Technical Report

Fixed-Wing High-Resolution Aeromagnetic, Gamma ray Spectrometric and Frequency-Domain Electromagnetic Survey

Tellus A9 Block, Republic of Ireland

2021

for

The Geological Survey, Ireland

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

Tel: +1 613.521.9626
Fax: +1 613.521.0215
www.sgl.com

PROFESSIONAL GEOSCIENTIST
MARTIN P. BATES
PRACTISING MEMBER
2330
ONTARIO

16 March 2022

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

Luise Sander, M.Sc.

Table of Contents

Index of Tables

Table of Figures

APPENDICES	
APPENDIX I	Company Profile
APPENDIX II	Planned Survey Lines
APPENDIX III	Survey Boundary Points
APPENDIX IV	Survey Equipment List
APPENDIX V	Survey Aircraft
APPENDIX VI	Weekly Reports
APPENDIX VII	Flown Survey Lines
APPENDIX VIII	Re-flights List
APPENDIX IX	Low Pass Filter Charts
APPENDIX X	Survey Lines with Diurnal Correction from GND1
APPENDIX XI	Spectral Components
APPENDIX XII	Shifting and Scaling List of Uranium Data
APPENDIX XIII	Digital Video Inventory

1. EXECUTIVE SUMMARY

Sander Geophysics Limited (SGL) conducted a fixed-wing high-resolution aeromagnetic, gamma-ray spectrometry and frequency-domain electromagnetic survey in the southern region of the Republic of Ireland for the Geological Survey of Ireland, covering County Cork with overlaps into Counties Limerick and Waterford. Please refer to Appendix I for a company profile of SGL.

The survey block “A9” is part of the ongoing Tellus Programme that commenced with the Tellus Airborne Geophysical survey of Northern Ireland in 2005/2006, conducted by the British Geological Survey (BGS), and the subsequent Tellus Border Survey in 2012 jointly administered by the GSI and the Geological Survey of Northern Ireland (GSNI).

The survey was conducted using SGL's De Havilland DHC-6 Twin Otter, registration C-GSGF. Production flights commenced on July 25, 2021 and were completed on September 21, 2021. A total of 46 flights were flown during the survey to complete the planned 18,047 line kilometers of the A9 block as determined using the ITM projection. Survey operations were conducted from Waterford airport (EIWF) for the entire A9 block.

The traverse lines were oriented N15°W and spaced at 200 m. The control lines were oriented N75°E and spaced at 2,000 m. The target clearance was 60 m above ground level, based on the Irish Aviation Authority (IAA) permit. The target average ground speed was 60 m/s, or 115 knots.

2. INTRODUCTION

This report describes the survey of the A9 Block flown by Sander Geophysics Limited (SGL) for the Geological Survey of Ireland (GSI) in the late summer of 2021. The survey was flown in the Republic of Ireland mainly in County Cork, with overlaps into Counties Limerick and Waterford.

Fixed-wing high-resolution aeromagnetic, gamma-ray spectrometric, and frequency-domain electromagnetic data were gathered during this survey. The instruments used to collect the data are described in **Section 4. Survey Equipment**, and the tests performed to calibrate instruments and to ensure optimal data quality are found in **Section 6. Ottawa Systems Tests** and **Section 7. A9 Block Systems Tests**.

