"	W 82º 46' 52.5177"
N 47º 51' 00.0327"	W 82º 47' 15.0177"
N 47º 51' 15.0327"	W 82º 47' 15.0177"
N 47º 51' 30.0327"	W 82º 47' 15.0177"
N 47º 51' 45.0327"	W 82º 47' 15.0177"
N 47º 51' 45.0327"	W 82º 47' 37.5178"
N 47º 51' 45.0327"	W 82º 48' 00.0178"
N 47º 51' 45.0327"	W 82º 48' 22.5178"
N 47º 51' 45.0327"	W 82º 48' 45.0178"
N 47º 51' 45.0327"	W 82º 49' 07.5178"
N 47º 52' 00.0327"	W 82º 49' 07.5178"
N 47º 52' 15.0327"	W 82º 49' 07.5178"
N 47º 52' 15.0327"	W 82º 49' 52.5178"
N 47º 52' 15.0327"	W 82º 50' 15.0178"
N 47º 52' 15.0327"	W 82º 50' 37.5178"
N 47º 52' 15.0327"	W 82º 51' 00.0178"
N 47º 52' 00.0327"	W 82º 51' 00.0178"
N 47º 52' 00.0327"	W 82º 51' 22.5178"
N 47º 52' 00.0327"	W 82º 51' 45.0178"
N 47º 51' 45.0327"	W 82º 51' 45.0178"

Latitude (ddº mm' ss.ssss")	Longitude (ddº mm' ss.ssss")
N 47º 51' 45.0327"	W 82º 52' 07.5178"
N 47º 51' 45.0327"	W 82º 52' 30.0178"
N 47º 51' 30.0327"	W 82º 52' 30.0178"
N 47º 51' 15.0327"	W 82º 52' 30.0178"
N 47º 51' 15.0327"	W 82º 52' 07.5178"
N 47º 51' 00.0327"	W 82º 52' 07.5178"
N 47º 50' 45.0327"	W 82º 52' 07.5178"
N 47º 50' 45.0327"	W 82º 51' 45.0178"
N 47º 50' 45.0327"	W 82º 51' 22.5178"
N 47º 50' 30.0327"	W 82º 51' 22.5178"
N 47º 50' 30.0327"	W 82º 51' 45.0178"
N 47º 50' 30.0327"	W 82º 52' 07.5178"
N 47º 50' 15.0327"	W 82º 52' 07.5178"
N 47º 50' 15.0327"	W 82º 52' 30.0178"
N 47º 50' 29.5789"	W 82º 52' 30.0178"
N 47º 50' 29.6815"	W 82º 52' 30.0178"
N 47º 50' 30.0327"	W 82º 52' 30.0178"
N 47º 50' 30.0327"	W 82º 52' 07.5178"
N 47º 50' 45.0327"	W 82º 52' 07.5178"
N 47º 50' 45.0327"	W 82º 52' 30.0178"
N 47º 50' 45.0327"	W 82º 52' 52.5178"
N 47º 50' 45.0327"	W 82º 53' 15.0179"
N 47º 50' 45.0327"	W 82º 53' 35.4604"
N 47º 50' 45.0327"	W 82º 53' 38.5177"
N 47º 50' 45.0327"	W 82º 54' 00.0179"
N 47º 51' 00.0327"	W 82º 54' 00.0179"
N 47º 51' 00.0327"	W 82º 54' 22.5179"
N 47º 51' 00.0327"	W 82º 54' 45.0179"
N 47º 51' 00.0327"	W 82º 55' 07.5179"
N 47º 51' 00.0327"	W 82º 55' 30.0179"
N 47º 51' 00.0327"	W 82º 55' 52.5179"
N 47º 51' 00.0327"	W 82º 56' 15.0179"
N 47º 51' 00.0327"	W 82º 56' 37.5179"
N 47º 50' 45.0327"	W 82º 56' 37.5179"
N 47º 50' 30.0327"	W 82º 56' 37.5179"
N 47º 50' 15.0327"	W 82º 56' 37.5179"
N 47º 50' 00.0327"	W 82º 56' 37.5179"
N 47º 50' 00.0327"	W 82º 56' 37.2123"
N 47º 50' 00.0327"	W 82º 56' 15.0179"
N 47º 50' 00.0327"	W 82º 55' 52.5179"
N 47º 49' 45.0327"	W 82º 55' 52.5179"

Latitude (ddº mm' ss.ssss")	Longitude (ddº mm' ss.ssss")
N 47º 49' 45.0327"	W 82º 56' 15.0179"
N 47º 49' 45.0327"	W 82º 56' 37.5179"
N 47º 49' 59.9159"	W 82º 56' 37.5179"

Table 3: Extension area, Block 2 survey boundary (WGS-84, latitude/longitude)

Latitude *(ddº mm' ss.ssss")*	Longitude (ddº mm' ss.ssss")
N 47º 46' 15.0328"	W 82º 58' 52.5199"
N 47º 46' 15.0328"	W 82º 57' 00.0199"
N 47º 43' 15.0328"	W 82º 57' 00.0198"
N 47º 43' 15.0328"	W 82º 58' 52.5199"

Table 4: Exclusion area within Block 1 (WGS-84, latitude/longitude).

Latitude (ddº mm' ss.ssss")	Longitude (ddº mm' ss.ssss")
N 47º 49' 00.0327"	W 82º 54' 22.5179"
N 47º 49' 00.0327"	W 82º 54' 00.0179"
N 47º 48' 45.0327"	W 82º 54' 00.0179"
N 47º 48' 30.0327"	W 82º 54' 00.0179"
N 47º 48' 15.0327"	W 82º 54' 00.0178"
N 47º 48' 00.0327"	W 82º 54' 00.0178"
N 47º 47' 45.0327"	W 82º 54' 00.0178"
N 47º 47' 30.0327"	W 82º 54' 00.0178"
N 47º 47' 15.0327"	W 82º 54' 00.0178"
N 47º 47' 15.0327"	W 82º 54' 22.5178"
N 47º 47' 00.0327"	W 82º 54' 22.5178"
N 47º 47' 00.0327"	W 82º 54' 00.0178"
N 47º 47' 00.0327"	W 82º 53' 37.5178"
N 47º 47' 00.0327"	W 82º 53' 15.0178"
N 47º 47' 15.0327"	W 82º 53' 15.0178"
N 47º 47' 30.0327"	W 82º 53' 15.0178"
N 47º 47' 45.0327"	W 82º 53' 15.0178"
N 47º 48' 00.0327"	W 82º 53' 15.0178"
N 47º 48' 00.0327"	W 82º 52' 52.5178"
N 47º 48' 00.0327"	W 82º 52' 30.0178"
N 47º 47' 45.0327"	W 82º 52' 30.0178"
N 47º 47' 30.0327"	W 82º 52' 30.0178"
N 47º 47' 15.0327"	W 82º 52' 30.0178"
N 47º 47' 00.0327"	W 82º 52' 30.0178"
N 47º 46' 45.0327"	W 82º 52' 30.0178"

Latitude (ddº mm' ss.ssss")	Longitude (ddº mm' ss.ssss")
N 47º 46' 30.0327"	W 82º 52' 30.0178"
N 47º 46' 15.0327"	W 82º 52' 30.0178"
N 47º 46' 15.0327"	W 82º 52' 52.5178"
N 47º 46' 15.0327"	W 82º 53' 15.0178"
N 47º 46' 15.0327"	W 82º 53' 37.5178"
N 47º 46' 00.0327"	W 82º 53' 37.5178"
N 47º 46' 00.0327"	W 82º 54' 00.0178"
N 47º 46' 00.0327"	W 82º 54' 22.5178"
N 47º 46' 00.0327"	W 82º 54' 45.0178"
N 47º 46' 00.0327"	W 82º 55' 07.5179"
N 47º 46' 15.0326"	W 82º 55' 07.5179"
N 47º 46' 30.0327"	W 82º 55' 07.5179"
N 47º 46' 45.0327"	W 82º 55' 07.5179"
N 47º 46' 45.0327"	W 82º 55' 30.0179"
N 47º 47' 00.0327"	W 82º 55' 30.0179"
N 47º 47' 15.0327"	W 82º 55' 30.0179"
N 47º 47' 15.0327"	W 82º 55' 52.5179"
N 47º 47' 30.0327"	W 82º 55' 52.5179"
N 47º 47' 29.9849"	W 82º 55' 33.0769"
N 47º 47' 35.2215"	W 82º 55' 34.4934"
N 47º 47' 49.7507"	W 82º 55' 36.3481"
N 47º 47' 48.5811"	W 82º 55' 53.8970"
N 47º 47' 46.2039"	W 82º 56' 15.0141"
N 47º 47' 45.0327"	W 82º 56' 15.0179"
N 47º 47' 45.0478"	W 82º 56' 25.6078"
N 47º 47' 43.3416"	W 82º 56' 40.4044"
N 47º 47' 58.4120"	W 82º 56' 42.8221"
N 47º 48' 10.8755"	W 82º 56' 49.9455"
N 47º 48' 09.3372"	W 82º 57' 09.9431"
N 47º 48' 34.9412"	W 82º 57' 15.8050"
N 47º 49' 02.1654"	W 82º 57' 18.7764"
N 47º 49' 05.6769"	W 82º 56' 53.2319"
N 47º 48' 52.0653"	W 82º 56' 51.7278"
N 47º 48' 55.4284"	W 82º 56' 29.1256"
N 47º 48' 41.1839"	W 82º 56' 31.5009"
N 47º 48' 30.0250"	W 82º 56' 31.5265"
N 47º 48' 30.0163"	W 82º 56' 19.1037"
N 47º 48' 32.2098"	W 82º 56' 06.6472"
N 47º 48' 30.0245"	W 82º 56' 06.2131"
N 47º 48' 30.0327"	W 82º 55' 52.5179"
N 47º 48' 45.0327"	W 82º 55' 52.5179"
N 47º 48' 45.0327"	W 82º 55' 30.0179"
N 47º 49' 00.0327"	W 82º 55' 30.0179"

Latitude (ddº mm' ss.ssss")	Longitude (ddº mm' ss.ssss")
N 47º 49' 15.0327"	W 82º 55' 30.0179"
N 47º 49' 15.0327"	W 82º 55' 07.5179"
N 47º 49' 15.0327"	W 82º 54' 45.0179"
N 47º 49' 15.0327"	W 82º 54' 22.5179"

4. SURVEY SPECIFICATIONS

Data Recording

In the aircraft:

- GPS positional data (time, latitude, longitude, altitude and raw range from each satellite being tracked) at 10 readings per second;
- Terrain clearance as measured by the radar altimeter at 10 readings per second;
- Terrain clearance as measured by the laser rangefinder at 3.3 readings per second;

In the towed bird:

- GPS positional data (time, latitude, longitude, altitude and raw range from each satellite being tracked) at 10 readings per second;
- Total magnetic field recorded at 160 readings per second from a three magnetometer gradient array M1 (port), M2 (starboard) and M3 (upper);
-

At the base and remote magnetic/GPS reference stations:

- Total magnetic field at 11 readings per second;
- GPS positional data (time, latitude, longitude, and raw range from each satellite being tracked) at 10 readings per second.

Technical Specifications

(a) Location (x, y, z) error shall be less than or equal to 1 m in each of the 3 coordinates after differential correction.

(b) Data gaps shall be no longer than 0.5 sec in any of airborne or ground GPS position, or airborne magnetometers.

(c) Horizontal deviation from planned lines shall be less than 20 m for a distance of over 2.0 km, and not exceeding 40 m in any instance (subject to the pilot's discretion in the interest of safety).

(d) Vertical deviation from target altitude shall be less than 20 m for a distance of over 2.0 km and not more than 30 m in any instance (subject to the pilot's discretion in the interest of safety).

(e) Airborne magnetometer high-frequency noise shall not exceed 0.2 nT peak to trough for a period of three minutes or more while on line.

(f) Ground magnetometer high-frequency noise shall not exceed 0.1 nT peak to trough for a period of three minutes or more while on line.

(g) Ground magnetometer diurnal activity must not exceed 3 nT peak to peak over one minute, or 0.5 nT peak to peak over 15 seconds.

Flight Specifications

The survey target average ground speed was 30 m/s (58.3 knots), maximum permitted ground speed was 38.6 m/s (75 knots).

The survey area flight line specifications are provided in *Table 5*. Survey lines are planned as straight with a constant heading in the geographic reference frame (rhumb lines), and the line direction is given with respect to geographic north.

Table 5: Flight line specifications

	Line Direction		Line Spacing (m)	
	Traverse	**Control**	**Traverse**	**Control**
Block 1	0°/180°	90°/270°	50	500
Block 2	0°/180°	90°/270°	50	500

The survey was flown using radar height guidance. Target survey altitude (radar clearance) above ground or tree tops (whichever is less) was 64 m for the helicopter, translating to an average of 40 m for the towed bird.

5. SURVEY EQUIPMENT

SGL provided the following instrumentation for this survey; see Appendix III for further details:

Airborne Navigation and Data Acquisition System

Sander Geophysics Data Acquisition System (SGDAS)

The SGDAS is the latest version of airborne navigation and data acquisition computers developed by SGL. It is the data gathering core for all the different types of survey data. The computer incorporates an altimeter analog to digital converter and a NovAtel GPS multi-frequency receiver (see the GNSS and GPS Receivers section below for the details) which automatically provides the UTC time base for the recorded data. The system acquires the different data streams from the sensors and receives and processes GPS signals from the GPS antenna. Navigation information from the navigation side of the computer can be used to guide the pilots along a pre-planned flight path in all three dimensions. Profiles of the incoming data are displayed in real-time to the pilots for continuous monitoring. The data are recorded in database format on redundant solid-state data storage modules.

Aerial and Ground Magnetometers

Geometrics G-822A

Both the ground and airborne systems used a non-oriented (strap-down) optically-pumped cesium split-beam sensor. These magnetometers have a sensor noise of 0.001 nT/√(Hz) and a dynamic range of 20,000 to 100,000 Nt. The airborne sensors were mounted in a fibreglass bird suspended approximately 24 m below the helicopter. The system had one magnetometer in each of the port and starboard pods of the bird mounted laterally ('M1' on the port side, 'M2' on the starboard side), 4.66 m apart, in order to record the horizontal magnetic gradient. A third magnetometer ('M3') was mounted in another pod at the end of a vertical arm, 2.21 m above the level of the two horizontal sensors. Total magnetic field measurements were recorded at 160 Hz in the bird, then later down-sampled to 10 Hz in the processing. The ground systems recorded magnetic data at 11 Hz.

Reference Station Acquisition System

Sander Geophysics SGRef

The SGRef reference (ground) station is a dual reference station. One half consists of a data acquisition computer with a cesium magnetometer interface and frequency counter to process the signal from the magnetometer sensor and from the GNSS receiver (see the GNSS Receivers section below for the details). The other half contains only a GNSS receiver. These two halves operate independently of each other. The time base (UTC) of both the ground and airborne systems is automatically provided by the GNSS receiver, ensuring proper merging of both data sets. All data are displayed on an LCD flat panel monitor. The magnetic data, sampled at 11 Hz and the GNSS data, sampled at 10 Hz, are recorded on solid state data storage modules. The entire reference data acquisition system was set for automatic, unattended recording. The noise level of the reference station magnetometer is less than 0.1 nT.

GNSS Receivers

NovAtel OEMV-3 receiver board

The NovAtel OEMV-3, multi-frequency GNSS (Global Navigation Satellite System) receiver is configurable up to 72 channels with the tracking of GPS (L1, L2, L5), GLONASS (L1, L2), SBAS, and L-band satellites and

signals. It provides averaged position and raw range information of all satellites in view. GNSS positional data are recorded at 10 Hz.

Pixhawk® 1 Autopilot

The Pixhawk Autopilot uses an ST Micro L3GD20H 16 bit gyroscope, an ST Micro LSM303D 14 bit accelerometer / magnetometer, an Invensense MPU 6000 3-axis accelerometer/gyroscope and a MEAS MS5611 barometer. Location and attitude data is recorded at a rate of 10 Hz on Unix Time base. The Pixhawk was mounted on the suspended bird and data was recorded autonomously.

Altimeters

SGLas-P - Riegl LD90-31K-HiP Laser Rangefinder

The Riegl laser altimeter uses a single optical laser beam to measure distance to the ground. It is effective over water and is eye safe. This profilometer has a range of 1500 m, a resolution of 0.01 m with an accuracy of 5 cm and a 3.3 Hz data rate.

Bendix King KRA-10A Radar Altimeter

The Bendix King radar altimeter has a resolution of 0.5 m, an accuracy of 5%, a range of 6 to 760 m, and a 10 Hz data rate. This system is employed as a backup system and not actively employed for survey guidance or data processing.

Survey Aircraft

Airbus Helicopters AS350 B3 (C-GSGH)

The AS350 B3 is a modern high performance light helicopter powered by Turbomeca Arriel turboshaft engines. These engines have an unrivalled safety record. The helicopter's endurance is between two and four hours depending on the particular survey type and location. The helicopter’s performance and effectiveness has been proven on numerous projects worldwide. SGL’s helicopters have been outfitted for low-level airborne geophysical surveys. Sensors are carried internally, or externally in towed "birds" on a cable with either single, dual or triple magnetometer configuration for horizontal and/or vertical gradient. The helicopter is especially well suited to hot and high-elevation conditions, including operations with heavy load requirements. The B3's reliable and powerful turbine engine, long endurance and high altitude capability make it an excellent survey aircraft. All survey modifications are certified to meet the requirements of the Canadian Aviation Regulations (CARs). A complete description of all survey aircraft is given in Appendix IV.

Data Processing Hardware and Software

Compilation of the data was performed on high performance desktop computers optimized for data processing tasks. SGL’s proprietary geophysical software was used for data processing.

6. SYSTEMS TESTS

Altimeters

Radar And Laser Altimeter Calibration

A test flight to calibrate the radar and laser altimeters was flown on April 28, 2021, over runway 10/28 at Chapleau Municipal Airport. Six passes were conducted over the runway at heights from 30 to 200 m above ground at various levels. The average altimeter values per pass were compared to the post-processed GPS altitudes. An ideal altimeter would yield a slope of 1 and an intercept of 0. The King radar altimeter slope was measured to be 1.0315 and the intercept 4.73 m. For the laser altimeter, the slope was 1.0007 and the intercept -0.60 m. These results are well within the expected accuracy of the altimeters. The calculated scale factor and intercept for the King radar altimeter were used in post-processing for correcting the raw radar data. Please refer to *Figure 3* which illustrates the results of the altimeter test.

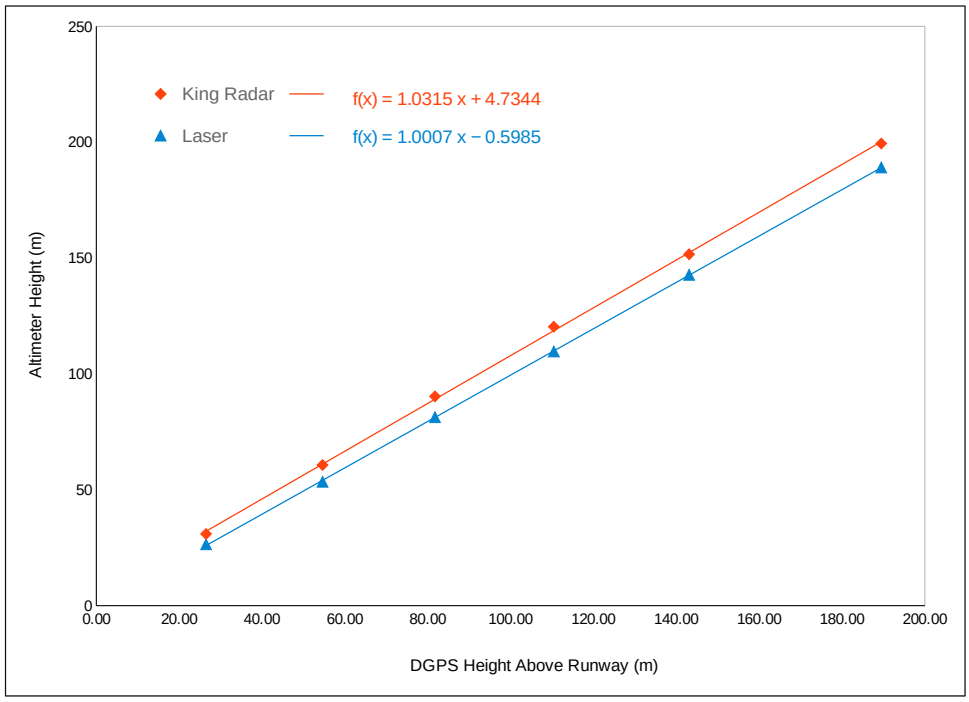


Figure 3: Altimeter Test

Magnetometer System Tests

Compensation Calibration

Compensation calibrations determine the magnetic influence of aircraft and its maneuvers on the magnetic data. Since the airborne magnetometers were installed in a towed bird with next to no magnetic interference from the helicopter, no compensation calibration was required for this survey.

7. FIELD OPERATIONS

Operational Base

Operations were conducted from Chapleau Municipal Airport (CYLD) near Chapleau, Ontario. Completion of the survey required 26 flights, which were performed from April 18 to May 15, 2021.

Mobilization of the SGL crew and equipment to Chapleau began with the arrival of the ground crew on April 15. The field office was set up at the crew accommodations, a hunting/fishing lodge about 13 km south of the town of Chapleau, and a 10-minute drive from the airport. Chapleau airport features two asphalt runways, 10/28 (5,000 ft) and 05/23 (3,000 ft), and a large equipment shed for assembly and repair of aircraft components, although there was no hangar for aircraft. The triaxial magnetometer bird was assembled and tested on April 16, and the primary magnetic base and GPS reference station was set up the same day. Mobilization was completed on April 17 with the arrival of the helicopter an Airbus Helicopters AS350 B3, registration C-GSGH, and the two pilots.

A reconnaissance/terrain following test flight was conducted on the morning of April 18, followed by the first acquisition flight. Inclement weather and a few mechanical issues hampered flying. The survey was completed on May 15. Depending on the weather, one or two sorties were flown on a given day. An altimeter test was performed on April 28 above the runway at Chapleau airport.

When not survey flying, the helicopter was parked on the tarmac in the northern corner of the apron, about 50 m east of the airport administration, see the satellite image in *Figure 4*. Each survey flight departed and returned to this location. *Table 6* shows the parking location of the aircraft in the WGS-84 datum.

Figure 4: Location of the mag sensor (yellow) and GPS antenna (red) for the reference station, Gnd1 at Chapleau airport, and also the parking position of the helicopter C-GSGH (purple).

Table 6: Helicopter C-GSGH parking location (datum WGS-84)

Latitude (dd° mm' ss")	Longitude (dd° mm' ss.ss")	Elevation (m)
N 47° 49' 07.70"	W 83° 21' 30.62"	424.5

Various delays in the survey progression were experienced. Shortly after survey start, the helicopter's starter generator developed a problem that required maintenance, causing a delay of four days. In the following weeks, the survey production slowed down as a result of occasional flight cancellations due to adverse weather.

After flight 1003, the port magnetometer sensor was replaced with a spare sensor, following sub-optimal performance of the original sensor.

Copies of the Weekly Reports detailing day-to-day operations and survey progress are provided in Appendix V.

Survey flights, including all necessary re-flights, were completed on May 15. Demobilization was initiated the following day and completed on May 16, 2021.

Coordinates and times of the actual lines flown are listed in Appendix VI.

Reference Stations

The first combined magnetic base / GPS reference station was set-up in a wooded area north of Chapleau airport's equipment shed. The second base station, used as a backup, was installed close to the shore of McLennan Lake by the crew accommodations. *Table 7* shows the WGS-84 coordinates of the local reference stations.

Table 7: Locations of reference stations (datum WGS-84)

Station No.	Location	Latitude (dd° mm' ss.sssss")	Longitude (dd° mm' ss.sssss")	Elevation (m)
Gnd1	Airport	N 47° 49' 07.2981"	W 83° 21' 38.3483"	413.61
Gnd2	Lodge	N 47° 43' 39.1931"	W 83° 23' 31.5589 "	424.52

Figure 5: GPS antenna employed at reference station Gnd1

Figure 6: The magnetic sensor employed at reference station Gnd1

Figure 7: The magnetic sensor employed at reference station Gnd2

The exact positions of both reference station GPS antennas were calculated using Precise Point Positioning (PPP) corrections, using *the algorithm developed by the Natural Resources Canada (NRCAN)* that has been incorporated in to SGL's suite of software. Positions were calculated using precise ephemeris data for days 110, 111, 121, 122 and 124 of 2021.

The magnetometers of the two base stations were housed in non-magnetic shells mounted on 2 m high poles which were erected in magnetically quiet areas, as far away from electrical interference and moving metal objects such as vehicles as practical. Power was supplied from nearby buildings by means of long extension cords. *Figure 4* shows the installation location of the GPS and magnetic sensors of base station Gnd1 superimposed on a satellite image of the airport.

Reflights

A small number of lines or sections of lines were re-flown in order to improve the quality of the survey data. *Table 8*shows a list of re-flown lines and the reasons why they were required.

Table 8: List of re-flown lines

Original Lines		Re-Flown Lines		
Line	**Flight**	**Line**	**Flight**	**Reason**
1056.0.0	1003	1056.0.1	1025	Port sensor mag blackouts
1060.0.0	1003	1060.0.1	1025	Port sensor mag blackouts
1062.0.0	1003	1062.0.1	1025	Port sensor mag blackouts
1344.0.0	1010	1344.0.1	1025	Port sensor mag blackouts
1158.0.0	1018	1158.0.1	1025	Port and upper sensor mag blackouts
1189.0.0	1020	1189.0.1	1025	Diurnal activity exceeds contract specifications

Field Personnel

Table 9 shows a list of SGL technical personnel who participated in the field operations.

Table 9: Survey field crew

	Name	Dates in Field
Project Manager	Kevin Charles	n/a
Crew Chief / Data Processor	Carsten Mueller	April 15 – May 17, 2021
Pilots	Richard Barrette	April 17 – May 16, 2021
	Seth Wildeman	April 17 – May 16, 2021
Aircraft Maintenance Engineer	Simon Worswick	April 22 – 25, 2021 May 14 – 16, 2021
Survey Systems Technician	Brent Lushaka	April 15 – May 17, 2021

8. DATA COMPILATION

Positional Data

A positional data flowchart is presented in *Figure 8*

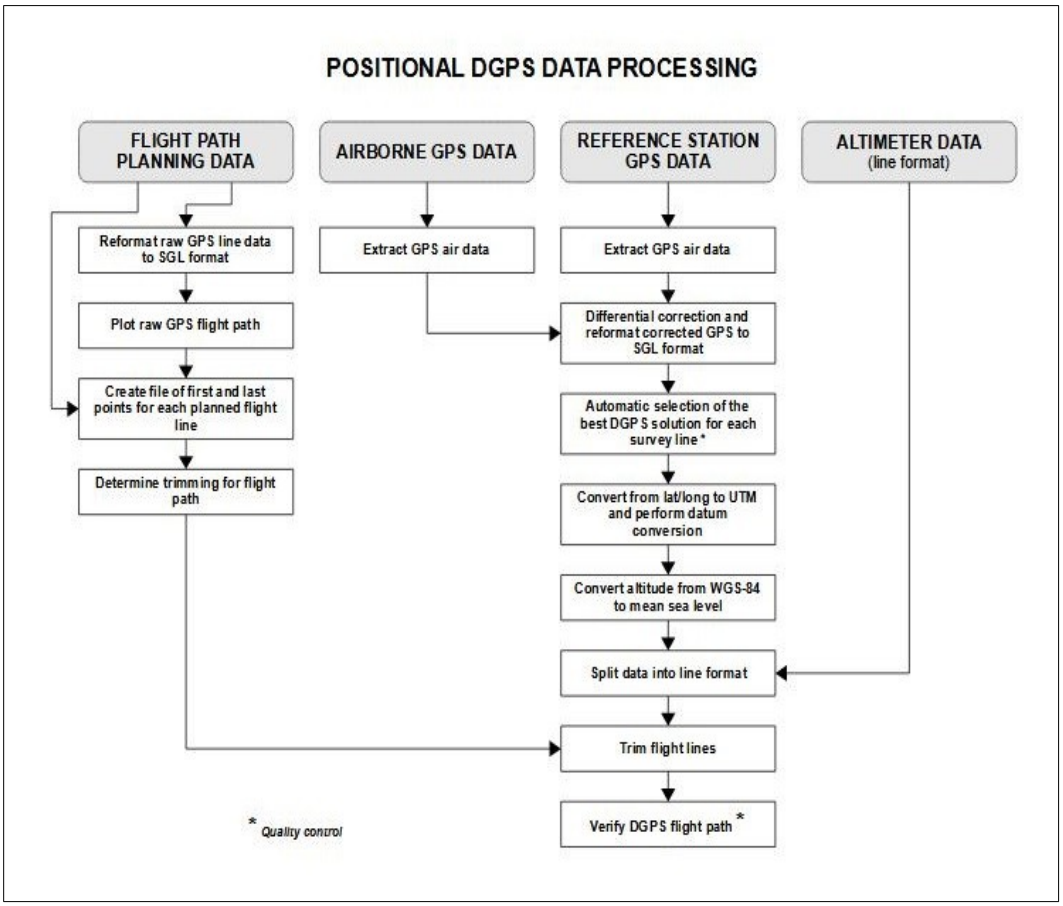


Figure 8: Positional DGPS data flowchart

A number of programs were executed for the compilation of navigation data in order to reformat and recalculate positions from raw 10 Hz range data obtained from the moving (airborne) receivers using combinations of L1 and L2 phase signal.

Accurate locations of the airborne GPS antenna were determined through Precise Point Positioning (PPP) corrections using the algorithm developed by the Natural Resources Canada (NRCAN) adapted to run under SGL's suite of software. This technique provides a final receiver location with an accuracy of better than 5 cm.

Positional data (x, y, z) were recorded and all data processing was performed in the WGS-84 datum; please see *Table 10* for ellipsoid parameters. Positions were delivered in the NAD-83 datum, UTM projection zone 17 N. See *Table 11* for the corresponding ellipsoid parameters and *Table 12* for the datum conversion parameters.

Table 10: Ellipsoid parameters of WGS-84

Ellipsoid	WGS-84
Semi-major axis	6378137.0
1/flattening	298.257223563

Table 11: Ellipsoid parameters of the GRS-80 ellipsoid, used by NAD-83

Ellipsoid	GRS-80
Semi-major axis	6378137.0
1/flattening	298.257222101

Table 12: Datum conversion parameters from NAD-83 to WGS-84

x shift (m)	0.991
y shift (m)	-1.9072
z shift (m)	-0.5129
x rotation (rad)	1.2581E-7
y rotation (rad)	0.3599E-7
z rotation (rad)	0.5607E-7

Elevation data were recorded relative to the WGS-84 ellipsoid and transformed to mean sea level (MSL) using the Earth Gravitational Model 2008 (EGM2008).

For the purpose of calculating a digital terrain model (DEM), the x, y, z coordinates of the GPS antenna are adjusted in vertical height to a reference point located on the floor level of the aircraft interior. Altimeter data is adjusted to the same reference point to assure consistency of reference when the data source are combined to calculate the DEM.

Radar and Laser Altimeter Data

The terrain clearance measured by the radar altimeter were recorded at 10 Hz. The radar does not always penetrate the canopy of the trees in the survey area, as it records the first return within the footprint of its signal. The radar altimeter data were filtered to remove high-frequency noise using a 67-point low pass filter (Appendix VII).

The laser altimeter recorded terrain clearance at 3.3 Hz. Even though the laser altimeter can record returns from more than 700 m above the ground with a high degree of certainty, some laser data dropouts occurred while flying over areas of poor reflectivity, such as lakes or snow, and due to the effects of mist. Short sections of poor laser or missing data were replaced using King radar data. Both GPS and altimeter data are adjusted so they are referenced to a standard reference point within the aircraft to ensure they are at a consistent level. A digital elevation model is derived with respect to MSL by subtracting the gap-filled laser altimeter data from the GPS elevation above MSL. The DEM is provided as a grid with a 10 m cell size.

The laser data were also processed with an iterative asymmetric de-spiking routine designed to remove early laser returns assumed to be mainly from trees. This version of the laser data is processed the same way as described above and used to derive a "bare earth" version of the DEM. The bare earth DEM is also provided as a grid with a 10 m cell size.

Magnetometer Data

A magnetic data flowchart is presented in *Figure 9.*

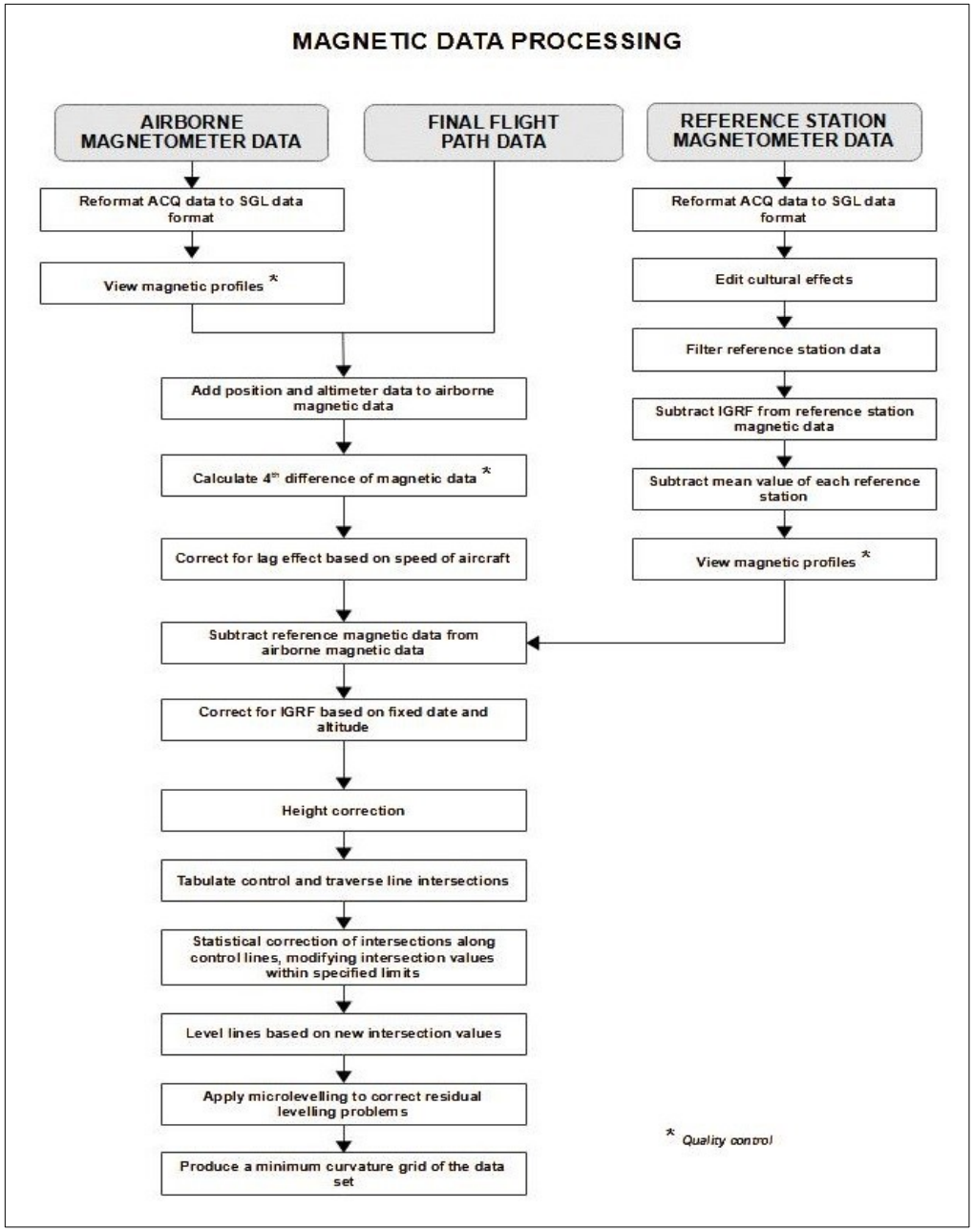


Figure 9: Magnetometer data processing flowchart

Reference Station Data

Magnetometer data from the primary reference station were inspected for cultural interference and edited where necessary, using comparison of the magnetic data from the two base stations as a guide. All reference station magnetometer data were filtered using a 121-point low pass filter (Appendix VII) to remove any high frequency interference, but retain the diurnal variations.

A correction for the International Geomagnetic Reference Field (IGRF) year 2020 model, was extrapolated for all ground magnetometer data using the fixed ground station location (see Section 7. FIELD OPERATIONS) and the recorded date of each flight. The mean residual magnetic field value of the primary reference station (Gnd1), calculated to be -30.55 nT, was subtracted to remove any bias from the local anomalous field. The backup base station's (Gnd2) mean residual magnetic field was 324.58 nT.

Airborne Data Extraction and Lag Correction

The airborne data from all three magnetometers were recorded at 160 Hz, and down sampled to 10 Hz for processing. All magnetic data were plotted and checked for any spikes or noise. A few short spikes, caused by one of the magnetometer sensors straddling the limit of the active zone (the port side sensor), were edited. A dynamic lag correction averaging 0.015 s but varying from between 0.011 s and 0.037 s depending on the instantaneous velocity of the helicopter, was applied to each data point. The aircraft speed dependent dynamic lag was calculated using SGL's *Dynlag* software. A hybrid magnetometer value, the average of the port side M1 and starboard side M2 sensors, was calculated and is used as the sensor for the purpose of deriving the basic aeromagnetic result. Processing of this hybrid value, referred to as the "M4" magnetic value, is described in the rest of this section. The final result is employed in the derivation of the gradient enhanced version of the magnetic data that is described in the section "Magnetometer Gradient Data" that follows below.

Diurnal Correction

Diurnal variations in the airborne magnetometer data were removed by subtracting the corrected reference station data. For almost all lines this data was from the primary reference station Gnd1, except for periods on day of year 115 (fiducials 61834 - 61971) and day of year 126 (fiducials 49038 – 49100, 49385 - 49519 and 51366 – 51591), for which Gnd2 data were substituted.

IGRF Correction

The airborne magnetometer data were corrected for the IGRF using the location, altitude, and date of each point. IGRF values were calculated using the year 2020 model. The altitude data used for the IGRF corrections are GPS heights above the WGS-84 ellipsoid. Removal of the IGRF from the magnetic data transforms it from Total Magnetic Intensity (TMI) to magnetic anomaly data.

Height Correction

At low altitudes, even relatively small differences in altitude may result in significant changes in spectral content of the magnetic data. Amplitude of magnetic signal drops off with height at an exponential rate proportional to the frequency of the signal, so that high frequency signal in particular changes rapidly with small changes in altitude close to the ground. Correcting for such changes using traditional levelling methods can be challenging since there is no way to properly extrapolate corrections from miss-ties at intersections due to altitude differences. Therefore, there is an advantage to correcting the airborne data for height variation before attempting levelling.

In order to correct magnetic data for altitude variation, we first need to define a consistent surface that will be used as a reference height. This can be a surface of constant height with respect to the ellipsoid

or a drape surface. The survey was not flown with a drape, but the aim was still to retain as much of the recorded signal content as possible. The minimum-curvature grid of the bird height above the WGS-84 ellipsoid, was the surface chosen, filtered with a second order Butterworth grid filter of wavelength 1,000 m. The difference between the obtained surface and the recorded altitude is the height difference to be accounted for.

The magnetic field intensity that would have been recorded at the different altitude was predicted based on a Taylor expansion that sums the derivatives of the field as follows:

$$T + (T' h)/1! + (T'' h^2)/2! + (T''' h^3)/3! + (T'''' h^4)/4! \ldots\ldots$$

where, T is the total magnetic intensity (TMI) at any given point,

T' is the first vertical derivative of the TMI, T'' is the second vertical derivative etc.

$1!$ is the first vertical derivative of the TMI, T'' is the second vertical derivative etc. is the factorial of 1, 2! is the factorial of 2 etc.

The series is infinite, but in practise there is no need to calculate the factors beyond the 4th derivative.

Instead of calculating the required vertical derivatives from the magnetic anomaly grid, the bias-corrected vertical gradient grid was used as the first vertical derivative, and the second vertical derivative was obtained by calculating the vertical derivative of the vertical gradient grid. Only the first two terms were used for the height correction.

The calculation was performed on the grids and applied to the time series data in one dimension which does not account for the cross line gradients.

Levelling

Intersections between control and traverse lines were determined by a program which extracts the magnetic, altitude, and x and y values of the traverse and control lines at each intersection point. Each control line was adjusted by a constant value to minimize the intersection differences, calculated as follows:

$\Sigma |i - a|$ summed over all traverse lines

where, i = (individual intersection difference)

a = (average intersection difference for that traverse line)

This is an iterative process. The variation of each intersection difference from the average intersection difference for each traverse line are calculated. The average of these intersection variation values are then derived for each control line, and the control line is adjusted up or down by that amount. The variation of each intersection from the average intersection difference for each traverse line are then recalculated, and another set of control line adjustments are derived accordingly. The procedure continues to iterate in this manner, but the adjustments become progressively smaller until the average adjustment falls below a pre-set threshold of <0.1nT.

Adjusted control lines were further corrected locally to minimize any residual differences. Traverse line levelling was carried out by a program that interpolates and extrapolates levelling values for each point based on the two closest levelling values. After traverse lines have been levelled, the control lines are

matched to them. This ensures that all intersections tie perfectly and permits the use of all data in the final products.

CLEVEL provides a curved correction using a function similar to spline interpolation. A third degree polynomial is used to interpolate between two intersections and the two values and two derivatives are chosen to determine the polynomial. CLEVEL is an improved method as it allows intersection points to be preserved with no mismatch and interpolation is smooth with the first derivative continuously approaching the same value from both sides of the intersection points.

The levelling procedure was verified through inspection of magnetic anomaly and vertical derivative grids (see below for derivative calculation), plotting profiles of corrections along lines, and examining levelling statistics to check for steep correction gradients.

Microlevelling

Microlevelling was applied to remove any residual diurnal effects from the data. This was achieved by using directional filters to identify and remove artifacts that are long wavelengths parallel to survey lines and short wavelengths perpendicular to survey lines. A limit of +/-1 nT was set for all microlevelling corrections.

Gridding

The grid of the magnetic anomaly was made using a minimum curvature algorithm to create a two-dimensional grid equally sampled in the x and y directions. The algorithm produces a smooth grid by iteratively solving a set of difference equations minimizing the total second horizontal derivative while attempting to honour the input data (Briggs, I.C, 1974, Geophysics, v 39, no. 1).

The final grids of the magnetic data were created with 10 m grid cell size appropriate for survey lines spaced at 50 m.

Vertical Derivatives of the Magnetic Anomaly

Vertical derivatives act as high pass filters that enhance the high frequency content of the data and suppress low frequency/long wavelength signal. The first vertical derivative (n=1) enhances rapid changes in the gravity or magnetic field at the edges of anomalies, and therefore it is useful for delimiting the extents of causative bodies.

If k_x and k_y are the wave numbers of the potential field in the two dimensional frequency domain, the n^{th} vertical derivative of a potential field is easily derived in the Fourier domain by applying the following filter:

$$F(k_x, k_y) = (-k)^n$$

where, $$k = \sqrt{(k_x^2 + k_y^2)}$$

The first vertical derivative of the magnetic anomaly is provided.

Horizontal Gradients of the Magnetic Anomaly

Horizontal gradient grids are used primarily for edge detection of causative bodies (contacts and faults with a large vertical displacement), but can also be useful for trend analysis and depth to source calculations. For RTP data, the horizontal gradient exhibits a symmetric peak with a maximum over the contact edge (Pilkinton and Keating, 2004).

The X (positive east) and Y (positive north) horizontal gradients of a potential field "f" are defined as:

$$(A(x))=[\frac{\partial f}{\partial x}]$$

and

$$(A(y))=[\frac{\partial f}{\partial y}]$$

where (A (x)) and (A (y) are the gradients and f is the magnetic intensity at a point (x, y). The horizontal derivatives are easily calculated in the space domain based on gridded data by dividing the difference between adjacent cells to the east and west or to the north and south by twice the grid cell size.

Total horizontal gradient of a potential field "f" is calculated from the gradients in the horizontal x and y plane as follows:

$$THG=\sqrt{\left[\frac{\partial f}{\partial x}\right]^2+\left[\frac{\partial f}{\partial y}\right]^2}$$

Magnetometer Gradient Data

A magnetic gradient data flowchart is presented in *Figure 10*.

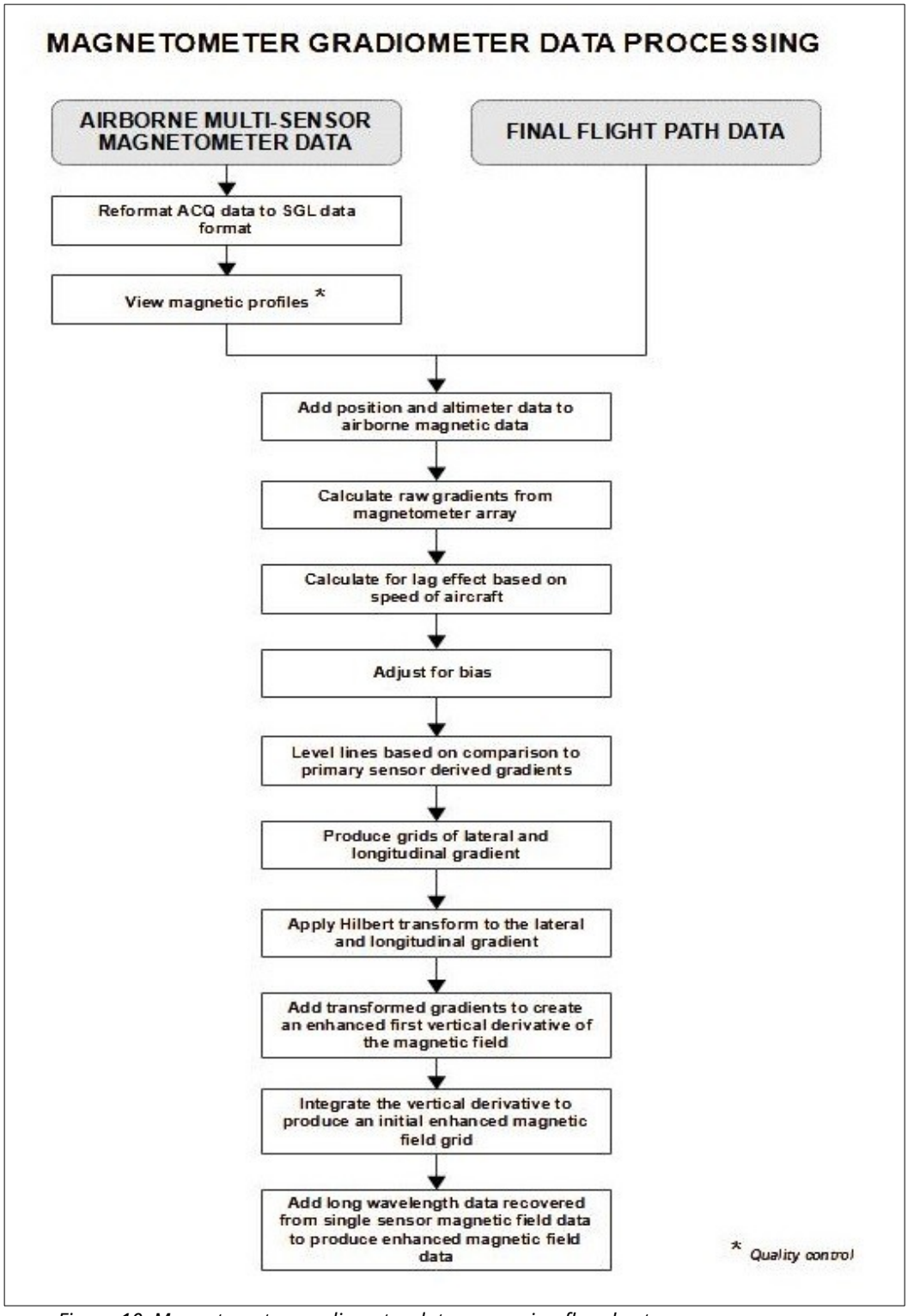


Figure 10: Magnetometer gradiometer data processing flowchart

The measured lateral and vertical gradients provide an improved rendition of the shorter wavelengths in the magnetic field than the total magnetic field measured by the hybrid primary sensor alone. This is because the direction and amplitude of the field's total gradient can be determined using the two measured gradients along with the rate of change of the total magnetic field (yielding the longitudinal gradient), providing information regarding the behaviour of the magnetic field in between traverse lines. A schematic of the towedbird with the array of magnetometers employed for this purpose is illustrated in *Figure 11*.

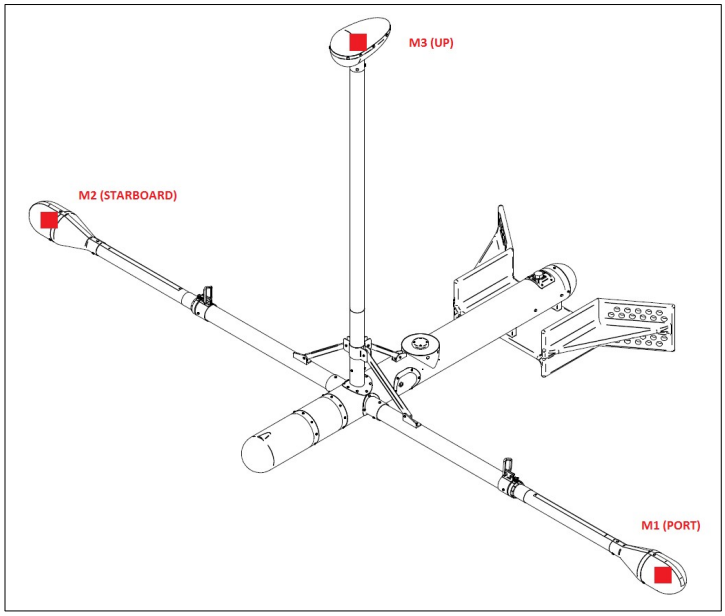


Figure 11: A schematic of the mag bird with the array of magnetometers

Raw Gradient Calculation

Initially, the magnetic gradients are derived with respect to the bird frame of reference. The lateral gradient data is derived from the difference in total magnetic intensity recorded at the port side (M1) and starboard side (M2) lateral sensors, divided by the separation of the magnetometers across the lateral beam as follows:

lateral gradient = (M2-M1) / lateral separation

where the lateral separation for the employed mag bird is 4.66 m.

The vertical gradient is derived from all sensors, being the difference in total magnetic intensity between the mean value of the port/starboard sensors M1 and M2 and the upper sensor M3, divided by the vertical separation between M1,2 and M3 along the vertical arm of the bird as follows:

vertical gradient = (((M2+M1)/2) - M3) / vertical separation between M1,2 and M3

where the vertical separation for the mag bird is 2.21 m.

The longitudinal gradient is derived by calculating the spatial derivative of the average of the total magnetic intensities M1 and M2 along the flight line, using the instantaneous ground speed of the bird for converting elapsed time to distance.