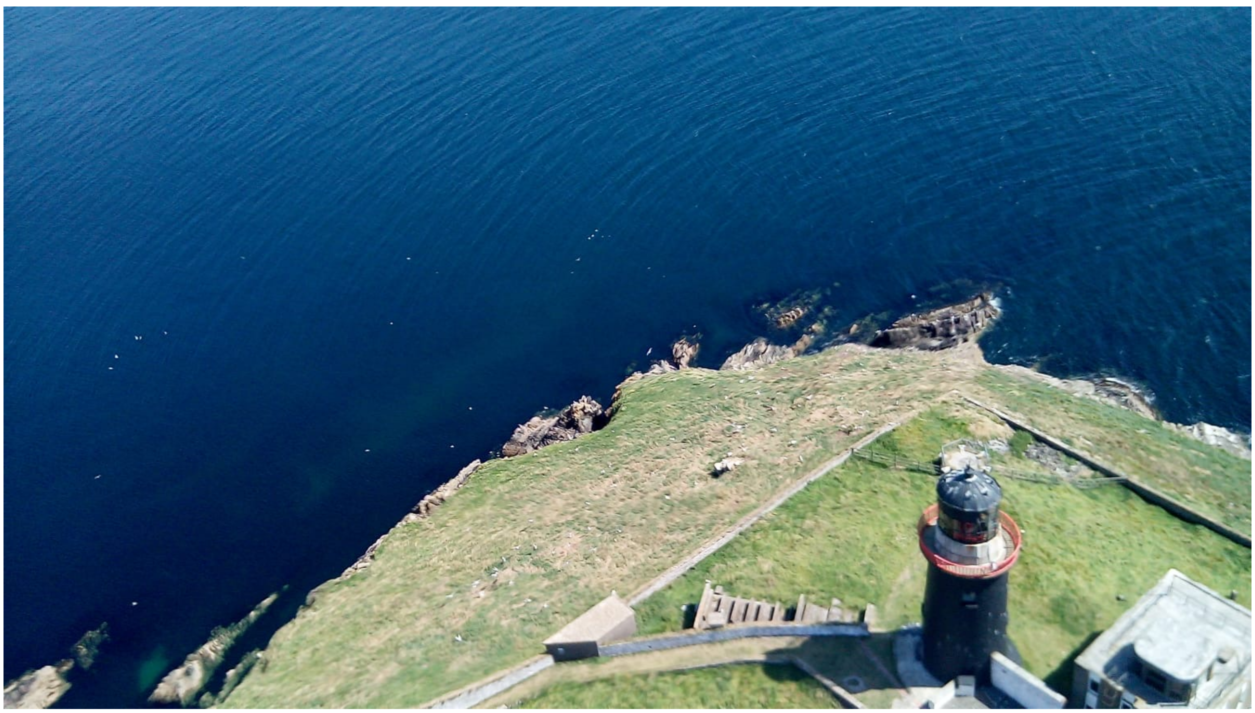


Figure 1: Ballycotton lighthouse in Ireland, located in the southeast corner of the A9 Block

Information relating to 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 8. Field Operations**. Re-flights are listed as well as the field crew members.

Details of data processing performed from data acquisition to final product creation are described in **Section 9. Digital Data Compilation**.

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

Table 1: Project Brief

Survey Title	Fixed-wing high-resolution aeromagnetic, gamma-ray spectrometric, and frequency-domain electromagnetic survey, Republic of Ireland
Client	Geological Survey Ireland (GSI)
Survey Location	Republic of Ireland
Survey Start Date	July 25, 2021
Survey End Date	September 21, 2021
Contact	Jim Hodgson (jim.hodgson@gsi.ie / tellus@gsi.ie)
Field Office Location	Dunmore East, County Waterford, Ireland
Airport Used	Waterford Airport (EIWF)
Aircraft Type	De Havilland DHC-6 Twin Otter
Total line kilometres	18,047 line kilometres
Survey Flying Particulars	
Block 1	
Traverse Lines	
Line numbers	9001 to 9232
Line direction	N15°W
Line spacing	200 m
Control Lines	
Line numbers	901 to 939
Line direction	N75°E
Line spacing	2000 m
Survey Altitude:	Target height of 60 m above ground. This number increased to 240 m over high fly zones and over built up areas outlined by the GSI.
Digital Terrain Source:	Shuttle Radar Topography Mission (SRTM)
Number of Flights (numbers)	46
Aircraft Target Ground Speed	60 m/s
Data	
Local Geomagnetic Declination/Inclination/Intensity	-16º 10’ / 69º 25’ / 53,160 nT
Survey Base Parking Location (datum WGS-84)	GND1: N52°11'23.5'' W07°04'47.2'' 83.7 m GND2: N52°09'21.0'' W07°00'39.5'' 107.6 m
Data Delivery Datum	IRENET95
Data Delivery Projection	Irish Transverse Mercator (ITM)