Lag Correction

Dynamic lag corrections reference the measured magnetic gradients to the location of the GPS antenna. A dynamic lag correction equivalent to the offset of 0.47 m as measured along the long axis of the bird from the GPS antenna to intersection point of the three sensor arms was applied to the lateral and vertical gradients.

The lag correction is applied to each data point dependent on the instantaneous velocity of the aircraft, so for example when flying exactly at the target speed of 58.3 knots, or 30 m/s, the correction is equal to 0.0157 s. The aircraft speed dependent dynamic lag was calculated using SGL's Dynlag software.

Bias Correction

Due to the different properties of the magnetic sensors employed on the aircraft, there is an inherent directional bias in the lateral and, to a much lesser extent, vertical gradient. Biases were corrected using an automatic algorithm adjusts the bias by subtracting the average value for each line, and adding back the average for the entire survey block. With a few exceptions, adjacent lines throughout the survey were flown in opposite directions, allowing for the effectiveness of the bias corrections to be assesssed. Corrections were applied to both lateral and vertical gradient data.

The across and along the aircraft gradients are combined to calculate the lateral and longitudinal gradients with respect to the survey lines so that positive gradients are eastward and northward respectively.

The measured horizontal and vertical gradients were compared to lateral and longitudinal horizontal gradients, and the first vertical derivative, derived from the residual magnetic field calculated from the hybrid center mag sensor M4, defined as the average of M1 and M2, as described in the section "Magnetometer Data" above. The horizontal gradients with respect to survey line direction and the vertical derivative of the hybrid sensor M4 are easily calculated in the space domain as described above from the gridded residual M4 magnetic field.

Levelling

Lateral, longitudinal and vertical gradients were "levelled" to gradients derived from M4 to account for minor bias variations that occur along a survey line. This is in part due to the fact that pitch and roll of the bird are not fully accounted for. Levelling was achieved by applying a 6.5 second low-pass filter to the difference between gradients derived from M4 and measured lateral gradients equivalent to 200 m at average survey speed. This process combines the longer wavelength data that is well sampled and represented by the M4 virtual sensor derived gradients for wavelengths of four times the survey line spacing or longer (ie. 200 m or more), with the detailed short-wavelength gradients best represented by the measured gradients, and helps to reconcile minor line-by-line differences not accounted for by the zero-order corrections alone.

Gridding

Grids of the lateral and longitudinal gradients were made using a minimum curvature algorithm to create a two-dimensional grid equally sampled in the x and y directions. The algorithm produces a smooth grid by iteratively solving a set of difference equations minimizing the total second horizontal derivative while attempting to honour the input data (Briggs, I.C, 1974, Geophysics, v 39, no. 1). A cell size of 10 m was employed.

Calculation of Enhanced Magnetic Anomaly

The two levelled horizontal gradient grids, lateral and longitudinal gradient, can be utilized to create a first vertical derivative grid using the Hilbert transform relationship (Nabighian, M.N. 1984, Geophysics v.49 p.780-786). Once the Hilbert transform has been applied to the lateral and longitudinal gradient grids, the outputs are summed to create a first vertical derivative grid. The first vertical derivative grid is then integrated to create a grid of gradient-enhanced magnetic anomaly.

However the integrated gradient enhanced magnetic anomaly grid does not contain the long wavelength signal that is well sampled and retained in the M4 sensor magnetic anomaly data. To account for this the long wavelength magnetic anomaly must be recovered. This was achieved by analysis of the difference between these two versions of the residual magnetic anomaly grid and a low pass filter is applied to the difference to isolate the missing long wavelengths that can then be added to the integrated magnetic anomaly. A 2nd order Butterworth filter with a cut-off of 5 km was found to match the two magnetic anomaly grid versions well whilst retaining the enhancement of the short wavelengths from the measured gradients. Since this grid based method is restricted in resolution to the grid cell size (10 m), the difference between the enhanced and M4 sensor magnetic anomaly grids is extracted along survey lines and applied as a correction to the higher resolution 10 Hz M4 sensor magnetic anomaly channel to provide a channel of gradient enhanced magnetic anomaly. Note however that it is not possible to re-grid this channel to recreate the enhanced magnetic anomaly grid since this does not reproduce the between line interpolation achieved by the procedure described above.

All grids generated during this procedure are created with a cell size of 10 m.

9. FINAL PRODUCTS

Digital Data Archives

Digital data are delivered in Geosoft compatible ASCII format (.xyz). Details of the fields of data provided for each data type are provided below:

Magnetic Data Channels

A listing of the magnetic data channels delivered with a sampling rate of 10 Hz can be found in *Table 13*.

Table 13: Magnetic data channels and format

Title	Units	Field Length	Description
LINE	-	8	Line number (xxxx.yy where xxxx is line number and y is segment number
DATE	-	11	Date (YYYY/MM/DD)
TIME	s	10	Seconds past midnight UTC
FLT	-	7	Flight number
YEAR	-	5	Year
FID	s	10	Fiducial seconds past midnight UTC
H-LAT	deg	14	Latitude, WGS-84, helicopter antenna
H-LONG	deg	14	Longitude, WGS-84, helicopter antenna
B-LAT	deg	14	Latitude, WGS-84, bird antenna
B-LONG	deg	14	Longitude, WGS-84, bird antenna
H-UTM-X	m	12	X coordinate, NAD-83, UTM zone 17N, helicopter antenna
H-UTM-Y	m	12	Y coordinate, NAD-83, UTM zone 17N, helicopter antenna
H-UTM-Z	m	11	GPS elevation above WGS-84 ellipsoid, helicopter antenna
H-MSL-Z	m	11	GPS elevation above EGM2008 geoid, helicopter antenna
B-UTM-X	m	12	X coordinate, NAD-83, UTM zone 17N, bird antenna
B-UTM-Y	m	12	Y coordinate, NAD-83, UTM zone 17N, bird antenna
B-UTM-Z	m	11	GPS elevation above WGS-84 ellipsoid, bird antenna
B-MSL-Z	m	11	GPS elevation above EGM2008 geoid, bird antenna
LASER	m	11	Filtered laser altimeter
TER	m	11	Terrain, generated from laser altimeter, with respect to the EGM2008 geoid
BTER	m	11	"Bare earth" laser derived terrain, with respect to the EGM2008 geoid
DIURNAL	nT	12	Diurnal magnetic field from reference station

Title	Units	Field Length	Description
MAG1RAW	nT	12	Airborne magnetic field, sensor 1 (port) (M1)
MAG2RAW	nT	12	Airborne magnetic field, sensor 2 (starboard) (M2)
MAG3RAW	nT	12	Airborne magnetic field, sensor 3 (upper) (M3)
MAG4RAW	nT	12	Airborne magnetic field, average of sensors 1 and 2 (M4)
MAGDC	nT	12	Diurnal corrected airborne magnetic field M4
MAGIGRF	nT	12	IGRF corrected airborne magnetic field M4
IGRF	nT	12	IGRF correction
HC-REF	m	12	Height correction reference surface with respect to the WGS-84 ellipsoid
MAGHEIGHT-COR	nT	12	Height corrections to magnetic field M4
MAGHEIGHT	nT	12	Height corrected airborne magnetic field M4
MAGLEVCOR	nT	12	Tie-line levelling corrections to magnetic field, M4
MAGLEV	nT	12	Levelled airborne magnetic field M4
MAGMLEV-COR	nT	12	Microlevelling corrections to magnetic field M4
MAGMLEV	nT	12	Microlevelled airborne magnetic field M4
LATLEV	nT/m	12	Levelled lateral gradient
LONLEV	nT/m	12	Levelled longitudinal gradient
VERTLEV	nT/m	12	Levelled vertical gradient
ENHAMF	nT	12	Horizontal magnetic gradient enhanced anomalous magnetic field
ENHFVD	nT/m	12	First vertical derivative of horizontal gradient enhanced anomalous magnetic field

Note: A '★' is used for any null values present.

Digital Grids

Details of the digital grids provided are as follows:

Formats:	Geosoft Binary (.grd) ASCII (.xyz)
Datum:	NAD-83
Projection:	UTM 17N

A list of all digital grids delivered can be found in *Table 14.*

Table 14: Delivered digital grids

Grid File Name	Units	Grid Cell Size (m)	Description
AMF	nT	10	Anomalous magnetic field
FVD	nT/m	10	First vertical derivative of anomalous magnetic field
ENHAMF	nT	10	Gradient enhanced anomalous magnetic field
ENHFVD	nT/m	10	First vertical derivative of gradient enhanced anomalous magnetic field
LAT	nT/m	10	Levelled lateral gradient
LON	nT/m	10	Levelled longitudinal gradient
VERT	nT/m	10	Levelled vertical gradient
TER	m	10	Laser derived terrain, with respect to the EGM2008 geoid
BTER	m	10	"Bare earth" laser derived terrain, with respect to the EGM2008 geoid

Appendix I

COMPANY PROFILE

ABOUT US

Sander Geophysics Limited (SGL) provides worldwide airborne geophysical surveys for petroleum and mineral exploration, and geological and environmental mapping. Services offered include high resolution airborne gravity, magnetic, electromagnetic, radiometric, and methane surveys, using fixed-wing aircraft and helicopters.

SGL head office in Ottawa, Canada

Dr. George W. Sander (1924-2008) founded SGL in 1956 to provide ground geophysical surveys. The first airborne surveys were performed as early as 1958, and by 1967 airborne geophysical surveys were the company's main focus. Operations have expanded steadily since SGL was founded 60 years ago. The company is led by co-Presidents Luise Sander and Stephan Sander.

WORLDWIDE OPERATIONS

SGL's head office and aircraft maintenance hangar are located at the International Airport in Ottawa, Canada. Sander Geophysics has operated on every continent including Antarctica, over diverse conditions ranging from the tropics to deserts, mountains and offshore.

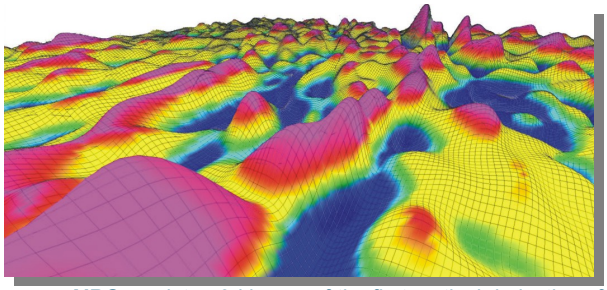
Facilities at the head office include a state of the art data processing department with an integrated digital cartographic department and a fully equipped electronics workshop for research, development and production of geophysical instruments. A Transport Canada Approved Maintenance Organization (AMO) for fixed-wing aircraft and helicopters allows most aircraft maintenance and modifications to be performed in-house.

SERVICES

AIRBORNE SURVEYS

- **Gravity (AIRGrav)**
- **Magnetic Total Field**
- **Magnetic Gradient**
- **Electromagnetic**
- **Gamma-ray Spectrometer**
- **Methane Mapping (SGMethane)**
- **Scanning LiDAR**

SGL offers gravity surveys with **AIRGrav** (Airborne Inertially Referenced Gravimeter), which was designed specifically for the unique characteristics of the airborne environment and is the highest resolution airborne gravimeter available. **AIRGrav** can be flown in an efficient survey aircraft during normal daytime conditions and is routinely flown in combination with magnetometer systems in SGL's airplanes and helicopters.



AIRGrav data: 3d image of the first vertical derivative of terrain corrected Bouguer gravity

DATA PROCESSING

Immediate data processing is part of SGL's standard quality control procedure, and provides clients with rapid results for evaluation while a survey is in progress. Sander Geophysics offers a full range of data enhancement programs and integrated interpretation services by experienced geoscientists. Available products in digital and/or hard copy include:

- **Contour, colour or shaded relief maps of any parameter or combination of parameters;**
- **NASVD processed gamma-ray spectrometer data;**

- **Filtered line or grid products such as vertical or horizontal gradients, frequency slices, high/low-pass or band-pass filtered, amplitude of the analytic signal, reduction to the pole, upward or downward continuation**
- **Computed depth to basement;**
- **Calculated digital terrain models;**
- **Two- or three-dimensional modelling;**
- **Cultural editing; and**
- **Complete geophysical interpretative reports.**

ENVIRONMENTAL MONITORING

The company also provides environmental monitoring services using gamma-ray spectrometers and specialized processing to detect and quantify natural and anthropogenic radiation, as well as accurate methane mapping and monitoring using SGMethane.

HEALTH & SAFETY

Sander Geophysics is a founding and active executive member of the International Airborne Geophysics Safety Association (IAGSA), which promotes the safe operation of helicopters and fixed-wing aircraft on airborne geophysical surveys.

SGL has developed and implemented a Safety Management System (SMS) and comprehensive Health, Safety and Environment (HSE) policies that govern all aspects of company operations. Safety initiatives include:

- **Project-specific Aviation Risk Analysis (ARA) and Personnel Risk Analysis (PRA) for all surveys;**
- **Real-time satellite tracking of SGL aircraft**
- **HSE and first aid training for all field personnel;**
- **Low-level flight and aircraft simulator training for pilots;**
- **Advanced safety training appropriate to the survey location, such as water-egress, wilderness survival, etc.**

SGL's excellent safety record reflects the quality and experience of its survey crews. This, combined with management's ongoing commitment to safety, helps to ensure that Sander Geophysics is a safe and reliable choice for airborne geophysical surveys.

PERSONNEL

Sander Geophysics has over 160 experienced permanent employees, including geophysicists, software and hardware engineers, aircraft maintenance engineers and pilots.

AIRCRAFT

SGL owns and operates thirteen aircraft, including eight Cessna Grand Caravans and a Twin Otter all equipped for geophysical surveys.

The Grand Caravans have been modified to allow the installation of a tri-axial magnetic gradiometer system. The company's fleet also includes a de Havilland DHC-6 Twin Otter for airborne magnetic, gravity, radiometric and frequency-domain EM surveys, and two AS350 B3 helicopters equipped for gravity, magnetic and radiometric surveys. Extensive modifications have been made to all of the survey aircraft to accommodate geophysical instruments and to reduce the aircraft's magnetic field. Typical Figures of Merit (FOM) for Sander Geophysics' fixed-wing aircraft are less than 1 nT. The company's aircraft are flown and maintained by licensed and experienced permanent employees of Sander Geophysics.

SGL aircraft

RESEARCH & DEVELOPMENT

Nearly one-third of the company's resources are devoted to developing new and more efficient instrumentation for airborne geophysical surveying, and to further refine its full suite of software for geophysical data processing.

Appendix II

Planned Lines

Datum: WGS-84

SEGMENT NO	START LAT	START LONG	END LAT	END LONG	LENGTH NM	LENGTH KM
C0101.0	N47:41.45	W082:57.03	N47:41.45	W082:46.44	7.16	13.26
C0102.0	N47:41.72	W082:57.03	N47:41.72	W082:46.44	7.16	13.26
C0103.0	N47:41.99	W082:57.03	N47:41.99	W082:44.58	8.41	15.58
C0104.0	N47:42.26	W082:57.03	N47:42.26	W082:44.58	8.41	15.58
C0105.0	N47:42.52	W082:57.03	N47:42.52	W082:43.81	8.93	16.54
C0106.0	N47:42.79	W082:57.03	N47:42.79	W082:43.81	8.93	16.54
C0107.0	N47:43.06	W082:57.03	N47:43.06	W082:43.81	8.93	16.54
C0108.0	N47:43.33	W082:57.03	N47:43.33	W082:43.44	9.18	16.99
C0109.0	N47:43.60	W082:57.03	N47:43.60	W082:43.08	9.42	17.45
C0110.0	N47:43.87	W082:57.03	N47:43.87	W082:43.08	9.42	17.45
C0111.0	N47:44.14	W082:57.03	N47:44.14	W082:43.08	9.42	17.44
C0112.0	N47:44.41	W082:57.03	N47:44.41	W082:43.08	9.42	17.44
C0113.0	N47:44.68	W082:57.03	N47:44.68	W082:43.08	9.42	17.44
C0114.0	N47:44.95	W082:57.03	N47:44.95	W082:43.08	9.42	17.44
C0115.0	N47:45.22	W082:57.03	N47:45.22	W082:43.08	9.42	17.44
C0116.0	N47:45.49	W082:57.03	N47:45.49	W082:43.08	9.41	17.44
C0117.0	N47:45.76	W082:57.03	N47:45.76	W082:43.08	9.41	17.43
C0118.0	N47:46.03	W082:57.03	N47:46.03	W082:43.08	9.41	17.43
C0119.0	N47:46.30	W082:58.93	N47:46.30	W082:43.08	10.69	19.81
C0120.0	N47:46.57	W082:58.93	N47:46.57	W082:43.08	10.69	19.81
C0121.0	N47:46.84	W082:58.93	N47:46.84	W082:43.08	10.69	19.80
C0122.0	N47:47.11	W082:58.93	N47:47.11	W082:42.71	10.94	20.26
C0123.0	N47:47.38	W082:58.93	N47:47.38	W082:42.71	10.94	20.25
C0124.0	N47:47.65	W082:58.93	N47:47.65	W082:42.71	10.94	20.25
C0125.0	N47:47.92	W082:58.93	N47:47.92	W082:42.71	10.93	20.25
C0126.0	N47:48.19	W082:58.93	N47:48.19	W082:42.71	10.93	20.25
C0127.0	N47:48.46	W082:58.93	N47:48.46	W082:42.71	10.93	20.25
C0128.0	N47:48.73	W082:58.93	N47:48.73	W082:42.71	10.93	20.25
C0129.0	N47:49.00	W082:58.93	N47:49.00	W082:42.71	10.93	20.24
C0130.0	N47:49.27	W082:58.93	N47:49.27	W082:43.85	10.17	18.83
C0131.0	N47:49.54	W082:58.17	N47:49.54	W082:43.85	9.65	17.87
C0132.0	N47:49.81	W082:58.17	N47:49.81	W082:43.85	9.65	17.87
C0133.0	N47:50.08	W082:57.44	N47:50.08	W082:43.85	9.16	16.96
C0134.0	N47:50.35	W082:56.67	N47:50.35	W082:43.85	8.64	16.00
C0135.0	N47:50.62	W082:56.67	N47:50.62	W082:43.85	8.64	16.00
C0136.0	N47:50.89	W082:56.67	N47:50.89	W082:43.85	8.64	15.99
C0137.0	N47:51.16	W082:52.54	N47:51.16	W082:43.85	5.86	10.85
C0138.0	N47:51.43	W082:52.54	N47:51.43	W082:47.20	3.60	6.66
C0139.0	N47:51.70	W082:52.54	N47:51.70	W082:47.20	3.59	6.66
C0140.0	N47:51.97	W082:51.81	N47:51.97	W082:49.07	1.85	3.43
C0141.0	N47:52.24	W082:51.05	N47:52.24	W082:49.07	1.33	2.47
T1001.0	N47:46.25	W082:58.89	N47:49.30	W082:58.89	3.05	5.65
T1002.0	N47:46.25	W082:58.85	N47:49.30	W082:58.85	3.05	5.65
T1003.0	N47:46.25	W082:58.81	N47:49.30	W082:58.81	3.05	5.65
T1004.0	N47:46.25	W082:58.77	N47:49.30	W082:58.77	3.05	5.65
T1005.0	N47:46.25	W082:58.73	N47:49.30	W082:58.73	3.05	5.65
T1006.0	N47:46.25	W082:58.69	N47:49.30	W082:58.69	3.05	5.65
T1007.0	N47:46.25	W082:58.65	N47:49.30	W082:58.65	3.05	5.65
T1008.0	N47:46.25	W082:58.61	N47:49.30	W082:58.61	3.05	5.65
T1009.0	N47:46.25	W082:58.57	N47:49.30	W082:58.57	3.05	5.65
T1010.0	N47:46.25	W082:58.53	N47:49.30	W082:58.53	3.05	5.65
T1011.0	N47:46.25	W082:58.49	N47:49.30	W082:58.49	3.05	5.65
T1012.0	N47:46.25	W082:58.45	N47:49.30	W082:58.45	3.05	5.65
T1013.0	N47:46.25	W082:58.41	N47:49.30	W082:58.41	3.05	5.65
T1014.0	N47:46.25	W082:58.37	N47:49.30	W082:58.37	3.05	5.65

SEGMENT	START		END		LENGTH	
NO	LAT	LONG	LAT	LONG	NM	KM
T1015.0	N47:46.25	W082:58.33	N47:49.30	W082:58.33	3.05	5.65
T1016.0	N47:46.25	W082:58.29	N47:49.30	W082:58.29	3.05	5.65
T1017.0	N47:46.25	W082:58.25	N47:49.30	W082:58.25	3.05	5.65
T1018.0	N47:46.25	W082:58.21	N47:49.30	W082:58.21	3.05	5.65
T1019.0	N47:46.25	W082:58.17	N47:49.30	W082:58.17	3.05	5.65
T1020.0	N47:46.25	W082:58.13	N47:49.84	W082:58.13	3.59	6.65
T1021.0	N47:46.25	W082:58.08	N47:49.84	W082:58.08	3.59	6.65
T1022.0	N47:46.25	W082:58.04	N47:49.84	W082:58.04	3.59	6.65
T1023.0	N47:46.25	W082:58.00	N47:49.84	W082:58.00	3.59	6.65
T1024.0	N47:46.25	W082:57.96	N47:49.84	W082:57.96	3.59	6.65
T1025.0	N47:46.25	W082:57.92	N47:49.84	W082:57.92	3.59	6.65
T1026.0	N47:46.25	W082:57.88	N47:49.84	W082:57.88	3.59	6.65
T1027.0	N47:46.25	W082:57.84	N47:49.84	W082:57.84	3.59	6.65
T1028.0	N47:46.25	W082:57.80	N47:49.84	W082:57.80	3.59	6.65
T1029.0	N47:46.25	W082:57.76	N47:49.84	W082:57.76	3.59	6.65
T1030.0	N47:46.25	W082:57.72	N47:49.84	W082:57.72	3.59	6.65
T1031.0	N47:46.25	W082:57.68	N47:49.84	W082:57.68	3.59	6.65
T1032.0	N47:46.25	W082:57.64	N47:49.84	W082:57.64	3.59	6.65
T1033.0	N47:46.25	W082:57.60	N47:49.84	W082:57.60	3.59	6.65
T1034.0	N47:46.25	W082:57.56	N47:49.84	W082:57.56	3.59	6.65
T1035.0	N47:46.25	W082:57.52	N47:49.84	W082:57.52	3.59	6.65
T1036.0	N47:46.25	W082:57.48	N47:49.84	W082:57.48	3.59	6.65
T1037.0	N47:46.25	W082:57.44	N47:49.84	W082:57.44	3.59	6.65
T1038.0	N47:46.25	W082:57.40	N47:50.11	W082:57.40	3.86	7.15
T1039.0	N47:46.25	W082:57.36	N47:50.11	W082:57.36	3.86	7.15
T1040.0	N47:46.25	W082:57.32	N47:50.11	W082:57.32	3.86	7.15
T1041.0	N47:46.25	W082:57.28	N47:50.11	W082:57.28	3.86	7.15
T1042.0	N47:46.25	W082:57.24	N47:50.11	W082:57.24	3.86	7.15
T1043.0	N47:46.25	W082:57.19	N47:50.11	W082:57.19	3.86	7.15
T1044.0	N47:46.25	W082:57.15	N47:50.11	W082:57.15	3.86	7.15
T1045.0	N47:46.25	W082:57.11	N47:50.11	W082:57.11	3.86	7.15
T1046.0	N47:46.25	W082:57.07	N47:50.11	W082:57.07	3.86	7.15
T1047.0	N47:46.25	W082:57.03	N47:50.11	W082:57.03	3.86	7.15
T1048.0	N47:41.32	W082:56.99	N47:50.11	W082:56.99	8.80	16.29
T1049.0	N47:41.32	W082:56.95	N47:50.11	W082:56.95	8.80	16.29
T1050.0	N47:41.32	W082:56.91	N47:50.11	W082:56.91	8.79	16.29
T1051.0	N47:41.32	W082:56.87	N47:50.11	W082:56.87	8.79	16.29
T1052.0	N47:41.32	W082:56.83	N47:50.11	W082:56.83	8.79	16.29
T1053.0	N47:41.32	W082:56.79	N47:50.11	W082:56.79	8.79	16.28
T1054.0	N47:41.32	W082:56.75	N47:50.11	W082:56.75	8.79	16.28
T1055.0	N47:41.32	W082:56.71	N47:50.11	W082:56.71	8.79	16.28
T1056.0	N47:41.32	W082:56.67	N47:50.11	W082:56.67	8.79	16.28
T1057.0	N47:41.32	W082:56.63	N47:51.00	W082:56.63	9.68	17.93
T1058.0	N47:41.32	W082:56.59	N47:51.00	W082:56.59	9.68	17.93
T1059.0	N47:41.32	W082:56.55	N47:51.00	W082:56.55	9.68	17.93
T1060.0	N47:41.32	W082:56.51	N47:51.00	W082:56.51	9.68	17.93
T1061.0	N47:41.33	W082:56.47	N47:51.00	W082:56.47	9.68	17.93
T1062.0	N47:41.33	W082:56.43	N47:51.00	W082:56.43	9.68	17.93
T1063.0	N47:41.33	W082:56.39	N47:51.00	W082:56.39	9.68	17.93
T1064.0	N47:41.33	W082:56.35	N47:51.00	W082:56.35	9.68	17.93
T1065.0	N47:41.33	W082:56.31	N47:51.00	W082:56.31	9.68	17.92
T1066.0	N47:41.33	W082:56.26	N47:51.00	W082:56.26	9.68	17.92
T1067.0	N47:41.33	W082:56.22	N47:51.00	W082:56.22	9.68	17.92
T1068.0	N47:41.33	W082:56.18	N47:51.00	W082:56.18	9.68	17.92
T1069.0	N47:41.33	W082:56.14	N47:51.00	W082:56.14	9.68	17.92
T1070.0	N47:41.33	W082:56.10	N47:51.00	W082:56.10	9.67	17.92
T1071.0	N47:41.33	W082:56.06	N47:51.00	W082:56.06	9.67	17.92
T1072.0	N47:41.33	W082:56.02	N47:51.00	W082:56.02	9.67	17.91
T1073.0	N47:41.33	W082:55.98	N47:51.00	W082:55.98	9.67	17.91

SEGMENT	START		END		LENGTH	
NO	LAT	LONG	LAT	LONG	NM	KM
T1074.0	N47:41.33	W082:55.94	N47:51.00	W082:55.94	9.67	17.91
T1075.0	N47:41.34	W082:55.90	N47:51.00	W082:55.90	9.67	17.91
T1076.0	N47:41.34	W082:55.86	N47:51.00	W082:55.86	9.67	17.91
T1077.0	N47:41.34	W082:55.82	N47:51.00	W082:55.82	9.67	17.91
T1078.0	N47:41.34	W082:55.78	N47:51.00	W082:55.78	9.67	17.91
T1079.0	N47:41.34	W082:55.74	N47:51.00	W082:55.74	9.67	17.91
T1080.0	N47:41.34	W082:55.70	N47:51.00	W082:55.70	9.67	17.90
T1081.0	N47:41.34	W082:55.66	N47:51.00	W082:55.66	9.67	17.90
T1082.0	N47:41.34	W082:55.62	N47:51.00	W082:55.62	9.67	17.90
T1083.0	N47:41.34	W082:55.58	N47:51.00	W082:55.58	9.67	17.90
T1084.0	N47:41.34	W082:55.54	N47:47.41	W082:55.54	6.07	11.24
T1084.1	N47:48.70	W082:55.54	N47:51.00	W082:55.54	2.30	4.26
T1085.0	N47:41.34	W082:55.50	N47:47.41	W082:55.50	6.07	11.24
T1085.1	N47:48.70	W082:55.50	N47:51.00	W082:55.50	2.30	4.26
T1086.0	N47:41.34	W082:55.46	N47:46.87	W082:55.46	5.53	10.24
T1086.1	N47:49.24	W082:55.46	N47:51.00	W082:55.46	1.76	3.26
T1087.0	N47:41.34	W082:55.42	N47:46.87	W082:55.42	5.53	10.24
T1087.1	N47:49.24	W082:55.42	N47:51.00	W082:55.42	1.76	3.26
T1088.0	N47:41.34	W082:55.37	N47:46.87	W082:55.37	5.53	10.24
T1088.1	N47:49.24	W082:55.37	N47:51.00	W082:55.37	1.76	3.26
T1089.0	N47:41.35	W082:55.33	N47:46.87	W082:55.33	5.53	10.24
T1089.1	N47:49.24	W082:55.33	N47:51.00	W082:55.33	1.76	3.26
T1090.0	N47:41.35	W082:55.29	N47:46.87	W082:55.29	5.53	10.23
T1090.1	N47:49.24	W082:55.29	N47:51.00	W082:55.29	1.76	3.26
T1091.0	N47:41.35	W082:55.25	N47:46.87	W082:55.25	5.53	10.23
T1091.1	N47:49.24	W082:55.25	N47:51.00	W082:55.25	1.76	3.26
T1092.0	N47:41.35	W082:55.21	N47:46.87	W082:55.21	5.52	10.23
T1092.1	N47:49.24	W082:55.21	N47:51.00	W082:55.21	1.76	3.26
T1093.0	N47:41.35	W082:55.17	N47:46.87	W082:55.17	5.52	10.23
T1093.1	N47:49.24	W082:55.17	N47:51.00	W082:55.17	1.76	3.26
T1094.0	N47:41.35	W082:55.13	N47:46.87	W082:55.13	5.52	10.23
T1094.1	N47:49.24	W082:55.13	N47:51.00	W082:55.13	1.76	3.26
T1095.0	N47:41.35	W082:55.09	N47:46.06	W082:55.09	4.71	8.73
T1095.1	N47:49.24	W082:55.09	N47:51.00	W082:55.09	1.76	3.26
T1096.0	N47:41.35	W082:55.05	N47:46.06	W082:55.05	4.71	8.73
T1096.1	N47:49.24	W082:55.05	N47:51.00	W082:55.05	1.76	3.26
T1097.0	N47:41.35	W082:55.01	N47:46.06	W082:55.01	4.71	8.73
T1097.1	N47:49.24	W082:55.01	N47:51.00	W082:55.01	1.76	3.26
T1098.0	N47:41.35	W082:54.97	N47:46.06	W082:54.97	4.71	8.72
T1098.1	N47:49.24	W082:54.97	N47:51.00	W082:54.97	1.76	3.26
T1099.0	N47:41.35	W082:54.93	N47:46.06	W082:54.93	4.71	8.72
T1099.1	N47:49.24	W082:54.93	N47:51.00	W082:54.93	1.76	3.26
T1100.0	N47:41.35	W082:54.89	N47:46.06	W082:54.89	4.71	8.72
T1100.1	N47:49.24	W082:54.89	N47:51.00	W082:54.89	1.76	3.26
T1101.0	N47:41.35	W082:54.85	N47:46.06	W082:54.85	4.71	8.72
T1101.1	N47:49.24	W082:54.85	N47:51.00	W082:54.85	1.76	3.26
T1102.0	N47:41.35	W082:54.81	N47:46.06	W082:54.81	4.71	8.72
T1102.1	N47:49.24	W082:54.81	N47:51.00	W082:54.81	1.76	3.26
T1103.0	N47:41.36	W082:54.77	N47:46.06	W082:54.77	4.71	8.72
T1103.1	N47:49.24	W082:54.77	N47:51.00	W082:54.77	1.76	3.26
T1104.0	N47:41.36	W082:54.73	N47:46.06	W082:54.73	4.71	8.72
T1104.1	N47:49.24	W082:54.73	N47:51.00	W082:54.73	1.76	3.26
T1105.0	N47:41.36	W082:54.69	N47:46.06	W082:54.69	4.71	8.72
T1105.1	N47:49.24	W082:54.69	N47:51.00	W082:54.69	1.76	3.26
T1106.0	N47:41.36	W082:54.65	N47:46.06	W082:54.65	4.71	8.71
T1106.1	N47:49.24	W082:54.65	N47:51.00	W082:54.65	1.76	3.26
T1107.0	N47:41.36	W082:54.61	N47:46.06	W082:54.61	4.70	8.71
T1107.1	N47:49.24	W082:54.61	N47:51.00	W082:54.61	1.76	3.26
T1108.0	N47:41.36	W082:54.57	N47:46.06	W082:54.57	4.70	8.71

SEGMENT	START		END		LENGTH	
NO	LAT	LONG	LAT	LONG	NM	KM
T1108.1	N47:49.24	W082:54.57	N47:51.00	W082:54.57	1.76	3.26
T1109.0	N47:41.36	W082:54.53	N47:46.06	W082:54.53	4.70	8.71
T1109.1	N47:49.24	W082:54.53	N47:51.00	W082:54.53	1.76	3.26
T1110.0	N47:41.36	W082:54.48	N47:46.06	W082:54.48	4.70	8.71
T1110.1	N47:49.24	W082:54.48	N47:51.00	W082:54.48	1.76	3.26
T1111.0	N47:41.36	W082:54.44	N47:46.06	W082:54.44	4.70	8.71
T1111.1	N47:49.24	W082:54.44	N47:51.00	W082:54.44	1.76	3.26
T1112.0	N47:41.36	W082:54.40	N47:46.06	W082:54.40	4.70	8.71
T1112.1	N47:49.24	W082:54.40	N47:51.00	W082:54.40	1.76	3.26
T1113.0	N47:41.36	W082:54.36	N47:47.41	W082:54.36	6.05	11.20
T1113.1	N47:48.97	W082:54.36	N47:51.00	W082:54.36	2.03	3.76
T1114.0	N47:41.36	W082:54.32	N47:47.41	W082:54.32	6.05	11.20
T1114.1	N47:48.97	W082:54.32	N47:51.00	W082:54.32	2.03	3.76
T1115.0	N47:41.36	W082:54.28	N47:47.41	W082:54.28	6.05	11.20
T1115.1	N47:48.97	W082:54.28	N47:51.00	W082:54.28	2.03	3.76
T1116.0	N47:41.36	W082:54.24	N47:47.41	W082:54.24	6.05	11.20
T1116.1	N47:48.97	W082:54.24	N47:51.00	W082:54.24	2.03	3.76
T1117.0	N47:41.36	W082:54.20	N47:47.41	W082:54.20	6.05	11.20
T1117.1	N47:48.97	W082:54.20	N47:51.00	W082:54.20	2.03	3.76
T1118.0	N47:41.37	W082:54.16	N47:47.41	W082:54.16	6.05	11.20
T1118.1	N47:48.97	W082:54.16	N47:51.00	W082:54.16	2.03	3.76
T1119.0	N47:41.37	W082:54.12	N47:47.41	W082:54.12	6.05	11.20
T1119.1	N47:48.97	W082:54.12	N47:51.00	W082:54.12	2.03	3.76
T1120.0	N47:41.37	W082:54.08	N47:47.41	W082:54.08	6.05	11.20
T1120.1	N47:48.97	W082:54.08	N47:51.00	W082:54.08	2.03	3.76
T1121.0	N47:41.37	W082:54.04	N47:47.41	W082:54.04	6.04	11.19
T1121.1	N47:48.97	W082:54.04	N47:51.00	W082:54.04	2.03	3.76
T1122.0	N47:41.37	W082:54.00	N47:51.00	W082:54.00	9.64	17.86
T1123.0	N47:41.37	W082:53.96	N47:50.75	W082:53.96	9.39	17.39
T1124.0	N47:41.37	W082:53.92	N47:50.75	W082:53.92	9.39	17.39
T1125.0	N47:41.37	W082:53.88	N47:50.75	W082:53.88	9.39	17.39
T1126.0	N47:41.37	W082:53.84	N47:50.75	W082:53.84	9.39	17.38
T1127.0	N47:41.37	W082:53.80	N47:50.75	W082:53.80	9.39	17.38
T1128.0	N47:41.37	W082:53.76	N47:50.75	W082:53.76	9.39	17.38
T1129.0	N47:41.37	W082:53.72	N47:50.75	W082:53.72	9.38	17.38
T1130.0	N47:41.37	W082:53.68	N47:50.75	W082:53.68	9.38	17.38
T1131.0	N47:41.37	W082:53.64	N47:50.75	W082:53.64	9.38	17.38
T1132.0	N47:41.38	W082:53.60	N47:50.75	W082:53.60	9.38	17.38
T1133.0	N47:41.38	W082:53.55	N47:50.75	W082:53.55	9.38	17.37
T1134.0	N47:41.38	W082:53.51	N47:50.75	W082:53.51	9.38	17.37
T1135.0	N47:41.38	W082:53.47	N47:50.75	W082:53.47	9.38	17.37
T1136.0	N47:41.38	W082:53.43	N47:50.75	W082:53.43	9.38	17.37
T1137.0	N47:41.38	W082:53.39	N47:50.75	W082:53.39	9.38	17.37
T1138.0	N47:41.38	W082:53.35	N47:50.75	W082:53.35	9.38	17.37
T1139.0	N47:41.38	W082:53.31	N47:50.75	W082:53.31	9.38	17.37
T1140.0	N47:41.38	W082:53.27	N47:50.75	W082:53.27	9.38	17.36
T1141.0	N47:41.38	W082:53.23	N47:50.75	W082:53.23	9.38	17.36
T1142.0	N47:41.38	W082:53.19	N47:50.75	W082:53.19	9.37	17.36
T1143.0	N47:41.38	W082:53.15	N47:50.75	W082:53.15	9.37	17.36
T1144.0	N47:41.38	W082:53.11	N47:50.75	W082:53.11	9.37	17.36
T1145.0	N47:41.38	W082:53.07	N47:50.75	W082:53.07	9.37	17.36
T1146.0	N47:41.39	W082:53.03	N47:50.75	W082:53.03	9.37	17.36
T1147.0	N47:41.39	W082:52.99	N47:50.75	W082:52.99	9.37	17.35
T1148.0	N47:41.39	W082:52.95	N47:50.75	W082:52.95	9.37	17.35
T1149.0	N47:41.39	W082:52.91	N47:50.75	W082:52.91	9.37	17.35
T1150.0	N47:41.39	W082:52.87	N47:50.75	W082:52.87	9.37	17.35
T1151.0	N47:41.39	W082:52.83	N47:50.75	W082:52.83	9.37	17.35
T1152.0	N47:41.39	W082:52.79	N47:50.75	W082:52.79	9.37	17.35
T1153.0	N47:41.39	W082:52.75	N47:50.75	W082:52.75	9.37	17.35

SEGMENT	START		END		LENGTH	
NO	LAT	LONG	LAT	LONG	NM	KM
T1154.0	N47:41.39	W082:52.71	N47:50.75	W082:52.71	9.36	17.34
T1155.0	N47:41.39	W082:52.66	N47:50.75	W082:52.66	9.36	17.34
T1156.0	N47:41.39	W082:52.62	N47:50.75	W082:52.62	9.36	17.34
T1157.0	N47:41.39	W082:52.58	N47:50.75	W082:52.58	9.36	17.34
T1158.0	N47:41.39	W082:52.54	N47:50.75	W082:52.54	9.36	17.34
T1159.0	N47:41.39	W082:52.50	N47:51.75	W082:52.50	10.36	19.19
T1160.0	N47:41.40	W082:52.46	N47:51.75	W082:52.46	10.36	19.19
T1161.0	N47:41.40	W082:52.42	N47:51.75	W082:52.42	10.36	19.19
T1162.0	N47:41.40	W082:52.38	N47:51.75	W082:52.38	10.36	19.19
T1163.0	N47:41.40	W082:52.34	N47:51.75	W082:52.34	10.36	19.18
T1164.0	N47:41.40	W082:52.30	N47:51.75	W082:52.30	10.36	19.18
T1165.0	N47:41.40	W082:52.26	N47:51.75	W082:52.26	10.36	19.18
T1166.0	N47:41.40	W082:52.22	N47:51.75	W082:52.22	10.36	19.18
T1167.0	N47:41.40	W082:52.18	N47:51.75	W082:52.18	10.36	19.18
T1168.0	N47:41.40	W082:52.14	N47:51.75	W082:52.14	10.36	19.18
T1169.0	N47:41.40	W082:52.10	N47:51.75	W082:52.10	10.35	19.18
T1170.0	N47:41.40	W082:52.06	N47:51.75	W082:52.06	10.35	19.18
T1171.0	N47:41.40	W082:52.02	N47:51.75	W082:52.02	10.35	19.17
T1172.0	N47:41.40	W082:51.98	N47:51.75	W082:51.98	10.35	19.17
T1173.0	N47:41.40	W082:51.94	N47:51.75	W082:51.94	10.35	19.17
T1174.0	N47:41.41	W082:51.90	N47:51.75	W082:51.90	10.35	19.17
T1175.0	N47:41.41	W082:51.86	N47:51.75	W082:51.86	10.35	19.17
T1176.0	N47:41.41	W082:51.82	N47:51.75	W082:51.82	10.35	19.17
T1177.0	N47:41.41	W082:51.77	N47:52.00	W082:51.77	10.60	19.63
T1178.0	N47:41.41	W082:51.73	N47:52.00	W082:51.73	10.60	19.63
T1179.0	N47:41.41	W082:51.69	N47:52.00	W082:51.69	10.60	19.63
T1180.0	N47:41.41	W082:51.65	N47:52.00	W082:51.65	10.60	19.63
T1181.0	N47:41.41	W082:51.61	N47:52.00	W082:51.61	10.60	19.62
T1182.0	N47:41.41	W082:51.57	N47:52.00	W082:51.57	10.60	19.62
T1183.0	N47:41.41	W082:51.53	N47:52.00	W082:51.53	10.59	19.62
T1184.0	N47:41.41	W082:51.49	N47:52.00	W082:51.49	10.59	19.62
T1185.0	N47:41.41	W082:51.45	N47:52.00	W082:51.45	10.59	19.62
T1186.0	N47:41.41	W082:51.41	N47:52.00	W082:51.41	10.59	19.62
T1187.0	N47:41.41	W082:51.37	N47:52.00	W082:51.37	10.59	19.62
T1188.0	N47:41.42	W082:51.33	N47:52.00	W082:51.33	10.59	19.62
T1189.0	N47:41.42	W082:51.29	N47:52.00	W082:51.29	10.59	19.61
T1190.0	N47:41.42	W082:51.25	N47:52.00	W082:51.25	10.59	19.61
T1191.0	N47:41.42	W082:51.21	N47:52.00	W082:51.21	10.59	19.61
T1192.0	N47:41.42	W082:51.17	N47:52.00	W082:51.17	10.59	19.61
T1193.0	N47:41.42	W082:51.13	N47:52.00	W082:51.13	10.59	19.61
T1194.0	N47:41.42	W082:51.09	N47:52.00	W082:51.09	10.59	19.61
T1195.0	N47:41.42	W082:51.05	N47:52.00	W082:51.05	10.59	19.61
T1196.0	N47:41.42	W082:51.01	N47:52.27	W082:51.01	10.85	20.10
T1197.0	N47:41.42	W082:50.97	N47:52.27	W082:50.97	10.85	20.10
T1198.0	N47:41.42	W082:50.93	N47:52.27	W082:50.93	10.85	20.10
T1199.0	N47:41.42	W082:50.88	N47:52.27	W082:50.88	10.85	20.10
T1200.0	N47:41.42	W082:50.84	N47:52.27	W082:50.84	10.85	20.10
T1201.0	N47:41.42	W082:50.80	N47:52.27	W082:50.80	10.85	20.10
T1202.0	N47:41.42	W082:50.76	N47:52.27	W082:50.76	10.85	20.10
T1203.0	N47:41.42	W082:50.72	N47:52.27	W082:50.72	10.85	20.10
T1204.0	N47:41.42	W082:50.68	N47:52.27	W082:50.68	10.85	20.10
T1205.0	N47:41.42	W082:50.64	N47:52.27	W082:50.64	10.85	20.10
T1206.0	N47:41.42	W082:50.60	N47:52.27	W082:50.60	10.85	20.10
T1207.0	N47:41.42	W082:50.56	N47:52.27	W082:50.56	10.85	20.10
T1208.0	N47:41.42	W082:50.52	N47:52.27	W082:50.52	10.85	20.10
T1209.0	N47:41.42	W082:50.48	N47:52.27	W082:50.48	10.85	20.10
T1210.0	N47:41.42	W082:50.44	N47:52.27	W082:50.44	10.85	20.10
T1211.0	N47:41.42	W082:50.40	N47:52.27	W082:50.40	10.85	20.10
T1212.0	N47:41.42	W082:50.36	N47:52.27	W082:50.36	10.85	20.10

SEGMENT	START		END		LENGTH	
NO	LAT	LONG	LAT	LONG	NM	KM
T1213.0	N47:41.42	W082:50.32	N47:52.27	W082:50.32	10.85	20.10
T1214.0	N47:41.42	W082:50.28	N47:52.27	W082:50.28	10.85	20.10
T1215.0	N47:41.42	W082:50.24	N47:52.27	W082:50.24	10.85	20.10
T1216.0	N47:41.42	W082:50.20	N47:52.27	W082:50.20	10.85	20.10
T1217.0	N47:41.42	W082:50.16	N47:52.27	W082:50.16	10.85	20.10
T1218.0	N47:41.42	W082:50.12	N47:52.27	W082:50.12	10.85	20.10
T1219.0	N47:41.42	W082:50.08	N47:52.27	W082:50.08	10.85	20.10
T1220.0	N47:41.42	W082:50.04	N47:52.27	W082:50.04	10.85	20.10
T1221.0	N47:41.42	W082:50.00	N47:52.27	W082:50.00	10.85	20.10
T1222.0	N47:41.42	W082:49.95	N47:52.27	W082:49.95	10.85	20.10
T1223.0	N47:41.42	W082:49.91	N47:52.27	W082:49.91	10.85	20.10
T1224.0	N47:41.42	W082:49.87	N47:52.27	W082:49.87	10.85	20.10
T1225.0	N47:41.42	W082:49.83	N47:52.27	W082:49.83	10.85	20.10
T1226.0	N47:41.42	W082:49.79	N47:52.27	W082:49.79	10.85	20.10
T1227.0	N47:41.42	W082:49.75	N47:52.27	W082:49.75	10.85	20.10
T1228.0	N47:41.42	W082:49.71	N47:52.27	W082:49.71	10.85	20.10
T1229.0	N47:41.42	W082:49.67	N47:52.27	W082:49.67	10.85	20.10
T1230.0	N47:41.42	W082:49.63	N47:52.27	W082:49.63	10.85	20.10
T1231.0	N47:41.42	W082:49.59	N47:52.27	W082:49.59	10.85	20.10
T1232.0	N47:41.42	W082:49.55	N47:52.27	W082:49.55	10.85	20.10
T1233.0	N47:41.42	W082:49.51	N47:52.27	W082:49.51	10.85	20.10
T1234.0	N47:41.42	W082:49.47	N47:52.27	W082:49.47	10.85	20.10
T1235.0	N47:41.42	W082:49.43	N47:52.27	W082:49.43	10.85	20.10
T1236.0	N47:41.42	W082:49.39	N47:52.27	W082:49.39	10.85	20.10
T1237.0	N47:41.42	W082:49.35	N47:52.27	W082:49.35	10.85	20.10
T1238.0	N47:41.42	W082:49.31	N47:52.27	W082:49.31	10.85	20.10
T1239.0	N47:41.42	W082:49.27	N47:52.27	W082:49.27	10.85	20.10
T1240.0	N47:41.42	W082:49.23	N47:52.27	W082:49.23	10.85	20.10
T1241.0	N47:41.42	W082:49.19	N47:52.27	W082:49.19	10.85	20.10
T1242.0	N47:41.42	W082:49.15	N47:52.27	W082:49.15	10.85	20.10
T1243.0	N47:41.42	W082:49.11	N47:52.27	W082:49.11	10.85	20.10
T1244.0	N47:41.42	W082:49.06	N47:51.75	W082:49.06	10.34	19.15
T1245.0	N47:41.42	W082:49.02	N47:51.75	W082:49.02	10.34	19.15
T1246.0	N47:41.42	W082:48.98	N47:51.75	W082:48.98	10.34	19.15
T1247.0	N47:41.42	W082:48.94	N47:51.75	W082:48.94	10.34	19.15
T1248.0	N47:41.42	W082:48.90	N47:51.75	W082:48.90	10.34	19.15
T1249.0	N47:41.42	W082:48.86	N47:51.75	W082:48.86	10.34	19.15
T1250.0	N47:41.42	W082:48.82	N47:51.75	W082:48.82	10.34	19.15
T1251.0	N47:41.42	W082:48.78	N47:51.75	W082:48.78	10.34	19.15
T1252.0	N47:41.42	W082:48.74	N47:51.75	W082:48.74	10.34	19.15
T1253.0	N47:41.42	W082:48.70	N47:51.75	W082:48.70	10.34	19.15
T1254.0	N47:41.42	W082:48.66	N47:51.75	W082:48.66	10.34	19.15
T1255.0	N47:41.42	W082:48.62	N47:51.75	W082:48.62	10.34	19.15
T1256.0	N47:41.42	W082:48.58	N47:51.75	W082:48.58	10.34	19.15
T1257.0	N47:41.42	W082:48.54	N47:51.75	W082:48.54	10.34	19.15
T1258.0	N47:41.42	W082:48.50	N47:51.75	W082:48.50	10.34	19.15
T1259.0	N47:41.42	W082:48.46	N47:51.75	W082:48.46	10.34	19.15
T1260.0	N47:41.42	W082:48.42	N47:51.75	W082:48.42	10.34	19.15
T1261.0	N47:41.42	W082:48.38	N47:51.75	W082:48.38	10.34	19.15
T1262.0	N47:41.42	W082:48.34	N47:51.75	W082:48.34	10.34	19.15
T1263.0	N47:41.42	W082:48.30	N47:51.75	W082:48.30	10.34	19.15
T1264.0	N47:41.42	W082:48.26	N47:51.75	W082:48.26	10.34	19.15
T1265.0	N47:41.42	W082:48.22	N47:51.75	W082:48.22	10.34	19.15
T1266.0	N47:41.42	W082:48.17	N47:51.75	W082:48.17	10.34	19.15
T1267.0	N47:41.42	W082:48.13	N47:51.75	W082:48.13	10.34	19.15
T1268.0	N47:41.42	W082:48.09	N47:51.75	W082:48.09	10.34	19.15
T1269.0	N47:41.42	W082:48.05	N47:51.75	W082:48.05	10.34	19.15
T1270.0	N47:41.42	W082:48.01	N47:51.75	W082:48.01	10.34	19.15
T1271.0	N47:41.42	W082:47.97	N47:51.75	W082:47.97	10.34	19.15