3. SURVEY AREA

The weather during the survey was partly sunny with broken cloud and intermittent heavy showers. High winds and fog were common.The area is mostly rural in character but contains a moderate amount of infrastructure including, towns, villages, farm houses, roads, railway lines, power lines and the city of Cork. The topography in the area slopes gently in altitude from the coast to over 400 m above sea level in the north east. *Figure 2* shows the geographical location of the survey are, and the planned survey lines are illustrated in *Figure 3* and listed in Appendix II

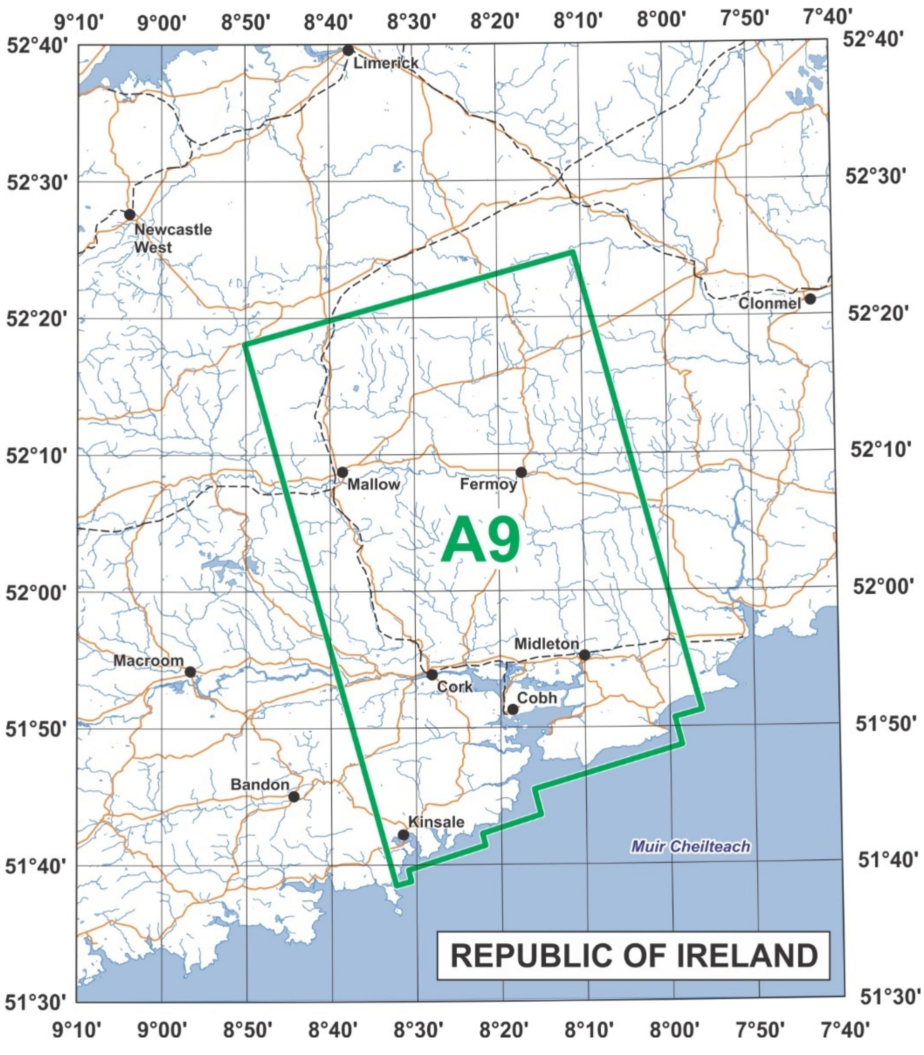


Figure 2: Survey location map of the A9 block

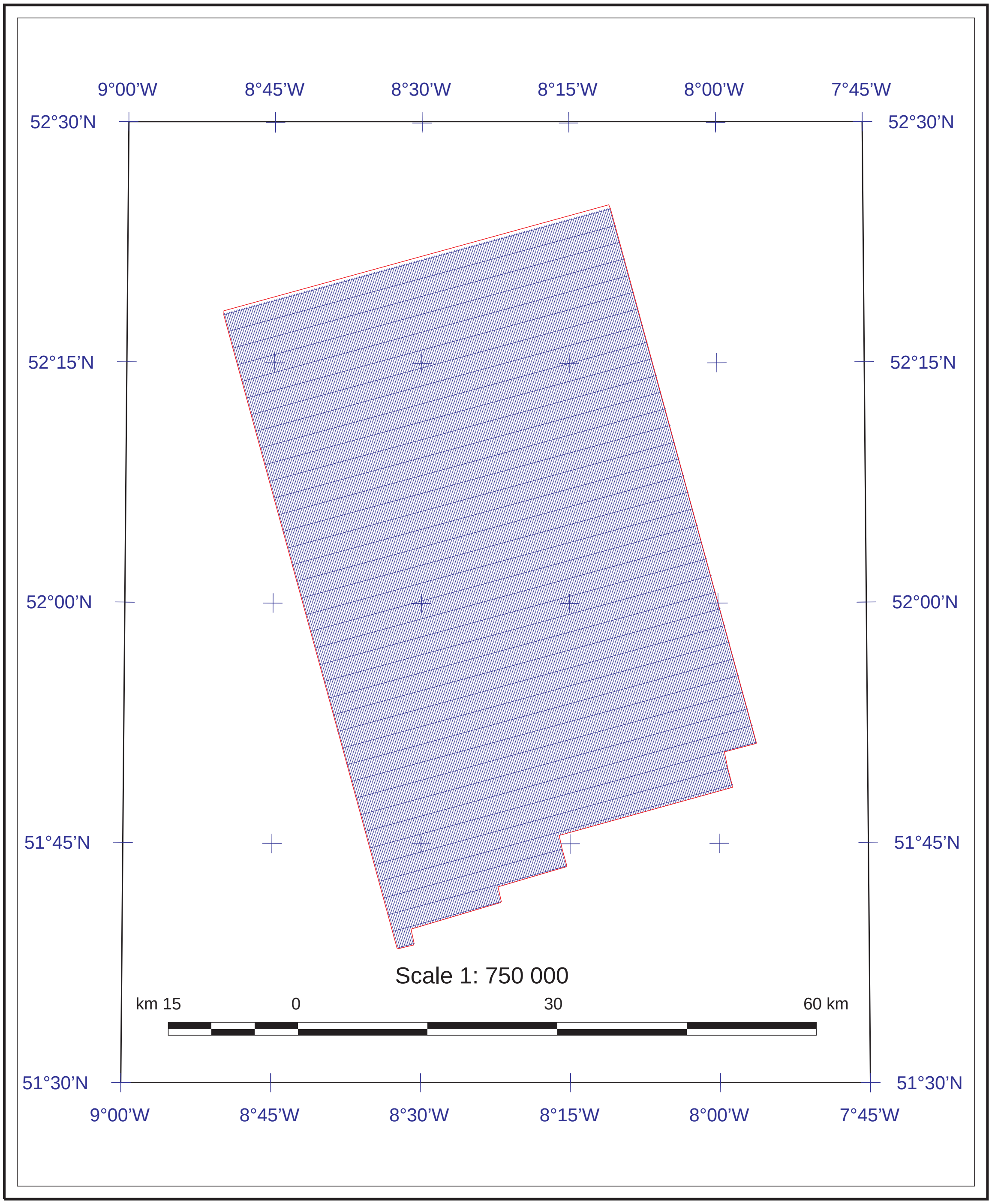


Figure 3: Planned survey lines

Survey Boundary

The survey boundary for the A9 block was defined from flight line end points. A full list of survey boundary points can be found in Appendix III. A simplified block boundary coordinate list is provided in *Table 2*.