SEGMENT	START		END		LENGTH	
NO	LAT	LONG	LAT	LONG	NM	KM
T1272.0	N47:41.42	W082:47.93	N47:51.75	W082:47.93	10.34	19.15
T1273.0	N47:41.42	W082:47.89	N47:51.75	W082:47.89	10.34	19.15
T1274.0	N47:41.42	W082:47.85	N47:51.75	W082:47.85	10.34	19.15
T1275.0	N47:41.42	W082:47.81	N47:51.75	W082:47.81	10.34	19.15
T1276.0	N47:41.42	W082:47.77	N47:51.75	W082:47.77	10.34	19.15
T1277.0	N47:41.42	W082:47.73	N47:51.75	W082:47.73	10.34	19.15
T1278.0	N47:41.42	W082:47.69	N47:51.75	W082:47.69	10.34	19.15
T1279.0	N47:41.42	W082:47.65	N47:51.75	W082:47.65	10.34	19.15
T1280.0	N47:41.42	W082:47.61	N47:51.75	W082:47.61	10.34	19.15
T1281.0	N47:41.42	W082:47.57	N47:51.75	W082:47.57	10.34	19.15
T1282.0	N47:41.42	W082:47.53	N47:51.75	W082:47.53	10.34	19.15
T1283.0	N47:41.42	W082:47.49	N47:51.75	W082:47.49	10.34	19.15
T1284.0	N47:41.42	W082:47.45	N47:51.75	W082:47.45	10.34	19.15
T1285.0	N47:41.42	W082:47.41	N47:51.75	W082:47.41	10.34	19.15
T1286.0	N47:41.42	W082:47.37	N47:51.75	W082:47.37	10.34	19.15
T1287.0	N47:41.42	W082:47.33	N47:51.75	W082:47.33	10.34	19.15
T1288.0	N47:41.42	W082:47.28	N47:51.75	W082:47.28	10.34	19.15
T1289.0	N47:41.42	W082:47.24	N47:51.75	W082:47.24	10.34	19.15
T1290.0	N47:41.42	W082:47.20	N47:51.00	W082:47.20	9.59	17.76
T1291.0	N47:41.42	W082:47.16	N47:51.00	W082:47.16	9.59	17.76
T1292.0	N47:41.42	W082:47.12	N47:51.00	W082:47.12	9.59	17.76
T1293.0	N47:41.42	W082:47.08	N47:51.00	W082:47.08	9.59	17.76
T1294.0	N47:41.42	W082:47.04	N47:51.00	W082:47.04	9.59	17.76
T1295.0	N47:41.42	W082:47.00	N47:51.00	W082:47.00	9.59	17.76
T1296.0	N47:41.42	W082:46.96	N47:51.00	W082:46.96	9.59	17.76
T1297.0	N47:41.42	W082:46.92	N47:51.00	W082:46.92	9.59	17.76
T1298.0	N47:41.42	W082:46.88	N47:51.00	W082:46.88	9.59	17.76
T1299.0	N47:41.42	W082:46.84	N47:51.00	W082:46.84	9.59	17.76
T1300.0	N47:41.42	W082:46.80	N47:51.00	W082:46.80	9.59	17.76
T1301.0	N47:41.42	W082:46.76	N47:51.00	W082:46.76	9.59	17.76
T1302.0	N47:41.42	W082:46.72	N47:51.00	W082:46.72	9.59	17.76
T1303.0	N47:41.42	W082:46.68	N47:51.00	W082:46.68	9.59	17.76
T1304.0	N47:41.42	W082:46.64	N47:51.00	W082:46.64	9.59	17.76
T1305.0	N47:41.42	W082:46.60	N47:51.00	W082:46.60	9.59	17.76
T1306.0	N47:41.42	W082:46.56	N47:51.00	W082:46.56	9.59	17.76
T1307.0	N47:41.42	W082:46.52	N47:51.00	W082:46.52	9.59	17.76
T1308.0	N47:41.42	W082:46.48	N47:51.00	W082:46.48	9.59	17.76
T1309.0	N47:41.96	W082:46.44	N47:51.00	W082:46.44	9.05	16.76
T1310.0	N47:41.96	W082:46.40	N47:51.00	W082:46.40	9.05	16.76
T1311.0	N47:41.96	W082:46.35	N47:51.00	W082:46.35	9.05	16.76
T1312.0	N47:41.96	W082:46.31	N47:51.00	W082:46.31	9.05	16.76
T1313.0	N47:41.96	W082:46.27	N47:51.00	W082:46.27	9.05	16.76
T1314.0	N47:41.96	W082:46.23	N47:51.00	W082:46.23	9.05	16.76
T1315.0	N47:41.96	W082:46.19	N47:51.00	W082:46.19	9.05	16.76
T1316.0	N47:41.96	W082:46.15	N47:51.00	W082:46.15	9.05	16.76
T1317.0	N47:41.96	W082:46.11	N47:51.00	W082:46.11	9.05	16.76
T1318.0	N47:41.96	W082:46.07	N47:51.00	W082:46.07	9.05	16.76
T1319.0	N47:41.96	W082:46.03	N47:51.00	W082:46.03	9.05	16.76
T1320.0	N47:41.96	W082:45.99	N47:51.00	W082:45.99	9.05	16.76
T1321.0	N47:41.96	W082:45.95	N47:51.00	W082:45.95	9.05	16.76
T1322.0	N47:41.96	W082:45.91	N47:51.00	W082:45.91	9.05	16.76
T1323.0	N47:41.96	W082:45.87	N47:51.00	W082:45.87	9.05	16.76
T1324.0	N47:41.96	W082:45.83	N47:51.00	W082:45.83	9.05	16.76
T1325.0	N47:41.96	W082:45.79	N47:51.00	W082:45.79	9.05	16.76
T1326.0	N47:41.96	W082:45.75	N47:51.00	W082:45.75	9.05	16.76
T1327.0	N47:41.96	W082:45.71	N47:51.00	W082:45.71	9.05	16.76
T1328.0	N47:41.96	W082:45.67	N47:51.00	W082:45.67	9.05	16.76
T1329.0	N47:41.96	W082:45.63	N47:51.00	W082:45.63	9.05	16.76
T1330.0	N47:41.96	W082:45.59	N47:51.00	W082:45.59	9.05	16.76

SEGMENT	START		END		LENGTH	
NO	LAT	LONG	LAT	LONG	NM	KM
T1331.0	N47:41.96	W082:45.55	N47:51.00	W082:45.55	9.05	16.76
T1332.0	N47:41.96	W082:45.51	N47:51.00	W082:45.51	9.05	16.76
T1333.0	N47:41.96	W082:45.46	N47:51.00	W082:45.46	9.05	16.76
T1334.0	N47:41.96	W082:45.42	N47:51.00	W082:45.42	9.05	16.76
T1335.0	N47:41.96	W082:45.38	N47:51.00	W082:45.38	9.05	16.76
T1336.0	N47:41.96	W082:45.34	N47:51.00	W082:45.34	9.05	16.76
T1337.0	N47:41.96	W082:45.30	N47:51.00	W082:45.30	9.05	16.76
T1338.0	N47:41.96	W082:45.26	N47:51.00	W082:45.26	9.05	16.76
T1339.0	N47:41.96	W082:45.22	N47:51.00	W082:45.22	9.05	16.76
T1340.0	N47:41.96	W082:45.18	N47:51.00	W082:45.18	9.05	16.76
T1341.0	N47:41.96	W082:45.14	N47:51.00	W082:45.14	9.05	16.76
T1342.0	N47:41.96	W082:45.10	N47:51.00	W082:45.10	9.05	16.76
T1343.0	N47:41.96	W082:45.06	N47:51.00	W082:45.06	9.05	16.76
T1344.0	N47:41.96	W082:45.02	N47:51.25	W082:45.02	9.30	17.22
T1345.0	N47:41.96	W082:44.98	N47:51.25	W082:44.98	9.30	17.22
T1346.0	N47:41.96	W082:44.94	N47:51.25	W082:44.94	9.30	17.22
T1347.0	N47:41.96	W082:44.90	N47:51.25	W082:44.90	9.30	17.22
T1348.0	N47:41.96	W082:44.86	N47:51.25	W082:44.86	9.30	17.22
T1349.0	N47:41.96	W082:44.82	N47:51.25	W082:44.82	9.30	17.22
T1350.0	N47:41.96	W082:44.78	N47:51.25	W082:44.78	9.30	17.22
T1351.0	N47:41.96	W082:44.74	N47:51.25	W082:44.74	9.30	17.22
T1352.0	N47:41.96	W082:44.70	N47:51.25	W082:44.70	9.30	17.22
T1353.0	N47:41.96	W082:44.66	N47:51.25	W082:44.66	9.30	17.22
T1354.0	N47:41.96	W082:44.62	N47:51.25	W082:44.62	9.30	17.22
T1355.0	N47:42.50	W082:44.57	N47:51.25	W082:44.57	8.76	16.22
T1356.0	N47:42.50	W082:44.53	N47:51.25	W082:44.53	8.76	16.22
T1357.0	N47:42.50	W082:44.49	N47:51.25	W082:44.49	8.76	16.22
T1358.0	N47:42.50	W082:44.45	N47:51.25	W082:44.45	8.76	16.22
T1359.0	N47:42.50	W082:44.41	N47:51.25	W082:44.41	8.76	16.22
T1360.0	N47:42.50	W082:44.37	N47:51.25	W082:44.37	8.76	16.22
T1361.0	N47:42.50	W082:44.33	N47:51.25	W082:44.33	8.76	16.22
T1362.0	N47:42.50	W082:44.29	N47:51.25	W082:44.29	8.76	16.22
T1363.0	N47:42.50	W082:44.25	N47:51.25	W082:44.25	8.76	16.22
T1364.0	N47:42.50	W082:44.21	N47:51.25	W082:44.21	8.76	16.22
T1365.0	N47:42.50	W082:44.17	N47:51.25	W082:44.17	8.76	16.22
T1366.0	N47:42.50	W082:44.13	N47:51.25	W082:44.13	8.76	16.22
T1367.0	N47:42.50	W082:44.09	N47:51.25	W082:44.09	8.76	16.22
T1368.0	N47:42.50	W082:44.05	N47:51.25	W082:44.05	8.76	16.22
T1369.0	N47:42.50	W082:44.01	N47:51.25	W082:44.01	8.76	16.22
T1370.0	N47:42.50	W082:43.97	N47:51.25	W082:43.97	8.76	16.22
T1371.0	N47:42.50	W082:43.93	N47:51.25	W082:43.93	8.76	16.22
T1372.0	N47:42.50	W082:43.89	N47:51.25	W082:43.89	8.76	16.22
T1373.0	N47:42.50	W082:43.85	N47:48.76	W082:43.85	6.26	11.60
T1374.0	N47:43.25	W082:43.81	N47:48.76	W082:43.81	5.51	10.21
T1375.0	N47:43.25	W082:43.77	N47:48.76	W082:43.77	5.51	10.21
T1376.0	N47:43.25	W082:43.73	N47:48.76	W082:43.73	5.51	10.21
T1377.0	N47:43.25	W082:43.69	N47:48.76	W082:43.69	5.51	10.21
T1378.0	N47:43.25	W082:43.64	N47:48.76	W082:43.64	5.51	10.21
T1379.0	N47:43.25	W082:43.60	N47:48.76	W082:43.60	5.51	10.21
T1380.0	N47:43.25	W082:43.56	N47:48.76	W082:43.56	5.51	10.21
T1381.0	N47:43.25	W082:43.52	N47:48.76	W082:43.52	5.51	10.21
T1382.0	N47:43.25	W082:43.48	N47:48.76	W082:43.48	5.51	10.20
T1383.0	N47:43.50	W082:43.44	N47:48.76	W082:43.44	5.26	9.74
T1384.0	N47:43.50	W082:43.40	N47:48.76	W082:43.40	5.26	9.74
T1385.0	N47:43.50	W082:43.36	N47:48.76	W082:43.36	5.26	9.74
T1386.0	N47:43.50	W082:43.32	N47:48.76	W082:43.32	5.26	9.74
T1387.0	N47:43.50	W082:43.28	N47:48.76	W082:43.28	5.26	9.74
T1388.0	N47:43.50	W082:43.24	N47:48.76	W082:43.24	5.26	9.74
T1389.0	N47:43.50	W082:43.20	N47:48.76	W082:43.20	5.26	9.74

SEGMENT	START		END		LENGTH	
NO	LAT	LONG	LAT	LONG	NM	KM
T1390.0	N47:43.50	W082:43.16	N47:48.76	W082:43.16	5.26	9.74
T1391.0	N47:43.50	W082:43.12	N47:49.03	W082:43.12	5.53	10.24
T1392.0	N47:47.00	W082:43.08	N47:49.03	W082:43.08	2.03	3.76
T1393.0	N47:47.00	W082:43.04	N47:49.03	W082:43.04	2.03	3.76
T1394.0	N47:47.00	W082:43.00	N47:49.03	W082:43.00	2.03	3.76
T1395.0	N47:47.00	W082:42.96	N47:49.03	W082:42.96	2.03	3.76
T1396.0	N47:47.00	W082:42.92	N47:49.03	W082:42.92	2.03	3.76
T1397.0	N47:47.00	W082:42.88	N47:49.03	W082:42.88	2.03	3.76
T1398.0	N47:47.00	W082:42.84	N47:49.03	W082:42.84	2.03	3.76
T1399.0	N47:47.00	W082:42.80	N47:49.03	W082:42.80	2.03	3.76
T1400.0	N47:47.00	W082:42.75	N47:49.03	W082:42.75	2.03	3.76

Total control line length = 361.60 nautical miles
= 669.68 kilometers.

Total traverse line length = 3384.62 nautical miles
= 6268.31 kilometers.

Total length of all lines = 3746.22 nautical miles
= 6937.99 kilometers.

SEGMENT	START		END		LENGTH	
NO	LAT	LONG	LAT	LONG	NM	KM
C0208.0	N47:43.33	W082:58.93	N47:43.33	W082:56.95	1.34	2.48
C0209.0	N47:43.60	W082:58.93	N47:43.60	W082:56.95	1.34	2.48
C0210.0	N47:43.87	W082:58.93	N47:43.87	W082:56.95	1.34	2.48
C0211.0	N47:44.14	W082:58.93	N47:44.14	W082:56.99	1.31	2.43
C0212.0	N47:44.41	W082:58.93	N47:44.41	W082:56.99	1.31	2.43
C0213.0	N47:44.68	W082:58.93	N47:44.68	W082:56.99	1.31	2.43
C0214.0	N47:44.95	W082:58.93	N47:44.95	W082:56.99	1.31	2.43
C0215.0	N47:45.22	W082:58.93	N47:45.22	W082:56.99	1.31	2.43
C0216.0	N47:45.49	W082:58.93	N47:45.49	W082:56.99	1.31	2.42
C0217.0	N47:45.76	W082:58.93	N47:45.76	W082:56.99	1.31	2.42
C0218.0	N47:46.03	W082:58.93	N47:46.03	W082:56.99	1.31	2.42
T2001.0	N47:43.25	W082:58.89	N47:46.33	W082:58.89	3.08	5.71
T2002.0	N47:43.25	W082:58.85	N47:46.33	W082:58.85	3.08	5.71
T2003.0	N47:43.25	W082:58.81	N47:46.33	W082:58.81	3.08	5.71
T2004.0	N47:43.25	W082:58.77	N47:46.33	W082:58.77	3.08	5.71
T2005.0	N47:43.25	W082:58.73	N47:46.33	W082:58.73	3.08	5.71
T2006.0	N47:43.25	W082:58.69	N47:46.33	W082:58.69	3.08	5.71
T2007.0	N47:43.25	W082:58.65	N47:46.33	W082:58.65	3.08	5.71
T2008.0	N47:43.25	W082:58.61	N47:46.33	W082:58.61	3.08	5.71
T2009.0	N47:43.25	W082:58.57	N47:46.33	W082:58.57	3.08	5.71
T2010.0	N47:43.25	W082:58.53	N47:46.33	W082:58.53	3.08	5.71
T2011.0	N47:43.25	W082:58.49	N47:46.33	W082:58.49	3.08	5.71
T2012.0	N47:43.25	W082:58.45	N47:46.33	W082:58.45	3.08	5.71
T2013.0	N47:43.25	W082:58.41	N47:46.33	W082:58.41	3.08	5.71
T2014.0	N47:43.25	W082:58.37	N47:46.33	W082:58.37	3.08	5.71
T2015.0	N47:43.25	W082:58.33	N47:46.33	W082:58.33	3.08	5.71
T2016.0	N47:43.25	W082:58.29	N47:46.33	W082:58.29	3.08	5.71
T2017.0	N47:43.25	W082:58.25	N47:46.33	W082:58.25	3.08	5.71
T2018.0	N47:43.25	W082:58.21	N47:46.33	W082:58.21	3.08	5.71
T2019.0	N47:43.25	W082:58.17	N47:46.33	W082:58.17	3.08	5.71
T2020.0	N47:43.25	W082:58.13	N47:46.33	W082:58.13	3.08	5.71
T2021.0	N47:43.25	W082:58.08	N47:46.33	W082:58.08	3.08	5.71
T2022.0	N47:43.25	W082:58.04	N47:46.33	W082:58.04	3.08	5.71
T2023.0	N47:43.25	W082:58.00	N47:46.33	W082:58.00	3.08	5.71
T2024.0	N47:43.25	W082:57.96	N47:46.33	W082:57.96	3.08	5.71
T2025.0	N47:43.25	W082:57.92	N47:46.33	W082:57.92	3.08	5.71
T2026.0	N47:43.25	W082:57.88	N47:46.33	W082:57.88	3.08	5.71
T2027.0	N47:43.25	W082:57.84	N47:46.33	W082:57.84	3.08	5.71
T2028.0	N47:43.25	W082:57.80	N47:46.33	W082:57.80	3.08	5.71
T2029.0	N47:43.25	W082:57.76	N47:46.33	W082:57.76	3.08	5.71
T2030.0	N47:43.25	W082:57.72	N47:46.33	W082:57.72	3.08	5.71
T2031.0	N47:43.25	W082:57.68	N47:46.33	W082:57.68	3.08	5.71
T2032.0	N47:43.25	W082:57.64	N47:46.33	W082:57.64	3.08	5.71
T2033.0	N47:43.25	W082:57.60	N47:46.33	W082:57.60	3.08	5.71
T2034.0	N47:43.25	W082:57.56	N47:46.33	W082:57.56	3.08	5.71
T2035.0	N47:43.25	W082:57.52	N47:46.33	W082:57.52	3.08	5.71
T2036.0	N47:43.25	W082:57.48	N47:46.33	W082:57.48	3.08	5.71
T2037.0	N47:43.25	W082:57.44	N47:46.33	W082:57.44	3.08	5.71
T2038.0	N47:43.25	W082:57.40	N47:46.33	W082:57.40	3.08	5.71
T2039.0	N47:43.25	W082:57.36	N47:46.33	W082:57.36	3.08	5.71
T2040.0	N47:43.25	W082:57.32	N47:46.33	W082:57.32	3.08	5.71
T2041.0	N47:43.25	W082:57.28	N47:46.33	W082:57.28	3.08	5.71
T2042.0	N47:43.25	W082:57.24	N47:46.33	W082:57.24	3.08	5.71
T2043.0	N47:43.25	W082:57.19	N47:46.33	W082:57.19	3.08	5.71
T2044.0	N47:43.25	W082:57.15	N47:46.33	W082:57.15	3.08	5.71
T2045.0	N47:43.25	W082:57.11	N47:46.33	W082:57.11	3.08	5.71
T2046.0	N47:43.25	W082:57.07	N47:46.33	W082:57.07	3.08	5.71

SEGMENT	START		END		LENGTH	
NO	LAT	LONG	LAT	LONG	NM	KM
T2047.0	N47:43.25	W082:57.03	N47:46.33	W082:57.03	3.08	5.71

Total control line length = 14.49 nautical miles
= 26.83 kilometers.

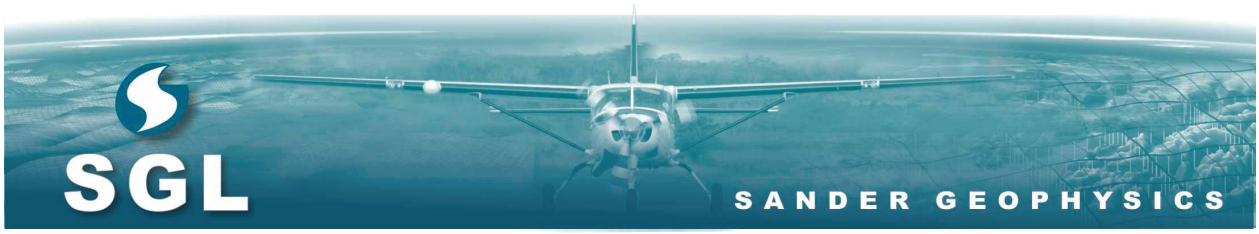
Total traverse line length = 144.79 nautical miles
= 268.15 kilometers.

Total length of all lines = 159.28 nautical miles
= 294.99 kilometers.

Appendix III

PART	Serial number	Description	Manufacturer
Aircraft- C-GSGH	3748	Eurocopter AS350 B3 Engine Turbomeca, mod. Arriel 2B,	Eurocopter
RA Transceiver - KING	18494	model KRA 10A	Bendix King
Laser Profilometer	9996506	LD90-31K-HiP, 11-28VDC laser rangefinder. Serial output/serial input 1-1500m capability	Riegl
Data Acquisition Computer	CDAC19	CPCI Data Acquisition computer	SGL
Baro Sensor	1452964	TJE Absolute Pressure Sensor	Honeywell
GPS Receiver	DAB13020124	OEMV-3, 72-ch, L1/L2	Novatel
GPS Antenna	7025	L1/L2 - Lband Aircraft Antenna AT1665-OW-TNCF-000-RG-38-NM	AeroAntenna
Gradiant Mag Bird	GM-Bird#2	Horizontal/Vertical Mag Bird	SGL
Magnetometer Sensor	75305-C997	I G-822A Magnetometer Sensor and Preamp	Geometrics
Magnetometer Sensor	75535-C2478	I G-822A Magnetometer Sensor and Preamp	Geometrics
Magnetometer Sensor	75543-C4915	I G-822A Magnetometer Sensor and Preamp	Geometrics
Data Acquisition Computer (GROUND)	M-SGREF-67	CPCI Data Acquisition computer	SGL
GPS Receiver	DAB08400111	OEMV-3, 72-ch, L1/L2	Novatel
GPS Antenna	NAE10170022	Model 702L,L1/L2 Kinematic GPS Ant.	Novatel
Magnetometer Sensor	75421-C1961	I G-822A Magnetometer Sensor and Preamp	Geometrics
Data Acquisition Computer (GROUND)	M-SGREF-70	CPCI Data Acquisition computer	SGL
GPS Receiver	DAB0400215	OEMV-3, 72-ch, L1/L2	Novatel
GPS Antenna	NVH03280031	Model 702,L1/L2 Kinematic GPS Ant.	Novatel
Magnetometer Sensor	75421-C1963	I G-822A Magnetometer Sensor and Preamp	Geometrics

Appendix IV



GEOPHYSICAL SURVEY AIRCRAFT

Airbus Helicopters AS350 B3

Registration	C-GSGH	C-FXPL
Serial #	3748	4881

The AS350 B3 is a modern high performance light helicopter powered by a Turbomeca Arriel turboshaft engine. These engines have an unrivalled safety record. Further enhancing safety, SGL's new B3 has a dual hydraulic system and a full FADEC engine control and monitoring system. The helicopter's endurance is between two and four hours depending on the survey set up. This helicopters performance and effectiveness has been proven on numerous projects worldwide.

GEOPHYSICAL SURVEYING

Both SGH and XPL have been outfitted for low level airborne geophysical surveys. Sensors are carried internally, or externally in towed "birds" on a cable with either single, or dual magnetometer configuration for vertical or horizontal gradient. The helicopter is especially well suited to hot and high elevation conditions, including any operations with heavy load requirements. The B3's reliable and powerful turbine engine, long endurance and high altitude capability make it an excellent survey aircraft.