Table 2: Survey block boundary (WGS-84 UTM Zone 29N)

Easting (m)	Northing (m)
511182.43	5794850.90
555607.01	5807498.42
555823.74	5807005.41
573210.27	5745423.56
573195.50	5745298.38
569531.66	5744292.14
570459.40	5740489.73
570484.25	5740187.63
550493.22	5734455.91
551408.72	5730948.09
551309.87	5730832.05
543465.66	5728442.67
543865.67	5726737.80
543768.99	5726634.56
533444.24	5723464.64
533811.27	5721817.71
533754.70	5721631.27
532007.97	5721194.77
531838.77	5721260.14
511166.86	5794375.67
511182.43	5794850.90

4. SURVEY EQUIPMENT

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

Frequency-Domain Electromagnetic (FEM) System

SGFEM four frequency (1) EM System (0.9, 3, 12, 24.5 kHz)

SGL's DHC-6 Twin Otter is configured with a four-frequency, wingtip mounted Frequency Electromagnetic (FEM) system that operates at four frequencies, 912, 3005, 11962 and 24510 Hz. This configuration results in a large transmitter-receiver coil separation which improves the signal to noise ratio. The transmitter-receiver coil pairs are mounted in a vertical-coplanar orientation which reduces noise by minimizing coupling with the wingtip surface. Additionally, the coils in any one set (transmitter or receiver) are axially offset and are kept adequately separated from each other. The system has a 40 Hz sampling rate which is later decimated to 10 Hz in the processing. The system is equipped with a power line monitor derived from the magnetic data, described in the section “Digital Data Compilation Magnetometer Data” that is particularly useful in identifying cultural interference when surveying in urban settings.

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. One airborne sensor was mounted in a fibreglass stinger extending from the tail of the aircraft and a second sensor was housed in the left FEM pod attached to the left wingtip. These magnetometers have a sensitivity of 0.005 nT and a range of 20,000 to 100,000 nT with a sensor noise of less than 0.02 nT. Total magnetic field measurements were recorded at 160 Hz in the aircraft then later decimated to 10 Hz in the processing. The ground systems recorded magnetic data at 11 Hz. For the primary purpose of the survey, the wingtip sensor is considered to be redundant.

Magnetic Compensation System

Sander Geophysics AIRComp

SGL's own hardware and software system, AIRComp, was used to remove the effects of the aircraft and its maneuvers from the recorded magnetic data. This system records the magnetic field measured by up to 4 cesium magnetometers, as well as the three axis output of a fluxgate magnetometer. These data are recorded for post-processing. Calibration of the magnetic effects of the aircraft is carried out as described in **Section 6. Ottawa Systems Tests**. Coefficients to be used for compensation are derived by processing the calibration flight data or from the survey data suitably screened to remove high gradient data. The compensation coefficients are applied to data recorded during normal survey operations to produce compensated magnetic data.

Gamma Ray Spectrometer System

Radiation Solutions RS-501 with Crystal Detector Packs RS5558, RS5557, RS5444, RS5632

The Radiation Solutions spectrometer system includes an on-board ADS computer for each crystal, providing real-time signal processing and analysis, and allowing automatic gain control for individual crystals using the natural thorium peak, and multi-channel recording and analysis. The system utilizes 16 downward-looking and 3 upward-looking parallelepiped NaI (Tl) crystals of 4.2 L each for a total downward volume of 67.2 litres and upward volume of 12.6 litres. The crystals are housed in four detector packs, four downward crystals in each pack and one upward crystal in three of the packs. Data were recorded in 1024 channel spectral mode and windowed data mode at an interval of 1 s.

Airborne Navigation and Data Acquisition System

Sander NavDAS

The NavDAS is the latest version of airborne navigation and data acquisition computers developed by SGL. It displays all incoming data on a flat panel screen for real-time monitoring. The data are recorded in database format on a solid-state internal hard drive and a removable hard drive simultaneously for transfer of data to the field office. The computer incorporates a magnetometer coupler, an altimeter analogue to digital converter and a GPS multi-frequency receiver NovAtel OEMV tracking 14 GPS Satellites, 12 GLONASS Satellites, 2 SBAS and 1 L Band which automatically provides the UTC time base for the recorded data. In addition to providing essential post-mission positional data, the NavDAS computer processes user-received GPS or real-time differentially corrected GPS (RDGPS) data and compares the data to the coordinates of a theoretical flight plan in order to guide pilots along the desired survey line in three dimensions.