AIRBUS HELICOPTERS AS350 B3 SPECIFICATIONS

Crew Capacity:

- 1 pilot and 1 co-pilot/operator

General:

- Fuselage comprising of the cabin and 3 luggage holds, cargo tie-down net and access doors
- Tail boom with stabilizer, extended anti-torque rotor and fin
- High skid landing gear capable of taking handling wheels

Power Plant:

- Turbomeca Arriel 2B (SGH) and 2B1 (XPL) turboshaft engine rated at 847 shp for take-off and 730 shp for maximum continuous use

Systems:

SGH	XPL
Dual flight controls, 3 main rotor and 1 tail rotor hydraulic servo units	Dual flight controls, 3 main rotor and 1 tail rotor hydraulic servo units with dual hydraulics
Digital engine control with manual backup	Full authority digital engine control (FADEC)
Cargo hook with electric and manual releases	Cargo hook with electric and manual releases

Dimensions:

Length (including rotor)	42 ft 5 in	12.94 m
Width	8 ft 4 in	2.53 m
Height	10 ft 11 in	3.33 m

Weights:

Empty	SGH 3,022 lb	XPL 3,130 lb	SGH 1,371 kg	XPL 1,420 kg
Maximum gross weight	SGH 4,961 lb	XPL 5,220 lb	SGH 2,250 kg	XPL 2,370 kg
Useful load	SGH 1,939 lb	XPL 2,090 lb	SGH 879 kg	XPL 948 kg

Performance (sea level, standard day, maximum take-off weight):

Maximum speed	155 kt	287 km/h
Fast cruise speed	142 kt	262 km/h
Recommended (economical) cruise speed	124 kt	230 km/h
Maximum 'bird' towing speed	80 kt	148 km/h
Maximum speed with stinger installed	135 kt	250 km/h
Hover-out-of-ground-effect (HOGE) at 2,250 kg (ISA)	11,500 ft	3,505 m
Range at recommended cruise speed (plus 20 min reserve)	314 nm	582 km
Maximum rate of climb at 65 kt	2,100 ft/min	10.7 m/s
Maximum sustained climb gradient	2,275 ft/nm	374 m/km
Service ceiling	23,000 ft	7,010 m
Fuel capacity	143 US gal	540 l
Fuel flow	50 US gal/h	189 l/h

Maximum Endurance:

- 2 hours and 32 minutes plus 20 minutes reserve at recommended cruise speed
- 4 hours plus 20 minutes reserve at maximum endurance speed (55 kt)

GEOPHYSICAL CAPABILITIES

AIRGrav, SGL airborne gravimeter

Magnetic total field with stinger (typical FOM 1.5 nT) or towed "bird"

Dual magnetometer vertical or horizontal gradient with a towed "bird"

Gamma-ray spectrometer, up to 42 litres (2,560 in^3) of detector crystals

SGMethane, methane gas sensing

Additional Features:

- VHF communication radios
- Iridium satellite telephone and satellite tracking
- GPS/VOR/ILS navigation equipment
- Video camera mount with downward looking opening
- Radar altimeter, 0-750 m
- Two instrument racks, standard 48 cm (19 in) width
- Electrical power capacity, 5.6 kW at 28 VDC; up to 2.8 kW available for equipment
- Provision to mount inertial navigation system
- GPS antenna mounted on tail fin (clear of rotor) plus data link for real-time corrections

SGL

Appendix V

SANDER GEOPHYSICS AIRBORNE GEOPHYSICAL SURVEY

260 Hunt Club Road, Ottawa, ON K1V 1C1 Canada Tel: +1 613-521-9626 Fax: +1 613-521-0215 www.sgl.com

SURVEY DETAILS			
Survey Name	High Resolution Helicopter Magnetic Gradient Survey	**Client Name**	Exiro Minerals Corp.
Survey Location	Sylvanite Property near Chapleau, Ontario	**Contact Name**	Simon Crosato
Project Code	ExiroM21.ON	**Contact Phone**	1 416 477 1971
Total km	6937.99	**Client Address**	25 Adelaide St. E, suite 1400, Toronto ON, M5C 3A1
Line Spacing	50m/500m		
Survey Type	Triaxial Magnetic Gradient	**Email**	Simon.Crosato@newcrest.com.au

SURVEY PRODUCTION SUMMARY			
Production This Week (km)	115.4	**Total km Flown to Date**	115.4
Total Remaining (km)	6822.6	**km Reflown This Week**	0.0
Percent Complete (%)	1.7	**Flight Time This Week (h)**	2.1
Prod km/Day This Week	16.5	**Prod km/Flt Hour This Week**	54.9

WEEKLY PRODUCTION

Week 1			Flight No.	Flight Time	No. of Lines Flown	No. Reflight Lines Flown	Production (km)	Reflown (km)
TOTALS				**2.1**	**19.0**	**0.0**	**115.4**	**0.0**
12-Apr	**Mon**	C-GSGH		0.0	0.0	0.0	0.0	0.0
Weather				**Remarks**				
Geomag								
13-Apr	**Tue**	C-GSGH		0.0	0.0	0.0	0.0	0.0
Weather				**Remarks**	Virtual aviation HSE meeting with Exiro Minerals; mobilization of ground crew approved.			
Geomag	N/A							
14-Apr	**Wed**	C-GSGH		0.0	0.0	0.0	0.0	0.0
Weather	mostly sunny			**Remarks**	Ground crew (C.Mueller, B.Lushaka) leave Ottawa with survey equipment in two vehicles. Mobilization of air crew approved.			
Geomag	N/A							
15-Apr	**Thu**	C-GSGH		0.0	0.0	0.0	0.0	0.0
Weather	overcast			**Remarks**	Ground crew arrive in Chapleau. Reconnaissance of town and airport, assessing crew accommodation options.			
Geomag	N/A							
16-Apr	**Fri**	C-GSGH		0.0	0.0	0.0	0.0	0.0
Weather	partly cloudy			**Remarks**	Assembling mag bird, installing mag base station Gnd1 at airport.			
Geomag	unsettled							
17-Apr	**Sat**	C-GSGH		0.0	0.0	0.0	0.0	0.0
Weather	partly coudy			**Remarks**	C-GSGH arrives at Chapleau airport with pilots R.Barrette and S.Wildeman. Crew accommodations moved to Moose Horn Lodge, field office installed.			
Geomag	unsettled to active							
18-Apr	**Sun**	C-GSGH	1001.0	2.1	19.0	0.0	115.4	0.0
Weather	sunny			**Remarks**	Reconnaissance flight of the survey block in the morning, data acquisition flight in the afternoon.			
Geomag	unsettled							
Comments	Mobilization to Chapleau completed, start of survey flights.							
Signed	C. Mueller							

SANDER GEOPHYSICS AIRBORNE GEOPHYSICAL SURVEY

260 Hunt Club Road, Ottawa, ON K1V 1C1 Canada Tel: +1 613-521-9626 Fax: +1 613-521-0215 www.sgl.com

SURVEY DETAILS			
Survey Name	High Resolution Helicopter Magnetic Gradient Survey	**Client Name**	Exiro Minerals Corp.
Survey Location	Sylvanite Property near Chapleau, Ontario	**Contact Name**	Simon Crosato
Project Code	ExiroM21.ON	**Contact Phone**	1 416 477 1971
Total km	6937.99	**Client Address**	25 Adelaide St. E, suite 1400, Toronto ON, M5C 3A1
Line Spacing	50m/500m		
Survey Type	Triaxial Magnetic Gradient	**Email**	Simon.Crosato@newcrest.com.au

SURVEY PRODUCTION SUMMARY			
Production This Week (km)	610.0	**Total km Flown to Date**	725.4
Total Remaining (km)	6212.6	**km Reflown This Week**	0.0
Percent Complete (%)	10.5	**Flight Time This Week (h)**	8.9
Prod km/Day This Week	87.1	**Prod km/Flt Hour This Week**	68.5

WEEKLY PRODUCTION

Week 2			Flight No.	Flight Time	No. of Lines Flown	No. Reflight Lines Flown	Production (km)	Reflown (km)
TOTALS				**8.9**	**52.0**	**0.0**	**610.0**	**0.0**
19-Apr	**Mon**	C-GSGH		0.0	0.0	0.0	0.0	0.0
Weather	overcast with intermittent rain			**Remarks**	No flight due to mechanical issue with helicopter (engine start problems).			
Geomag	N/A							
20-Apr	**Tue**	C-GSGH		0.0	0.0	0.0	0.0	0.0
Weather	flurries			**Remarks**	No flight due to mechanical issue with helicopter (starter generator).			
Geomag	unsettled							
21-Apr	**Wed**	C-GSGH		0.0	0.0	0.0	0.0	0.0
Weather	partly cloudy			**Remarks**	No flight due to mechanical issue with helicopter (starter generator). An AME has been dispatched from Ottawa.			
Geomag	quiet							
22-Apr	**Thu**	C-GSGH		0.0	0.0	0.0	0.0	0.0
Weather	broken cloud			**Remarks**	Problem with starter generator was rectified by AME, helicopter is returned to service.			
Geomag	unsettled							
23-Apr	**Fri**	C-GSGH	1002	3.2	29.0	0.0	199.5	0.0
Weather	mostly sunny			**Remarks**	Data acquisition flight in the morning. Afternoon flight aborted due to issues with the data recording (meanwhile fixed).			
Geomag	quiet							
24-Apr	**Sat**	C-GSGH	1003	2.0	7.0	0.0	123.9	0.0
Weather	partly cloudy, overcast, rain			**Remarks**	Data acquisition flight in the morning, weather deteriorating as day went on (rain in afternoon and snow in evening).			
Geomag	quiet to unsettled							
25-Apr	**Sun**	C-GSGH	1004	3.7	16.0	0.0	286.7	0.0
Weather	light snow			**Remarks**	Data acquisition flight, late start due to ice and snow buildup on helicopter and bird.			
Geomag	quiet							
Comments	Production continues, slowed by mechanical problem with the aircraft.							
Signed	C. Mueller							

SANDER GEOPHYSICS AIRBORNE GEOPHYSICAL SURVEY

260 Hunt Club Road, Ottawa, ON K1V 1C1 Canada Tel: +1 613-521-9626 Fax: +1 613-521-0215 www.sgl.com

SURVEY DETAILS			
Survey Name	High Resolution Helicopter Magnetic Gradient Survey	**Client Name**	Exiro Minerals Corp.
Survey Location	Sylvanite Property near Chapleau, Ontario	**Contact Name**	Simon Crosato
Project Code	ExiroM21.ON	**Contact Phone**	1 416 477 1971
Total km	6937.99	**Client Address**	25 Adelaide St. E, suite 1400, Toronto ON, M5C 3A1
Line Spacing	50m/500m		
Survey Type	Triaxial Magnetic Gradient	**Email**	Simon.Crosato@newcrest.com.au

SURVEY PRODUCTION SUMMARY			
Production This Week (km)	2759.8	**Total km Flown to Date**	3485.2
Total Remaining (km)	3452.8	**km Reflown This Week**	0.0
Percent Complete (%)	50.2	**Flight Time This Week (h)**	36.1
Prod km/Day This Week	394.3	**Prod km/Flt Hour This Week**	76.4

WEEKLY PRODUCTION

Week 3			Flight No.	Flight Time	No. of Lines Flown	No. Reflight Lines Flown	Production (km)	Reflown (km)
TOTALS				**36.1**	**222.0**	**0.0**	**2759.8**	**0.0**
26-Apr	**Mon**	C-GSGH	1005, 1006	7.5	46.0	0.0	554.8	0.0
Weather	sunny, then overcast, snow			**Remarks**	Two data acquisition flights: 1005 in morning, 1006 in afternoon.			
Geomag	quiet							
27-Apr	**Tue**	C-GSGH	1007	4.0	50.0	0.0	241.9	0.0
Weather	overcast			**Remarks**	Clearing fresh snow off helicopter in morning, field safety meeting; data acquisition flight in afternoon.			
Geomag	quiet							
28-Apr	**Wed**	C-GSGH	1008	4.8	23.0	0.0	350.8	0.0
Weather	broken cloud			**Remarks**	Altimeter test flight in the morning, acquisition flight in the afternoon.			
Geomag	quiet to unsettled							
29-Apr	**Thu**	C-GSGH	1009	7.1	41.0	0.0	558.0	0.0
Weather	partly cloudy			**Remarks**	Acquisition flight, two sorties.			
Geomag	quiet							
30-Apr	**Fri**	C-GSGH		0.0	0.0	0.0	0.0	0.0
Weather	partly cloudy, windy			**Remarks**	No flight due to strong winds.			
Geomag	N/A							
1-May	**Sat**	C-GSGH	1010	4.0	18.0	0.0	304.4	0.0
Weather	mixed with snow, rain; windy			**Remarks**	Acquisition flight in morning, no flight in afternoon due to rain and strong winds.			
Geomag	quiet							
2-May	**Sun**	C-GSGH	1011, 1012	8.7	44.0	0.0	749.9	0.0
Weather	partly cloudy			**Remarks**	Two acquisition flights.			
Geomag	quiet to unsettled							
Comments	Data acquisition progressing well, slowed by two days of strong winds.							
Signed	C. Mueller							

SANDER GEOPHYSICS AIRBORNE GEOPHYSICAL SURVEY

260 Hunt Club Road, Ottawa, ON K1V 1C1 Canada Tel: +1 613-521-9626 Fax: +1 613-521-0215 www.sgl.com

SURVEY DETAILS			
Survey Name	High Resolution Helicopter Magnetic Gradient Survey	**Client Name**	Exiro Minerals Corp.
Survey Location	Sylvanite Property near Chapleau, Ontario	**Contact Name**	Simon Crosato
Project Code	ExiroM21.ON	**Contact Phone**	1 416 477 1971
Total km	7233	**Client Address**	25 Adelaide St. E, suite 1400, Toronto ON, M5C 3A1
Line Spacing	50m/500m		
Survey Type	Triaxial Magnetic Gradient	**Email**	Simon.Crosato@newcrest.com.au

SURVEY PRODUCTION SUMMARY			
Production This Week (km)	1655.3	**Total km Flown to Date**	5140.5
Total Remaining (km)	2092.5	**km Reflown This Week**	0.0
Percent Complete (%)	71.1	**Flight Time This Week (h)**	21.0
Prod km/Day This Week	236.5	**Prod km/Flt Hour This Week**	78.8

WEEKLY PRODUCTION

Week 4			Flight No.	Flight Time	No. of Lines Flown	No. Reflight Lines Flown	Production (km)	Reflown (km)
TOTALS				**21.0**	**92.0**	**0.0**	**1655.3**	**0.0**
3-May	**Mon**	C-GSGH	1013	4.0	17.0	0.0	**301.6**	0.0
Weather	overcast, then rain			**Remarks**	Acquisition flight in morning. No afternoon flight due to adverse weather.			
Geomag	quiet							
4-May	**Tue**	C-GSGH		0.0	0.0	0.0	0.0	0.0
Weather	intermittent rain			**Remarks**	No flight due to rain and low visibility.			
Geomag	N/A							
5-May	**Wed**	C-GSGH		0.0	0.0	0.0	0.0	0.0
Weather	broken cloud			**Remarks**	No flight due to adverse weather (low ceiling, then strong winds).			
Geomag	N/A							
6-May	**Thu**	C-GSGH	1014, 1015	8.2	36.0	0.0	641.4	0.0
Weather	broken cloud, overcast			**Remarks**	Two acquisition flights.			
Geomag	quiet							
7-May	**Fri**	C-GSGH	1016	4.4	18.0	0.0	347.9	0.0
Weather	partly cloudy, then precipitation			**Remarks**	Acquisition flight in morning, no afternoon flight due to rain/snow.			
Geomag	quiet							
8-May	**Sat**	C-GSGH	1017	4.4	21.0	0.0	364.5	0.0
Weather	partly cloudy			**Remarks**	Acquisition flight in morning, no afternoon flight due to low ceiling.			
Geomag	quiet							
9-May	**Sun**	C-GSGH		0.0	0.0	0.0	0.0	0.0
Weather	broken cloud			**Remarks**	No flight due to adverse weather (low ceiling, some rain/snow).			
Geomag	N/A							
Comments	Survey progresses with some delays due to adverse weather.							
Signed	C. Mueller							

SANDER GEOPHYSICS AIRBORNE GEOPHYSICAL SURVEY

260 Hunt Club Road, Ottawa, ON K1V 1C1 Canada Tel: +1 613-521-9626 Fax: +1 613-521-0215 www.sgl.com

SURVEY DETAILS			
Survey Name	High Resolution Helicopter Magnetic Gradient Survey	**Client Name**	Exiro Minerals Corp.
Survey Location	Sylvanite Property near Chapleau, Ontario	**Contact Name**	Simon Crosato
Project Code	ExiroM21.ON	**Contact Phone**	1 416 477 1971
Total km	7233	**Client Address**	25 Adelaide St. E, suite 1400, Toronto ON, M5C 3A1
Line Spacing	50m/500m		
Survey Type	Triaxial Magnetic Gradient	**Email**	Simon.Crosato@newcrest.com.au

SURVEY PRODUCTION SUMMARY			
Production This Week (km)	2092.5	**Total km Flown to Date**	7233.0
Total Remaining (km)	0.0	**km Reflown This Week**	33.2
Percent Complete (%)	100.0	**Flight Time This Week (h)**	28.7
Prod km/Day This Week	298.9	**Prod km/Flt Hour This Week**	72.9

WEEKLY PRODUCTION

Week 5			Flight No.	Flight Time	No. of Lines Flown	No. Reflight Lines Flown	Production (km)	Reflown (km)
TOTALS				**28.7**	**144.0**	**6.0**	**2092.5**	**33.2**
10-May	**Mon**	C-GSGH		0.0	0.0	0.0	0.0	0.0
Weather	snow/sleet showers			**Remarks**	No flight due to adverse weather (low ceiling with sleet and snow).			
Geomag	N/A							
11-May	**Tue**	C-GSGH	1018, 1019	7.8	30.0	0.0	578.4	0.0
Weather	partly cloudy to overcast, windy			**Remarks**	Two acquisition flights, morning flight in strong gusty winds from the NW.			
Geomag	quiet to unsettled							
12-May	**Wed**	C-GSGH	1020, 1021	8.5	36.0	0.0	719.7	0.0
Weather	partly cloudy			**Remarks**	Two acquisition flights.			
Geomag	unsettled to stormy							
13-May	**Thu**	C-GSGH	1022, 1023	6.9	28.0	0.0	519.2	0.0
Weather	partly cloudy			**Remarks**	Two acquisition flights, main block (Block 1) is complete.			
Geomag	quiet to unsettled							
14-May	**Fri**	C-GSGH	1024	3.4	42.0	0.0	230.1	0.0
Weather	partly cloudy			**Remarks**	One acquisition flight, scheduled maintenance on helicopter.			
Geomag	quiet							
15-May	**Sat**	C-GSGH	1025	2.1	8.0	6.0	45.1	33.2
Weather	partly cloudy			**Remarks**	The remaining Block2 lines have been completed, as well as re-flights of several partial lines for data quality improvement.			
Geomag	quiet to unsettled							
16-May	**Sun**	C-GSGH		0.0	0.0	0.0	0.0	0.0
Weather	partly cloudy			**Remarks**	Helicopter departs Chapleau in morning. Uninstalling ground and office equipment, disassembling mag bird, packing.			
Geomag	N/A							
Comments	Survey complete, demobilization in progress.							
Signed	C. Mueller							

Appendix VI

Flown Lines

Datum: WGS-84

UTM: 17N

LINE	TIME	TIME	MIN X	MAX X	MIN Y	MAX Y	FLIGHT	DAY	YEAR
101.00	64759.50	65169.70	353632.37	366941.77	5283452.91	5283772.95	2009	119	2021
102.00	74844.00	75248.80	353587.03	366895.74	5283954.64	5284274.49	2009	119	2021
103.00	46187.50	46631.30	353660.01	369290.27	5284400.08	5284772.59	1010	121	2021
104.00	56345.20	56826.50	353616.82	369256.39	5284898.51	5285275.08	1009	119	2021
105.00	47670.10	48166.70	353686.32	370275.73	5285377.78	5285772.34	1011	122	2021
106.00	56838.40	57543.90	353640.14	370237.98	5285877.21	5286271.36	1010	121	2021
107.00	67081.60	67567.00	353709.79	370299.08	5286379.59	5286772.01	1012	122	2021
108.00	79662.10	80136.80	353713.19	370715.59	5286860.35	5287272.06	1012	122	2021
109.00	46228.40	46769.60	353735.56	371234.54	5287355.82	5287769.07	1013	123	2021
110.00	60117.70	60642.30	353740.42	371196.46	5287856.59	5288271.84	1011	122	2021
111.00	64728.90	65307.50	351382.35	371248.63	5288354.32	5288832.31	1023	133	2021
112.00	65357.80	66019.60	351336.30	371210.19	5288855.60	5289331.54	1023	133	2021
113.00	66072.60	66634.60	351409.54	371274.51	5289355.75	5289829.13	1023	133	2021
114.00	66703.70	67323.80	351361.90	371227.40	5289859.25	5290332.57	1023	133	2021
115.00	67371.80	67923.40	351430.87	371294.73	5290352.83	5290825.96	1023	133	2021
116.00	67993.20	68585.20	351391.39	371250.92	5290851.60	5291337.25	1023	133	2021
117.00	68641.60	69209.80	351457.68	371319.40	5291351.29	5291828.33	1023	133	2021
118.00	69258.50	69882.20	351415.19	371272.89	5291857.19	5292330.23	1023	133	2021
119.00	46697.20	47396.30	351480.71	371340.68	5292355.89	5292830.37	1005	116	2021
120.00	47488.00	48231.20	351438.84	371298.87	5292855.75	5293337.97	1005	116	2021
121.00	48310.60	48929.90	351514.58	371364.40	5293355.42	5293829.17	1005	116	2021
122.00	49026.70	49663.50	351469.13	371774.33	5293845.10	5294329.36	1005	116	2021
123.00	49749.30	50473.90	351531.55	371842.02	5294344.56	5294829.96	1005	116	2021
124.00	50544.30	51244.20	351495.50	371797.76	5294844.13	5295330.76	1005	116	2021
125.00	51317.70	51965.90	351564.38	371861.00	5295343.31	5295828.95	1005	116	2021
126.00	52032.90	52707.40	351520.62	371817.15	5295844.70	5296332.05	1005	116	2021
127.00	52803.80	53489.40	351583.70	371885.03	5296340.04	5296829.88	1005	116	2021
128.00	53554.50	54209.90	351543.79	371842.71	5296844.26	5297332.67	1005	116	2021
129.00	54279.80	54911.80	351602.82	371908.50	5297342.74	5297827.73	1005	116	2021
130.00	57861.40	58441.20	351576.79	370457.07	5297871.35	5298328.60	1005	116	2021
131.00	46967.70	47480.00	352597.91	370517.52	5298371.96	5298800.79	1009	119	2021
132.00	70689.50	71264.70	352553.77	370475.01	5298879.49	5299309.46	1023	133	2021
133.00	70136.70	70617.00	353531.84	370539.17	5299373.52	5299779.28	1023	133	2021
134.00	57677.90	58226.10	354449.50	370493.26	5299872.87	5300256.28	1016	127	2021
135.00	45022.70	45522.80	354515.84	370558.09	5300373.59	5300756.80	1016	127	2021
136.00	75651.20	76245.10	354473.73	370519.55	5300868.90	5301257.03	1015	126	2021
137.00	71520.80	71829.40	359683.81	370580.86	5301372.13	5301626.98	1023	133	2021
138.00	57670.60	57879.10	359646.71	366356.72	5301969.18	5302127.67	1013	123	2021
139.00	45474.90	45677.50	359707.72	366422.87	5302466.63	5302627.59	1014	126	2021
140.00	56733.10	56868.50	360573.44	364059.39	5303023.15	5303098.60	1014	126	2021
141.00	64122.60	64209.30	361596.50	364128.05	5303516.88	5303577.80	1015	126	2021
208.00	53634.50	53739.40	351289.24	353771.24	5287268.00	5287337.00	1024	134	2021
209.00	53799.90	53876.30	351349.07	353793.02	5287767.53	5287831.18	1024	134	2021
210.00	53983.80	54072.40	351316.80	353800.65	5288270.89	5288333.96	1024	134	2021
1001.00	67149.70	67327.50	351533.20	351680.73	5292771.96	5298380.28	1001	108	2021
1002.00	67398.50	67599.70	351586.28	351732.55	5292818.24	5298426.48	1001	108	2021
1003.00	67667.80	67856.20	351640.75	351778.41	5292774.76	5298375.15	1001	108	2021
1004.00	48988.90	49145.00	351688.45	351834.67	5292829.75	5298430.36	1002	113	2021
1005.00	49204.30	49392.70	351737.56	351883.47	5292773.52	5298374.39	1002	113	2021
1006.00	49457.40	49617.40	351786.95	351939.24	5292821.26	5298423.64	1002	113	2021
1007.00	49699.10	49882.20	351836.96	351975.13	5292768.76	5298373.30	1002	113	2021
1008.00	68074.00	68262.00	351891.22	352039.83	5292820.09	5298419.92	1001	108	2021
1009.00	68346.40	68551.60	351942.35	352087.78	5292770.81	5298372.24	1001	108	2021
1010.00	68622.30	68825.80	351993.22	352133.25	5292816.19	5298414.31	1001	108	2021
1011.00	68883.70	69091.90	352046.08	352184.20	5292760.06	5298368.97	1001	108	2021
1012.00	69161.80	69379.30	352089.70	352242.82	5292808.70	5298413.61	1001	108	2021
1013.00	69437.90	69638.50	352144.01	352289.65	5292759.77	5298363.98	1001	108	2021
1014.00	49974.60	50154.00	352192.85	352334.81	5292808.86	5298407.43	1002	113	2021
1015.00	50283.80	50480.80	352242.40	352386.33	5292753.33	5298358.10	1002	113	2021
1016.00	50584.40	50767.50	352296.78	352439.03	5292805.41	5298411.09	1002	113	2021
1017.00	50851.00	51063.90	352343.00	352487.17	5292754.08	5298356.48	1002	113	2021
1018.00	69737.20	69930.40	352393.78	352541.52	5292804.02	5298409.74	1001	108	2021