SG102 AHRS

The SG102 is an Attitude Heading Reference System (AHRS). It comes with a selectable speed ARINC 429 output, which allows us to interface our SGDAS. It is a solid-state three-axis instrument certified for primary heading reference and standby attitude. The SG102 system includes a sealed magnetic transducer (magnetometer) for stabilized magnetic heading (accuracy of +/- 1deg magnetic). Heading, Pitch and roll information (0.25 degrees typical) are recorded for post processing of geophysical data.

Reference Station Acquisition System

Sander Geophysics MSGRef

The reference station system MSGRef consists of a ground data acquisition computer with a Sander magnetometer frequency counter to process the signal from the magnetometer sensor and from the GPS receiver. The noise level of the station magnetometer is less than 0.1 nT. The time base (UTC) of both the ground and airborne systems is automatically provided by the GPS 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 GPS data, sampled at 10 Hz, are recorded on the internal hard drive of the computer and the removable hard drive simultaneously for transfer to the processing computers in the field office. The entire reference data acquisition system is fully automatic and was set for unattended recording.

Reference Station GPS Receiver

NovAtel OEMV-3 receiver board

The OEM3 is a high performance, high accuracy, dual-frequency GPS receiver that is capable of receiving and tracking the L1 C/A code, L1 and L2 carrier phase, and L2 P-code (or encrypted Y-code) of up to 24 GPS satellites. The GPS data are recorded at 10 Hz.

Digital Video System

SGDIS - Sander Geophysics Digital Imaging System

The video camera is mounted in the floor of the aircraft and oriented to look vertically below while in flight. Real time text annotation of position, flight information and fiducial marking are incorporated for flight path verification. The data are stored, by flight line, in avi format, viewable by any commercial media player.

Altimeters

SGLas-P - Riegl LD90-3300VHS-FLP Laser Rangefinder

The Riegl laser altimeter is an eye safe laser, has a range of 338 m, a resolution of 0.01 m with an accuracy of 5 cm and a 20 Hz data rate.

Collins AL-101 Radar Altimeter

The Collins radar altimeter has a resolution of 0.5 m, an accuracy of 5%, a range of 0 to 408 m., and a 10 Hz data rate. This system is actively employed for survey guidance and data acquisition.

Honeywell Barometric Pressure Sensor

The barometric pressure sensor measures static pressure to an accuracy of ± 4 m and resolution of 2 m over a range up to 30,000 ft. above sea level. The barometric altimeter data is sampled at 10 Hz.

Air Temperature Sensor

Omega RTD-805 Outside Air Temperature Probe

The outside air temperature is measured at 10 Hz with a resolution of 0.1º C. The temperature sensor has a range of +/-100º C and an accuracy of +/-0.2º C. The temperature sensor is mounted in an air inlet duct at the point where the wing strut attaches to the right-hand wing.

Survey Aircraft

De Havilland DHC-6 Twin Otter (C-GSGF)

The De Havilland DHC-6 Twin Otter (C-GSGF) is an all metal, high-wing, twin-engine, short takeoff and landing (STOL) aircraft. It is powered by two Pratt & Whitney Canada PT6A-27 engines that run a constant speed, fully feathering, and reversible propeller. The PT6 turbine engines provide ample power for climbing over steep terrain, working at altitudes up to 7,000 m and can withstand frequent rapid power changes. The aircraft is highly manoeuvrable, rugged in design, and can be flown at speeds from 80 to 160 knots. The low stall speeds and abundant available power make the Twin Otter a safe and effective aircraft for surveys requiring flying over rough topography, low air speeds or flights at high altitude. The aircraft has fixed gear, extendable flaps and manually adjustable trim tabs on the primary controls for the roll and pitch axes and full rudder trim for the yaw axis. The aircraft is equipped with full de-icing equipment and sufficient avionics for instrument flying, including a flight control system. Supplementary fuel can be added for transoceanic flight. The Twin Otter is certified for IFR flights in known icing conditions. *Figure 4* shows a photo of the De Havilland DHC-6 Twin Otter aircraft on the ground.