LINE	TIME	TIME	MIN X	MAX X	MIN Y	MAX Y	FLIGHT	DAY	YEAR
1019.00	69998.70	70199.90	352443.61	352591.83	5292751.36	5298358.18	1001	108	2021
1020.00	70292.10	70531.60	352491.35	352663.83	5292803.25	5299405.39	1001	108	2021
1021.00	70593.60	70856.20	352545.21	352714.52	5292753.76	5299352.44	1001	108	2021
1022.00	71013.20	71285.70	352595.57	352767.82	5292802.33	5299402.69	1001	108	2021
1023.00	71339.80	71584.80	352638.95	352818.21	5292749.22	5299355.43	1001	108	2021
1024.00	51127.50	51365.90	352693.16	352866.64	5292794.03	5299400.34	1002	113	2021
1025.00	51467.10	51717.70	352747.91	352916.00	5292740.82	5299348.81	1002	113	2021
1026.00	51818.90	52083.40	352799.71	352965.23	5292788.04	5299390.38	1002	113	2021
1027.00	52207.70	52475.50	352850.30	353018.59	5292734.07	5299345.03	1002	113	2021
1028.00	71661.10	71909.90	352903.40	353066.13	5292785.47	5299394.77	1001	108	2021
1029.00	71962.40	72219.90	352952.37	353119.76	5292742.06	5299344.65	1001	108	2021
1030.00	72306.10	72571.50	353006.01	353164.33	5292785.19	5299386.99	1001	108	2021
1031.00	72632.40	72883.80	353053.07	353221.11	5292740.13	5299344.95	1001	108	2021
1032.00	52582.30	52827.10	353097.08	353275.67	5292786.12	5299393.41	1002	113	2021
1033.00	52879.90	53130.60	353152.82	353320.11	5292743.16	5299343.37	1002	113	2021
1034.00	53196.60	53443.80	353198.01	353371.67	5292775.56	5299390.63	1002	113	2021
1035.00	53494.00	53752.00	353250.49	353425.80	5292734.27	5299342.59	1002	113	2021
1036.00	53815.00	54042.50	353304.54	353468.28	5292780.09	5299384.78	1002	113	2021
1037.00	54124.10	54368.70	353353.16	353520.57	5292731.59	5299329.15	1002	113	2021
1038.00	54457.60	54714.60	353402.80	353583.81	5292782.78	5299876.09	1002	113	2021
1039.00	54826.30	55100.00	353450.74	353637.26	5292726.40	5299832.10	1002	113	2021
1040.00	55154.90	55415.90	353510.46	353693.49	5292770.48	5299878.20	1002	113	2021
1041.00	55470.90	55736.60	353554.11	353733.71	5292720.26	5299827.68	1002	113	2021
1042.00	55792.80	56057.50	353602.46	353786.51	5292766.97	5299867.04	1002	113	2021
1043.00	56120.00	56382.40	353654.14	353837.18	5292722.13	5299820.04	1002	113	2021
1044.00	56460.40	56731.90	353708.91	353889.14	5292766.18	5299866.24	1002	113	2021
1045.00	56820.60	57072.60	353757.17	353939.57	5292712.57	5299823.40	1002	113	2021
1046.00	57159.30	57432.60	353808.81	353985.28	5292763.05	5299873.33	1002	113	2021
1047.00	57531.80	57762.60	353857.36	354041.95	5292707.88	5299827.95	1002	113	2021
1048.00	58073.80	58592.10	353678.12	354089.31	5283520.97	5299864.77	1002	113	2021
1049.00	63844.90	64339.00	353728.18	354138.62	5283476.01	5299809.82	1023	133	2021
1050.00	52509.10	53026.30	353779.68	354192.96	5283530.69	5299870.40	1022	133	2021
1051.00	53071.70	53585.90	353829.76	354242.30	5283473.82	5299819.58	1022	133	2021
1052.00	53636.80	54128.40	353876.82	354289.75	5283531.32	5299868.61	1022	133	2021
1053.00	54191.90	54692.40	353929.34	354344.33	5283478.42	5299813.25	1022	133	2021
1054.00	54750.60	55274.50	353981.60	354391.37	5283532.13	5299862.18	1022	133	2021
1055.00	55338.90	55860.50	354030.21	354442.42	5283476.91	5299811.54	1022	133	2021
1056.00	46922.40	47359.40	354079.30	354421.65	5283475.95	5296758.38	1003	114	2021
1056.01	46649.60	46749.60	354413.05	354494.11	5296746.00	5299864.12	1025	135	2021
1057.00	47427.90	48054.40	354130.18	354588.44	5283525.83	5301508.99	1003	114	2021
1058.00	48116.30	48656.70	354181.21	354639.53	5283474.55	5301460.09	1003	114	2021
1059.00	48809.50	49394.70	354232.01	354686.22	5283532.39	5301511.78	1003	114	2021
1060.00	49660.90	50082.40	354280.79	354602.81	5283482.99	5296253.14	1003	114	2021
1060.01	46846.30	47009.50	354600.33	354733.80	5296191.33	5301456.07	1025	135	2021
1061.00	50151.60	50840.70	354335.16	354790.48	5283518.78	5301506.17	1003	114	2021
1062.00	50993.80	51455.30	354383.35	354780.54	5283473.19	5299247.39	1003	114	2021
1062.01	47150.90	47225.90	354779.77	354837.85	5299242.37	5301506.29	1025	135	2021
1063.00	60683.40	61262.40	354435.98	354885.31	5283480.58	5301461.67	1004	115	2021
1064.00	61337.50	61980.40	354486.19	354942.74	5283534.02	5301508.67	1004	115	2021
1065.00	62052.40	62594.00	354538.41	354989.65	5283478.64	5301450.87	1004	115	2021
1066.00	62703.90	63332.80	354587.92	355037.52	5283533.38	5301502.86	1004	115	2021
1067.00	63416.00	63926.40	354634.47	355088.46	5283481.28	5301450.62	1004	115	2021
1068.00	63996.50	64730.10	354684.25	355142.19	5283532.00	5301497.58	1004	115	2021
1069.00	64808.60	65329.10	354738.93	355193.80	5283477.43	5301449.66	1004	115	2021
1070.00	65416.20	66047.00	354790.94	355241.77	5283533.43	5301493.39	1004	115	2021
1071.00	66148.90	66705.30	354835.76	355293.74	5283470.34	5301447.39	1004	115	2021
1072.00	66775.80	67480.60	354890.22	355341.23	5283531.39	5301494.03	1004	115	2021
1073.00	67546.90	68070.00	354942.58	355392.75	5283478.33	5301442.54	1004	115	2021
1074.00	68167.70	68806.50	354994.06	355440.63	5283532.52	5301490.97	1004	115	2021
1075.00	68894.40	69427.70	355047.11	355495.79	5283475.81	5301437.06	1004	115	2021
1076.00	69504.30	70158.60	355093.53	355548.99	5283533.18	5301492.48	1004	115	2021
1077.00	70225.60	70726.30	355144.04	355596.74	5283477.62	5301432.05	1004	115	2021
1078.00	70814.00	71463.10	355197.21	355642.73	5283534.24	5301490.35	1004	115	2021
1079.00	65343.70	66055.80	355248.93	355694.67	5283478.36	5301440.46	1006	116	2021
1080.00	66114.90	66652.40	355295.00	355746.97	5283524.22	5301483.07	1006	116	2021
1081.00	66727.10	67302.70	355347.36	355794.95	5283472.65	5301427.83	1006	116	2021
1082.00	67366.20	67932.70	355399.15	355846.50	5283533.91	5301483.37	1006	116	2021
1083.00	68010.60	68644.00	355449.59	355893.73	5283474.99	5301432.94	1006	116	2021

LINE	TIME	TIME	MIN X	MAX X	MIN Y	MAX Y	FLIGHT	DAY	YEAR
1084.00	68697.60	69003.40	355502.36	355778.44	5283533.00	5294825.35	1006	116	2021
1084.10	75360.10	75492.80	355838.87	355943.97	5297164.59	5301478.22	1006	116	2021
1085.00	69066.10	69426.20	355547.69	355830.86	5283471.91	5294771.80	1006	116	2021
1085.10	64805.80	64949.50	355888.87	355994.70	5297113.43	5301423.25	1007	117	2021
1086.00	69653.90	69950.60	355596.82	355856.44	5283532.31	5293825.95	1006	116	2021
1086.10	65032.90	65142.20	355965.11	356046.04	5298162.54	5301478.12	1007	117	2021
1087.00	70018.40	70346.30	355649.58	355908.07	5283473.23	5293767.89	1006	116	2021
1087.10	65199.10	65308.30	356013.44	356097.09	5298108.09	5301421.01	1007	117	2021
1088.00	70408.50	70717.40	355702.17	355960.01	5283534.26	5293822.67	1006	116	2021
1088.10	65369.30	65479.10	356063.53	356147.32	5298163.83	5301475.52	1007	117	2021
1089.00	70793.10	71174.40	355752.42	356009.39	5283476.18	5293769.12	1006	116	2021
1089.10	65544.40	65672.70	356114.84	356194.50	5298110.91	5301418.13	1007	117	2021
1090.00	71212.70	71552.90	355794.31	356058.92	5283526.59	5293816.41	1006	116	2021
1090.10	65735.60	65855.30	356165.77	356248.70	5298156.91	5301474.21	1007	117	2021
1091.00	71614.10	71981.00	355848.43	356108.95	5283476.96	5293775.61	1006	116	2021
1091.10	65919.60	66035.00	356214.52	356298.61	5298108.69	5301418.80	1007	117	2021
1092.00	72028.60	72331.00	355902.75	356160.68	5283529.62	5293815.60	1006	116	2021
1092.10	66099.10	66213.20	356267.00	356351.22	5298158.14	5301471.15	1007	117	2021
1093.00	72389.10	72740.40	355954.48	356210.42	5283477.92	5293760.84	1006	116	2021
1093.10	66272.40	66391.50	356315.76	356398.49	5298105.98	5301414.96	1007	117	2021
1094.00	72794.40	73102.30	356006.74	356255.22	5283533.22	5293809.02	1006	116	2021
1094.10	66457.40	66577.60	356366.95	356450.40	5298153.74	5301465.35	1007	117	2021
1095.00	73209.40	73502.30	356052.58	356272.26	5283487.42	5292258.51	1006	116	2021
1095.10	66638.90	66772.40	356417.70	356500.27	5298097.05	5301419.93	1007	117	2021
1096.00	73579.60	73850.70	356106.87	356323.00	5283526.45	5292305.10	1006	116	2021
1096.10	66821.70	66929.50	356467.29	356553.45	5298146.99	5301463.81	1007	117	2021
1097.00	73924.80	74247.80	356153.64	356375.23	5283472.99	5292261.26	1006	116	2021
1097.10	66975.50	67091.60	356519.80	356603.38	5298095.53	5301412.72	1007	117	2021
1098.00	74289.60	74538.10	356209.05	356419.41	5283532.02	5292311.77	1006	116	2021
1098.10	67132.20	67232.80	356572.00	356651.86	5298148.11	5301465.79	1007	117	2021
1099.00	74588.60	74901.10	356255.82	356477.46	5283475.17	5292253.43	1006	116	2021
1099.10	67280.30	67405.90	356621.44	356705.62	5298094.58	5301413.74	1007	117	2021
1100.00	74955.50	75231.10	356300.54	356526.57	5283520.85	5292305.76	1006	116	2021
1100.10	67463.20	67581.00	356674.84	356756.67	5298139.99	5301459.25	1007	117	2021
1101.00	71529.20	71812.80	356360.20	356578.95	5283476.99	5292252.67	1007	117	2021
1101.10	67636.90	67763.00	356722.76	356806.83	5298090.81	5301408.51	1007	117	2021
1102.00	71866.30	72145.40	356414.69	356625.14	5283524.06	5292309.13	1007	117	2021
1102.10	67806.10	67923.10	356772.49	356853.28	5298139.11	5301458.08	1007	117	2021
1103.00	72183.90	72437.10	356459.77	356676.92	5283477.27	5292254.36	1007	117	2021
1103.10	67980.30	68101.70	356817.14	356907.33	5298087.88	5301409.05	1007	117	2021
1104.00	72492.10	72778.20	356516.63	356728.07	5283523.67	5292306.53	1007	117	2021
1104.10	68147.70	68269.50	356873.86	356955.07	5298137.37	5301456.83	1007	117	2021
1105.00	72818.80	73100.10	356560.43	356776.38	5283477.17	5292246.75	1007	117	2021
1105.10	68330.40	68446.20	356922.53	357004.67	5298085.23	5301404.65	1007	117	2021
1106.00	73249.90	73551.10	356612.81	356828.35	5283525.20	5292302.95	1007	117	2021
1106.10	68501.20	68619.10	356975.15	357054.67	5298137.48	5301453.03	1007	117	2021
1107.00	73613.20	73910.60	356658.43	356879.85	5283482.35	5292245.95	1007	117	2021
1107.10	68684.70	68803.10	357023.46	357106.87	5298085.20	5301396.67	1007	117	2021
1108.00	74004.10	74324.10	356714.86	356930.42	5283526.46	5292297.04	1007	117	2021
1108.10	68861.50	68977.70	357077.10	357156.90	5298136.53	5301447.26	1007	117	2021
1109.00	74388.20	74694.80	356763.51	356979.74	5283483.45	5292244.03	1007	117	2021
1109.10	69037.30	69150.90	357124.77	357206.12	5298083.42	5301395.25	1007	117	2021
1110.00	74750.00	75067.30	356815.07	357028.99	5283533.22	5292298.40	1007	117	2021
1110.10	69211.10	69320.20	357176.30	357256.15	5298133.59	5301447.65	1007	117	2021
1111.00	75136.50	75428.60	356863.26	357081.52	5283481.64	5292241.52	1007	117	2021
1111.10	69406.50	69515.20	357223.88	357307.08	5298078.92	5301397.20	1007	117	2021
1112.00	75491.20	75795.00	356915.66	357129.61	5283533.08	5292295.28	1007	117	2021
1112.10	69590.40	69704.90	357276.32	357357.88	5298134.66	5301443.93	1007	117	2021
1113.00	75921.00	76280.20	356964.74	357243.22	5283482.22	5294734.72	1007	117	2021
1113.10	69767.50	69893.60	357311.89	357408.37	5297581.29	5301390.52	1007	117	2021
1114.00	61009.80	61366.90	357016.32	357294.73	5283533.09	5294790.03	1008	118	2021
1114.10	69973.00	70101.20	357365.90	357458.15	5297630.10	5301444.13	1007	117	2021
1115.00	61429.30	61762.00	357067.90	357344.04	5283477.77	5294734.00	1008	118	2021
1115.10	70218.20	70343.90	357413.61	357512.56	5297571.43	5301395.71	1007	117	2021
1116.00	61829.20	62212.20	357116.83	357395.38	5283534.78	5294786.02	1008	118	2021
1116.10	70388.40	70505.70	357467.43	357562.45	5297625.12	5301445.70	1007	117	2021
1117.00	62276.10	62638.50	357167.00	357447.67	5283476.82	5294733.65	1008	118	2021
1117.10	70554.30	70681.10	357519.27	357613.27	5297573.43	5301394.00	1007	117	2021

LINE	TIME	TIME	MIN X	MAX X	MIN Y	MAX Y	FLIGHT	DAY	YEAR
1118.00	62734.60	63091.90	357218.14	357495.25	5283532.19	5294790.70	1008	118	2021
1118.10	70722.20	70845.00	357571.74	357665.60	5297623.38	5301443.85	1007	117	2021
1119.00	63133.90	63477.60	357256.44	357551.95	5283480.22	5294733.57	1008	118	2021
1119.10	70895.40	71026.10	357616.27	357713.45	5297569.83	5301389.46	1007	117	2021
1120.00	63545.00	63925.40	357321.18	357600.85	5283531.85	5294781.13	1008	118	2021
1120.10	71076.50	71198.60	357674.16	357771.07	5297619.99	5301440.85	1007	117	2021
1121.00	63963.30	64336.70	357360.74	357647.22	5283477.45	5294730.22	1008	118	2021
1121.10	71248.90	71380.00	357718.41	357814.55	5297567.72	5301392.13	1007	117	2021
1122.00	64391.40	64951.40	357421.57	357861.72	5283532.15	5301439.46	1008	118	2021
1123.00	65028.60	65551.70	357473.23	357900.93	5283479.46	5300916.95	1008	118	2021
1124.00	65620.00	66209.90	357525.38	357952.79	5283533.95	5300973.25	1008	118	2021
1125.00	66265.30	66811.80	357575.09	358001.46	5283483.65	5300912.58	1008	118	2021
1126.00	66873.60	67472.10	357630.16	358053.67	5283534.70	5300967.39	1008	118	2021
1127.00	67521.00	68062.50	357668.84	358104.59	5283484.46	5300919.15	1008	118	2021
1128.00	68134.20	68699.10	357727.61	358153.91	5283540.69	5300967.30	1008	118	2021
1129.00	68757.00	69305.70	357777.26	358201.87	5283486.84	5300911.37	1008	118	2021
1130.00	69371.10	69953.30	357827.71	358255.80	5283534.62	5300963.41	1008	118	2021
1131.00	70002.40	70554.10	357876.74	358304.23	5283483.99	5300905.85	1008	118	2021
1132.00	45956.70	46503.90	357930.93	358360.78	5283534.75	5300960.16	1017	128	2021
1133.00	45391.70	45903.20	357982.51	358406.11	5283483.24	5300902.45	1017	128	2021
1134.00	70611.80	71220.70	358019.00	358466.52	5283533.92	5300958.02	1008	118	2021
1135.00	71292.00	71825.80	358078.01	358507.32	5283485.06	5300911.30	1008	118	2021
1136.00	71881.20	72429.10	358128.61	358563.73	5283535.46	5300954.70	1008	118	2021
1137.00	72470.20	73008.00	358175.95	358604.64	5283480.37	5300899.40	1008	118	2021
1138.00	73056.20	73634.90	358225.74	358657.77	5283533.46	5300954.74	1008	118	2021
1139.00	46564.90	47096.30	358282.53	358709.69	5283481.62	5300901.97	1017	128	2021
1140.00	47151.50	47699.60	358329.51	358761.95	5283532.80	5300951.25	1017	128	2021
1141.00	47752.20	48263.70	358382.09	358813.65	5283482.44	5300893.20	1017	128	2021
1142.00	48342.50	48867.00	358435.91	358861.32	5283537.75	5300948.17	1017	128	2021
1143.00	48947.70	49470.90	358484.71	358909.68	5283481.31	5300890.42	1017	128	2021
1144.00	49532.20	50058.10	358536.65	358961.58	5283537.50	5300947.40	1017	128	2021
1145.00	50120.00	50665.60	358585.14	359003.25	5283481.94	5300891.20	1017	128	2021
1146.00	50718.00	51315.00	358636.90	359062.28	5283534.70	5300944.20	1017	128	2021
1147.00	51363.80	51923.30	358685.45	359108.50	5283480.92	5300895.84	1017	128	2021
1148.00	51976.20	52561.90	358737.81	359160.08	5283529.01	5300937.48	1017	128	2021
1149.00	52609.60	53128.30	358786.53	359211.08	5283482.99	5300886.17	1017	128	2021
1150.00	53186.60	53737.60	358841.19	359264.27	5283538.48	5300938.15	1017	128	2021
1151.00	53792.40	54304.90	358890.14	359312.25	5283479.33	5300883.10	1017	128	2021
1152.00	54368.20	54899.00	358941.09	359365.75	5283539.25	5300937.54	1017	128	2021
1153.00	54957.20	55517.40	358994.00	359414.85	5283485.64	5300883.06	1017	128	2021
1154.00	55566.40	56163.50	359039.63	359469.10	5283536.70	5300928.43	1017	128	2021
1155.00	56208.90	56773.20	359094.55	359517.17	5283481.29	5300889.81	1017	128	2021
1156.00	56816.70	57428.30	359137.40	359565.35	5283527.40	5300927.06	1017	128	2021
1157.00	57476.00	58002.90	359193.80	359619.27	5283482.28	5300874.05	1017	128	2021
1158.00	46712.30	47251.00	359246.05	359638.06	5283534.98	5299685.14	1018	131	2021
1158.01	47442.70	47485.90	359635.29	359666.85	5299623.29	5300925.04	1025	135	2021
1159.00	47429.60	48031.50	359295.15	359762.33	5283482.33	5302723.79	1018	131	2021
1160.00	48092.80	48776.90	359348.12	359810.08	5283537.55	5302778.56	1018	131	2021
1161.00	48836.80	49420.80	359395.78	359862.44	5283482.15	5302724.74	1018	131	2021
1162.00	49493.80	50192.80	359447.64	359918.03	5283525.63	5302772.46	1018	131	2021
1163.00	50243.70	50869.90	359497.41	359964.29	5283483.92	5302733.97	1018	131	2021
1164.00	50933.00	51690.10	359548.50	360015.05	5283530.50	5302772.76	1018	131	2021
1165.00	51738.30	52378.50	359597.27	360072.92	5283482.90	5302725.32	1018	131	2021
1166.00	52440.00	53134.10	359652.98	360115.30	5283540.57	5302774.08	1018	131	2021
1167.00	53187.50	53785.90	359698.97	360168.54	5283492.69	5302716.03	1018	131	2021
1168.00	53848.60	54563.00	359750.42	360217.95	5283543.87	5302764.20	1018	131	2021
1169.00	54626.90	55211.50	359800.96	360267.65	5283492.90	5302711.26	1018	131	2021
1170.00	55275.90	56077.50	359850.32	360318.41	5283531.36	5302759.84	1018	131	2021
1171.00	56133.50	56743.40	359896.98	360370.99	5283491.04	5302726.95	1018	131	2021
1172.00	56808.20	57605.80	359948.24	360424.05	5283527.47	5302756.06	1018	131	2021
1173.00	57655.30	58277.60	360001.16	360468.80	5283492.39	5302721.62	1018	131	2021
1174.00	58343.50	59063.40	360054.21	360520.62	5283541.77	5302761.71	1018	131	2021
1175.00	59123.60	59711.70	360105.39	360568.44	5283494.01	5302714.77	1018	131	2021
1176.00	68166.50	68870.90	360157.34	360618.13	5283541.74	5302754.93	1019	131	2021
1177.00	68951.40	69567.60	360206.30	360680.99	5283487.59	5303171.44	1019	131	2021
1178.00	69631.80	70371.30	360259.16	360730.80	5283539.05	5303214.59	1019	131	2021
1179.00	70450.50	71035.00	360306.92	360781.49	5283486.40	5303165.83	1019	131	2021
1180.00	71121.60	71869.80	360359.57	360831.33	5283537.80	5303207.75	1019	131	2021

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1181.00	71928.90	72525.50	360407.62	360884.32	5283487.89	5303163.73	1019	131	2021
1182.00	72594.70	73326.20	360456.56	360936.27	5283542.75	5303207.65	1019	131	2021
1183.00	73398.40	74031.40	360512.43	360981.00	5283492.43	5303168.82	1019	131	2021
1184.00	74106.50	74829.40	360561.64	361033.86	5283543.00	5303207.19	1019	131	2021
1185.00	74899.10	75482.30	360607.65	361087.48	5283485.79	5303158.96	1019	131	2021
1186.00	75552.80	76295.60	360662.61	361132.58	5283543.12	5303206.28	1019	131	2021
1187.00	76368.40	76947.70	360711.24	361181.52	5283487.69	5303158.52	1019	131	2021
1188.00	45241.60	45860.00	360762.43	361236.25	5283541.02	5303207.33	1020	132	2021
1189.01	47624.10	48234.10	360811.99	361284.49	5283487.16	5303156.59	1025	135	2021
1190.00	46603.60	47235.90	360863.73	361335.49	5283541.33	5303202.39	1020	132	2021
1191.00	47296.60	47884.10	360913.95	361386.36	5283486.77	5303148.20	1020	132	2021
1192.00	47947.90	48616.60	360969.21	361438.49	5283541.17	5303199.47	1020	132	2021
1193.00	48667.80	49269.80	361017.74	361491.31	5283485.42	5303154.11	1020	132	2021
1194.00	49328.20	49998.30	361064.71	361538.36	5283534.44	5303199.17	1020	132	2021
1195.00	50058.90	50630.40	361118.41	361593.85	5283483.82	5303151.67	1020	132	2021
1196.00	50700.60	51336.20	361169.03	361650.97	5283539.40	5303687.70	1020	132	2021
1197.00	51394.60	51980.40	361219.62	361701.70	5283484.02	5303636.03	1020	132	2021
1198.00	52042.80	52718.70	361269.93	361750.99	5283540.25	5303683.00	1020	132	2021
1199.00	52786.70	53387.50	361318.25	361802.18	5283481.54	5303631.99	1020	132	2021
1200.00	53460.70	54178.60	361375.30	361848.60	5283533.07	5303681.75	1020	132	2021
1201.00	54241.80	54837.80	361420.81	361910.20	5283475.86	5303631.56	1020	132	2021
1202.00	54896.60	55558.20	361472.65	361947.35	5283530.98	5303682.29	1020	132	2021
1203.00	55619.10	56219.30	361525.84	362009.91	5283470.92	5303635.45	1020	132	2021
1204.00	56287.40	56936.90	361575.61	362052.77	5283529.72	5303675.49	1020	132	2021
1205.00	57000.00	57570.70	361622.19	362103.09	5283471.28	5303621.16	1020	132	2021
1206.00	65445.50	66074.20	361673.46	362154.13	5283527.15	5303673.34	1021	132	2021
1207.00	66128.90	66704.80	361721.90	362204.44	5283465.89	5303624.87	1021	132	2021
1208.00	66777.50	67440.30	361775.37	362258.13	5283523.10	5303672.34	1021	132	2021
1209.00	67510.10	68092.50	361823.71	362306.57	5283467.21	5303617.64	1021	132	2021
1210.00	68163.00	68850.00	361875.75	362355.38	5283519.38	5303669.11	1021	132	2021
1211.00	68905.60	69507.30	361923.85	362406.14	5283464.71	5303619.66	1021	132	2021
1212.00	69564.30	70226.20	361978.20	362450.94	5283519.10	5303664.55	1021	132	2021
1213.00	70290.10	70869.10	362027.91	362509.04	5283463.31	5303619.63	1021	132	2021
1214.00	70926.30	71553.50	362081.08	362560.00	5283518.89	5303665.37	1021	132	2021
1215.00	71617.60	72204.10	362129.65	362607.70	5283457.67	5303611.96	1021	132	2021
1216.00	72262.90	72942.00	362178.93	362657.61	5283515.69	5303663.76	1021	132	2021
1217.00	73001.50	73574.70	362232.24	362712.65	5283457.55	5303603.71	1021	132	2021
1218.00	73637.30	74368.40	362278.31	362762.85	5283502.07	5303658.90	1021	132	2021
1219.00	74416.70	75027.80	362323.57	362811.64	5283455.40	5303613.36	1021	132	2021
1220.00	75091.90	75805.10	362378.10	362859.53	5283506.26	5303658.83	1021	132	2021
1221.00	75847.10	76417.80	362430.74	362912.45	5283452.81	5303609.13	1021	132	2021
1222.00	76482.30	77126.40	362484.77	362958.97	5283506.56	5303658.69	1021	132	2021
1223.00	77182.70	77761.80	362532.27	363010.91	5283449.31	5303603.30	1021	132	2021
1224.00	44806.80	45478.30	362585.03	363061.00	5283503.45	5303654.78	1022	133	2021
1225.00	45538.10	46181.60	362635.61	363112.18	5283446.79	5303601.53	1022	133	2021
1226.00	46240.40	46902.20	362688.74	363163.38	5283504.17	5303650.84	1022	133	2021
1227.00	46965.60	47609.30	362732.75	363214.46	5283445.69	5303596.07	1022	133	2021
1228.00	47663.00	48342.50	362790.98	363267.44	5283497.61	5303649.25	1022	133	2021
1229.00	48397.20	49068.40	362838.91	363318.51	5283446.84	5303602.26	1022	133	2021
1230.00	49138.10	49788.30	362890.40	363364.49	5283493.90	5303641.33	1022	133	2021
1231.00	49848.00	50527.70	362937.35	363417.34	5283439.94	5303595.69	1022	133	2021
1232.00	50585.70	51213.50	362990.67	363465.30	5283490.18	5303643.99	1022	133	2021
1233.00	51532.40	52147.50	363039.41	363518.86	5283436.61	5303583.83	1022	133	2021
1234.00	56689.90	57402.20	363090.88	363566.95	5283490.30	5303639.76	1016	127	2021
1235.00	55932.80	56614.60	363141.96	363617.20	5283434.99	5303585.49	1016	127	2021
1236.00	55209.20	55871.00	363193.49	363667.03	5283488.93	5303633.01	1016	127	2021
1237.00	54500.30	55138.40	363240.61	363717.67	5283432.55	5303581.42	1016	127	2021
1238.00	53790.00	54437.80	363293.62	363774.61	5283477.46	5303630.17	1016	127	2021
1239.00	53079.90	53737.20	363345.89	363821.30	5283429.51	5303596.16	1016	127	2021
1240.00	52338.70	53023.30	363397.15	363867.31	5283478.91	5303629.55	1016	127	2021
1241.00	51615.90	52288.90	363446.29	363922.85	5283424.99	5303592.33	1016	127	2021
1242.00	50844.40	51541.50	363493.67	363967.75	5283480.43	5303630.37	1016	127	2021
1243.00	50104.60	50772.80	363542.81	364019.13	5283427.06	5303572.99	1016	127	2021
1244.00	49339.60	50012.60	363597.00	364046.82	5283481.47	5302672.11	1016	127	2021
1245.00	48635.00	49270.90	363644.05	364096.26	5283426.18	5302621.24	1016	127	2021
1246.00	47888.20	48572.40	363695.00	364144.13	5283468.55	5302672.61	1016	127	2021
1247.00	47194.80	47831.60	363749.36	364205.22	5283420.87	5302630.74	1016	127	2021
1248.00	46471.30	47133.30	363797.56	364251.10	5283468.63	5302673.26	1016	127	2021

LINE	TIME	TIME	MIN X	MAX X	MIN Y	MAX Y	FLIGHT	DAY	YEAR
1249.00	45800.80	46415.20	363851.73	364306.63	5283417.07	5302620.96	1016	127	2021
1250.00	74749.20	75431.90	363899.81	364352.74	5283473.20	5302664.42	1015	126	2021
1251.00	74048.40	74674.80	363949.71	364396.51	5283414.03	5302610.64	1015	126	2021
1252.00	73401.90	73986.80	364000.59	364450.48	5283466.96	5302658.83	1015	126	2021
1253.00	72718.20	73342.50	364051.09	364497.67	5283411.53	5302605.98	1015	126	2021
1254.00	72054.80	72645.60	364098.48	364550.85	5283454.28	5302661.00	1015	126	2021
1255.00	71323.70	72004.50	364152.22	364600.94	5283412.33	5302608.37	1015	126	2021
1256.00	70617.20	71262.40	364201.18	364651.56	5283458.21	5302660.73	1015	126	2021
1257.00	69897.40	70561.20	364254.45	364700.76	5283409.32	5302605.73	1015	126	2021
1258.01	69197.80	69829.80	364305.85	364756.14	5283459.51	5302657.70	1015	126	2021
1259.00	68525.10	69135.40	364354.45	364802.68	5283407.97	5302606.23	1015	126	2021
1260.00	67669.70	68277.20	364405.04	364855.09	5283459.06	5302656.15	1015	126	2021
1261.00	66993.50	67607.50	364456.80	364902.48	5283401.72	5302598.25	1015	126	2021
1262.00	66274.80	66933.10	364508.36	364956.98	5283453.86	5302654.02	1015	126	2021
1263.00	65630.80	66219.60	364558.61	365009.35	5283401.90	5302599.43	1015	126	2021
1264.00	64938.90	65566.00	364611.75	365058.25	5283459.05	5302653.01	1015	126	2021
1265.00	64296.70	64885.30	364651.65	365102.73	5283399.02	5302597.83	1015	126	2021
1266.00	55935.20	56557.20	364707.01	365158.31	5283456.01	5302646.48	1014	126	2021
1267.00	55244.40	55852.60	364760.94	365208.94	5283395.24	5302593.06	1014	126	2021
1268.00	54553.60	55181.30	364810.85	365257.15	5283448.65	5302644.99	1014	126	2021
1269.00	53859.30	54476.00	364861.94	365305.72	5283392.53	5302590.45	1014	126	2021
1270.00	53128.80	53791.40	364915.48	365359.94	5283440.79	5302637.64	1014	126	2021
1271.00	52457.30	53073.50	364959.79	365405.78	5283392.14	5302586.04	1014	126	2021
1272.00	51763.40	52390.70	365011.07	365458.75	5283444.40	5302635.21	1014	126	2021
1273.00	51094.40	51712.10	365058.25	365511.77	5283390.40	5302595.32	1014	126	2021
1274.00	50387.10	51026.80	365113.35	365558.72	5283445.55	5302636.25	1014	126	2021
1275.00	49713.40	50326.00	365163.53	365608.93	5283385.54	5302582.72	1014	126	2021
1276.00	49023.60	49644.60	365214.03	365659.17	5283439.80	5302634.66	1014	126	2021
1277.00	48395.70	48961.80	365264.79	365710.63	5283385.30	5302580.57	1014	126	2021
1278.00	47733.90	48335.80	365318.36	365766.32	5283436.86	5302636.35	1014	126	2021
1279.00	47083.40	47677.00	365364.92	365810.99	5283385.22	5302585.80	1014	126	2021
1280.00	46432.50	47037.30	365419.14	365866.05	5283438.29	5302631.56	1014	126	2021
1281.00	45765.80	46370.80	365472.62	365915.23	5283385.12	5302577.91	1014	126	2021
1282.00	56914.50	57541.90	365519.30	365963.60	5283434.77	5302628.33	1013	123	2021
1283.00	56190.30	56852.30	365566.17	366011.60	5283382.33	5302572.58	1013	123	2021
1284.00	55489.70	56105.30	365616.52	366065.78	5283431.33	5302628.11	1013	123	2021
1285.00	54673.20	55440.30	365670.10	366116.63	5283388.74	5302576.31	1013	123	2021
1286.00	53919.70	54612.00	365723.83	366169.11	5283423.44	5302623.79	1013	123	2021
1287.00	53152.60	53873.10	365770.91	366217.52	5283375.26	5302577.87	1013	123	2021
1288.00	52413.40	53089.50	365811.87	366270.90	5283421.25	5302626.31	1013	123	2021
1289.00	51692.90	52353.30	365871.77	366315.07	5283369.40	5302569.77	1013	123	2021
1290.00	51035.70	51593.10	365924.22	366334.18	5283421.81	5301230.62	1013	123	2021
1291.00	50357.60	50969.90	365972.28	366385.70	5283370.78	5301178.85	1013	123	2021
1292.00	49741.50	50290.10	366024.17	366436.00	5283424.50	5301230.08	1013	123	2021
1293.00	49012.60	49686.10	366072.11	366484.58	5283373.36	5301183.00	1013	123	2021
1294.00	48331.10	48944.70	366123.83	366539.43	5283410.38	5301226.70	1013	123	2021
1295.00	47664.40	48270.70	366177.81	366593.02	5283367.58	5301183.51	1013	123	2021
1296.00	47005.70	47590.60	366227.07	366646.33	5283411.08	5301225.52	1013	123	2021
1297.00	78953.60	79438.30	366275.22	366690.13	5283363.52	5301175.49	1012	122	2021
1298.00	78357.00	78905.80	366329.02	366741.46	5283416.00	5301224.42	1012	122	2021
1299.00	77806.80	78309.90	366372.60	366790.66	5283357.93	5301181.64	1012	122	2021
1300.00	77159.00	77753.70	366433.81	366839.40	5283414.12	5301221.84	1012	122	2021
1301.00	76551.00	77088.70	366478.58	366889.57	5283358.84	5301174.15	1012	122	2021
1302.00	75901.60	76475.20	366530.66	366936.12	5283411.70	5301222.19	1012	122	2021
1303.00	75286.70	75837.30	366580.65	366990.06	5283352.82	5301163.54	1012	122	2021
1304.00	74678.00	75227.30	366628.87	367039.37	5283405.83	5301212.15	1012	122	2021
1305.00	74129.00	74637.80	366683.39	367085.10	5283348.71	5301166.50	1012	122	2021
1306.00	73539.40	74077.50	366725.15	367138.55	5283404.48	5301212.41	1012	122	2021
1307.00	72967.90	73491.50	366784.81	367195.81	5283349.58	5301160.68	1012	122	2021
1308.00	72384.60	72915.50	366831.97	367237.07	5283401.22	5301207.11	1012	122	2021
1309.00	71765.80	72296.10	366906.36	367293.41	5284344.61	5301154.15	1012	122	2021
1310.00	71164.80	71701.30	366958.37	367344.28	5284401.51	5301204.15	1012	122	2021
1311.00	70593.90	71106.50	367005.69	367392.70	5284342.09	5301150.80	1012	122	2021
1312.00	69995.10	70523.30	367058.51	367445.93	5284400.15	5301202.69	1012	122	2021
1313.00	69460.00	69945.00	367109.66	367492.00	5284345.29	5301157.53	1012	122	2021
1314.00	68903.40	69410.50	367160.37	367544.98	5284389.84	5301199.32	1012	122	2021
1315.00	68334.90	68852.60	367207.20	367596.16	5284341.18	5301156.04	1012	122	2021
1316.00	67749.90	68276.90	367258.26	367658.19	5284395.75	5301201.03	1012	122	2021

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1317.00	59420.30	59917.30	367318.78	367692.18	5284340.84	5301154.58	1011	122	2021
1318.00	58848.20	59366.00	367359.37	367748.47	5284394.46	5301192.73	1011	122	2021
1319.00	58285.60	58805.90	367416.82	367802.93	5284335.95	5301161.21	1011	122	2021
1320.00	57674.90	58233.90	367468.77	367851.49	5284392.73	5301190.24	1011	122	2021
1321.00	57075.00	57604.80	367513.00	367897.03	5284332.53	5301136.38	1011	122	2021
1322.00	56480.50	57018.10	367565.03	367949.12	5284392.07	5301193.71	1011	122	2021
1323.00	55895.20	56405.30	367614.44	367997.68	5284331.47	5301137.54	1011	122	2021
1324.00	55303.80	55837.30	367667.38	368047.58	5284386.21	5301191.69	1011	122	2021
1325.00	54733.20	55253.50	367712.14	368098.21	5284333.41	5301147.96	1011	122	2021
1326.00	54130.20	54677.30	367764.09	368149.31	5284380.46	5301191.81	1011	122	2021
1327.00	53555.20	54078.90	367814.48	368205.43	5284327.16	5301140.50	1011	122	2021
1328.00	52931.70	53499.90	367866.33	368246.41	5284375.79	5301188.23	1011	122	2021
1329.00	52344.00	52871.10	367917.91	368300.40	5284324.79	5301129.89	1011	122	2021
1330.00	51747.60	52283.60	367969.05	368353.53	5284378.34	5301184.83	1011	122	2021
1331.00	51179.90	51685.00	368018.44	368401.13	5284322.01	5301127.36	1011	122	2021
1332.00	50619.00	51123.50	368066.51	368453.88	5284375.31	5301183.20	1011	122	2021
1333.00	50061.10	50568.00	368123.23	368502.14	5284320.77	5301132.83	1011	122	2021
1334.00	49475.70	50008.50	368168.35	368551.25	5284371.51	5301179.83	1011	122	2021
1335.00	48923.00	49413.60	368225.48	368607.17	5284316.89	5301129.68	1011	122	2021
1336.00	48343.80	48862.80	368276.40	368654.97	5284370.96	5301176.04	1011	122	2021
1337.00	56051.00	56707.60	368319.49	368702.91	5284314.17	5301118.34	1010	121	2021
1338.00	55516.90	55984.30	368377.00	368752.84	5284368.08	5301171.06	1010	121	2021
1339.00	54822.60	55443.70	368422.71	368807.13	5284314.70	5301116.06	1010	121	2021
1340.00	54261.00	54740.80	368476.31	368858.04	5284357.59	5301167.83	1010	121	2021
1341.00	53546.70	54220.80	368527.50	368907.35	5284307.23	5301122.53	1010	121	2021
1342.00	52973.00	53473.60	368571.79	368954.41	5284356.64	5301165.34	1010	121	2021
1343.00	52316.90	52928.60	368624.93	369012.21	5284313.12	5301118.68	1010	121	2021
1344.00	51741.80	52228.60	368703.85	369069.03	5285413.40	5301627.68	1010	121	2021
1344.01	48485.50	48520.60	368677.00	368702.39	5284363.03	5285469.71	1025	135	2021
1345.00	51091.80	51651.60	368726.83	369117.64	5284307.03	5301574.40	1010	121	2021
1346.00	50527.80	51023.20	368780.69	369167.28	5284363.32	5301627.71	1010	121	2021
1347.00	49944.00	50471.50	368827.34	369219.33	5284303.14	5301571.74	1010	121	2021
1348.00	49397.70	49877.60	368880.13	369270.26	5284356.73	5301628.06	1010	121	2021
1349.00	48688.30	49344.10	368931.07	369318.66	5284299.21	5301575.99	1010	121	2021
1350.00	48066.80	48617.20	368975.62	369372.94	5284349.69	5301624.07	1010	121	2021
1351.00	47365.20	48018.50	369032.55	369424.05	5284298.73	5301575.11	1010	121	2021
1352.00	46752.90	47303.50	369079.71	369471.93	5284346.85	5301620.97	1010	121	2021
1353.00	74256.50	74761.40	369133.89	369526.22	5284303.26	5301571.79	2009	119	2021
1354.00	73718.50	74205.90	369181.84	369573.54	5284352.42	5301620.35	2009	119	2021
1355.00	73204.00	73653.20	369257.85	369627.23	5285294.15	5301562.82	2009	119	2021
1356.00	72650.30	73150.20	369308.36	369675.15	5285345.54	5301621.07	2009	119	2021
1357.00	72095.30	72589.90	369358.84	369722.94	5285294.21	5301560.94	2009	119	2021
1358.00	71518.40	72033.50	369408.40	369774.83	5285347.78	5301619.93	2009	119	2021
1359.00	70944.60	71459.10	369458.03	369825.67	5285288.43	5301560.18	2009	119	2021
1360.00	70385.80	70892.70	369507.95	369877.60	5285339.16	5301611.67	2009	119	2021
1361.00	69764.90	70338.80	369561.72	369928.95	5285289.08	5301563.40	2009	119	2021
1362.00	69173.30	69706.20	369609.62	369979.61	5285329.48	5301607.74	2009	119	2021
1363.00	68539.80	69129.30	369658.25	370028.02	5285286.40	5301562.49	2009	119	2021
1364.00	67919.10	68480.40	369708.21	370079.76	5285331.50	5301605.93	2009	119	2021
1365.00	67276.20	67849.10	369761.09	370127.61	5285286.43	5301553.03	2009	119	2021
1366.00	66665.70	67210.90	369814.31	370180.83	5285337.05	5301604.61	2009	119	2021
1367.00	66054.20	66595.20	369865.07	370228.80	5285281.85	5301552.05	2009	119	2021
1368.00	65486.00	65993.60	369913.48	370279.72	5285338.43	5301601.93	2009	119	2021
1369.00	55726.10	56295.40	369966.35	370330.48	5285281.72	5301559.86	1009	119	2021
1370.00	55104.70	55664.80	370013.82	370377.27	5285331.65	5301598.48	1009	119	2021
1371.00	54509.80	55058.20	370067.42	370429.23	5285275.78	5301554.16	1009	119	2021
1372.00	53954.10	54448.60	370113.25	370485.62	5285326.44	5301600.44	1009	119	2021
1373.00	53521.50	53888.40	370167.08	370427.59	5285273.35	5296926.31	1009	119	2021
1374.00	53137.60	53463.30	370249.97	370477.33	5286721.86	5296982.44	1009	119	2021
1375.00	52761.90	53076.40	370298.52	370527.98	5286662.88	5296924.05	1009	119	2021
1376.00	52402.20	52705.70	370349.87	370579.09	5286719.60	5296978.70	1009	119	2021
1377.00	52027.00	52329.80	370399.43	370629.33	5286662.81	5296923.44	1009	119	2021
1378.00	51681.40	51971.60	370451.23	370681.17	5286721.59	5296979.02	1009	119	2021
1379.00	51314.40	51624.40	370500.58	370730.45	5286655.81	5296923.46	1009	119	2021
1380.00	50958.10	51269.80	370551.70	370784.69	5286713.48	5296977.90	1009	119	2021
1381.00	50590.20	50910.20	370598.68	370830.91	5286657.28	5296920.84	1009	119	2021
1382.00	50199.10	50541.60	370655.19	370881.13	5286707.52	5296970.29	1009	119	2021
1383.00	49853.10	50160.00	370712.83	370934.03	5287121.25	5296916.47	1009	119	2021

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1384.00	49502.70	49803.30	370761.13	370979.28	5287166.84	5296972.83	1009	119	2021
1385.00	49129.20	49440.20	370813.06	371030.65	5287119.71	5296912.58	1009	119	2021
1386.00	48769.90	49068.20	370864.30	371085.06	5287173.56	5296970.14	1009	119	2021
1387.00	48397.50	48713.50	370915.67	371132.09	5287114.45	5296911.42	1009	119	2021
1388.00	48019.90	48332.30	370968.10	371185.18	5287168.08	5296964.65	1009	119	2021
1389.00	47625.90	47918.60	371017.09	371234.11	5287109.85	5296904.86	1009	119	2021
1390.00	57469.00	57804.10	371067.80	371283.12	5287162.26	5296960.51	1005	116	2021
1391.00	57018.50	57414.70	371115.62	371348.86	5287113.40	5297413.59	1005	116	2021
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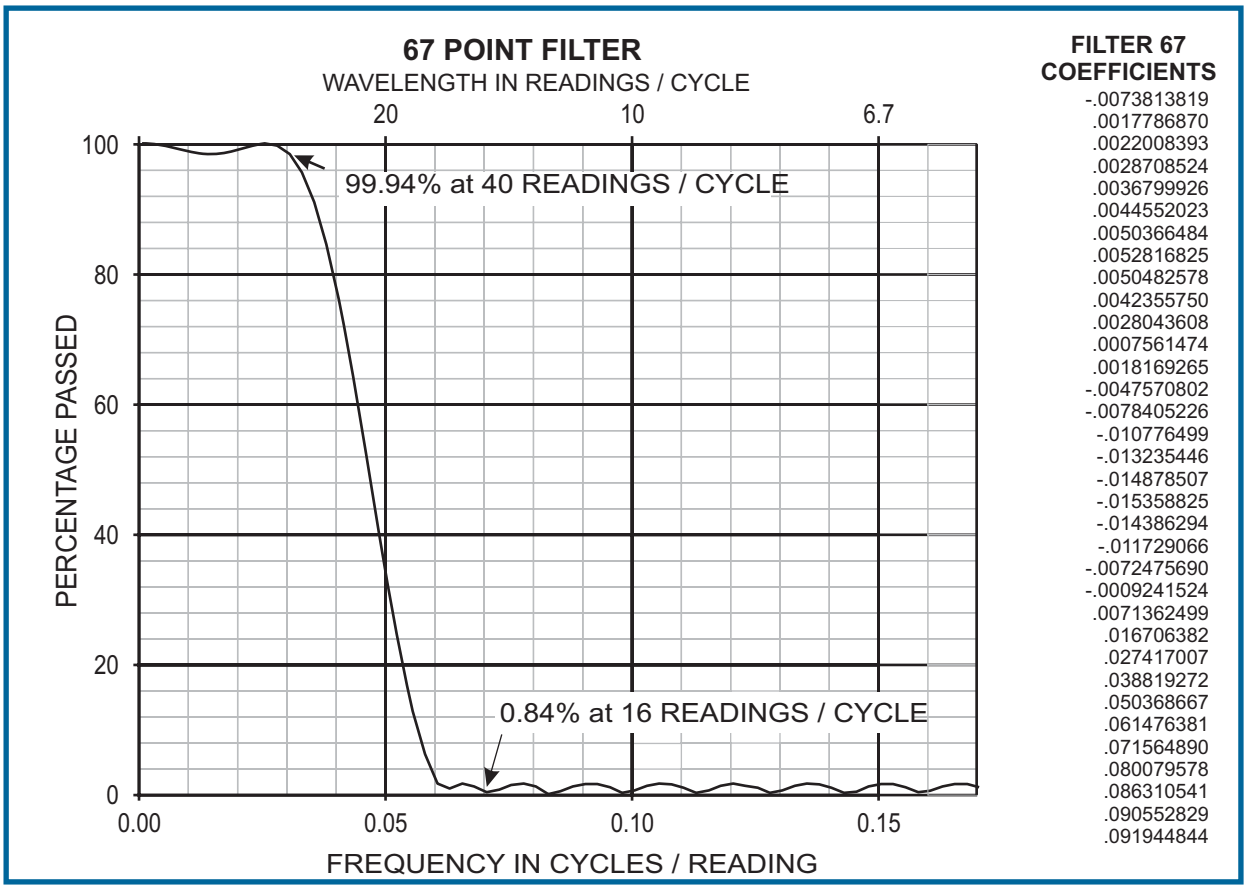
SGL

Appendix VII



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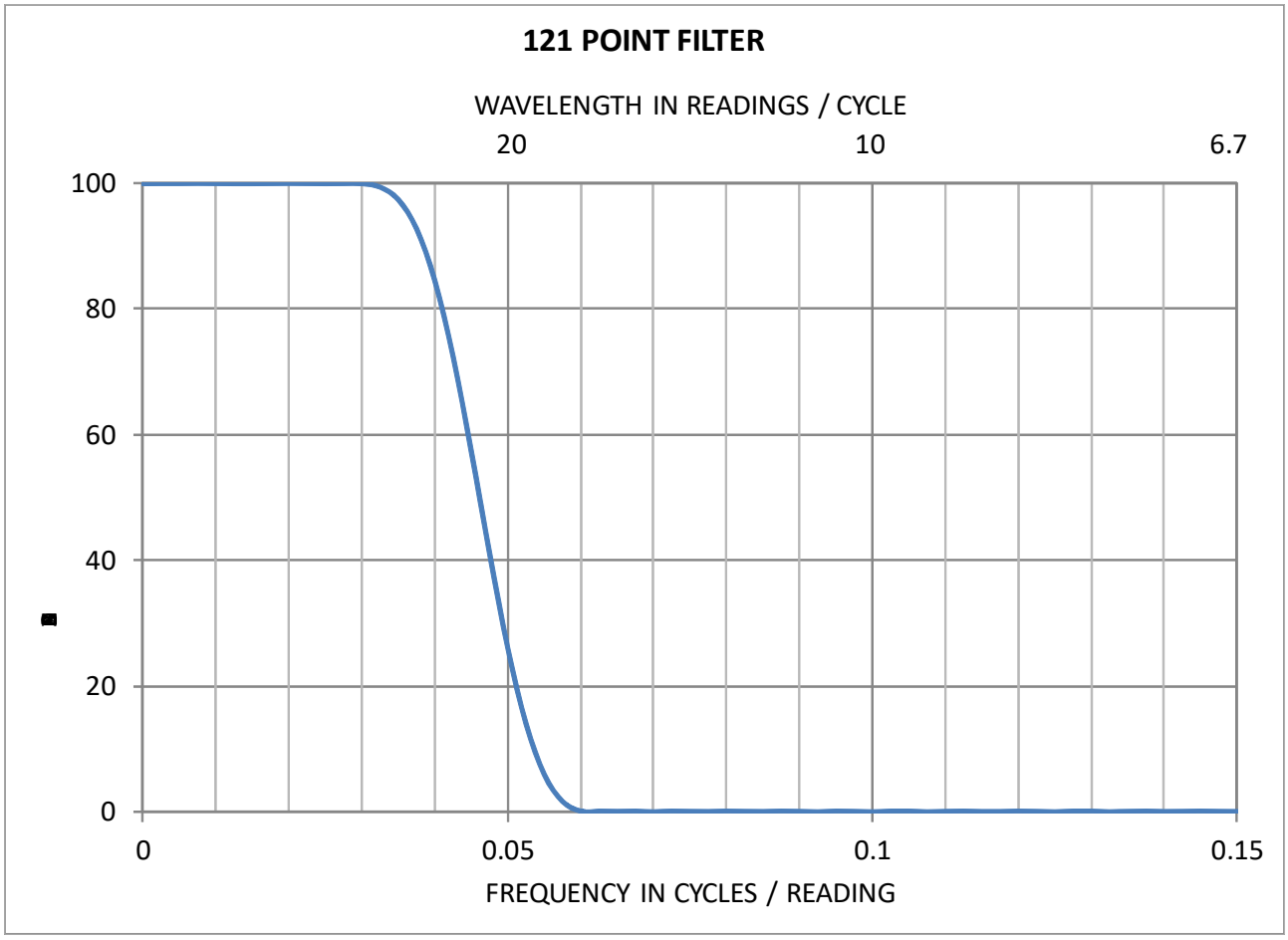
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FREQUENCY IN CYCLES / READING