Figure 4: SGL's Twin Otter, Registration C-GSGF

The SGL Twin Otter is fully equipped for airborne magnetic, radiometric and frequency-domain Electromagnetic (FEM) surveys. EM fields are measured with the SGL frequency-domain EM system (SGFEM). The four-frequency FEM transmitter is located in the right wingtip FEM pod, and the receiver is located in the left wingtip FEM pod. The magnetic field is measured by up to two sensors allowing for horizontal gradient with one sensor in the composite tail stinger and one in the left wingtip FEM pod. The Twin Otter can carry up to 79.8 litres of detector crystals for gamma-ray spectrometer surveys. The aircraft conforms to Canadian aeronautical regulations in survey configuration. See Appendix V.

Data Processing Hardware and Software

Processing was performed on high performance desktop computers optimized for processing tasks. SGL's proprietary geophysical software was used for data processing.

5. SURVEY SPECIFICATIONS

Data Recording

In the aircraft:

- GPS positional data (time, latitude, longitude, altitude and raw range from each satellite being tracked) 10 readings per second (10 Hz);
- Altitude as measured by the barometric altimeter at 10 readings per second (10 Hz);
- Terrain clearance as measured by the radar altimeter at 10 readings per second (10 Hz);
- Terrain clearance as measured by the laser rangefinder at 20 readings per second (20 Hz);
- Total magnetic field recorded at 160 readings per second (160 Hz);
- Airborne gamma ray data recorded in windowed and 1024 channel spectral format at 1 reading per second (1 Hz);
- Outside air temperature at 10 readings per second (10 Hz);
- Digital video at 30 frams per second (30 Hz);
- Electromagnetic in-phase and quadrature components for four frequencies (912, 3005, 11962 and 24510 Hz designated as P09, Q09, P3, Q3, P12, Q12, P25 and Q25 respectively) recorded at 40 Hz.

At the base and remote magnetic/GPS reference stations:

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

Technical Specifications

The following technical specifications were adhered to:

- The horizontal accuracy of the final flight path after correction shall typically be +/- 0.5 m.
- Traverse lines with deviation greater than 40 m from the planned line over a distance of 2.5 km or more, or greater than 80 m from the planned line over any distance, will be re-flown (except where ground conditions dictate otherwise).
- Tie lines with deviation greater than 80 m from the planned line over a distance of 2.5 km or more, or greater than 160 m from the planned line over any distance, will be re-flown (except where ground conditions dictate otherwise).
- Lines where terrain clearance exceeds +/- 20 m from the nominal survey height for more than 2.5 km or 40 m form the nominal survey height at any time on any line will be re-flown (unless local topography makes it unavoidable).
- The average flying speed for the survey aircraft is 116 knots or 60 m/s and should not be exceeded by more than 30% for more than 2.5 km.
- The aircraft shall be equipped with a survey magnetometer fitted according to the manufacturer's specification, with a resolution of 0.001 nT and a noise envelope of <0.1 nT.
- The aircraft magnetic heading error after compensation shall be less than +/- 1.0 nT on reciprocal survey headings.
- The envelope sum of the compensation maneuvers shall not exceed 3 nT.

- During data acquisition magnetic variations recorded at the local base magnetometer should not exceed 12 nT over any 3-minute chord or exceed 2 nT over any 30 second chord, on flight lines or tie lines.
- Relative count rates above background during the pre/post flight source tests will be within two standard deviations of the average sample checks for the survey.
- The average line gamma spectra for any line should not appear anomalous by comparison with previously acquired data.
- The calculated PDOP should be <6 and more than 4 satellites should be available.
- If both primary and secondary GPS base stations fail to record for 30 minutes or more simultaneously the affected lines will be re-flown.
- If both primary and secondary magnetic base stations fail to record for 30 minutes or more simultaneously the affected lines will be re-flown.
- The calibration of the EM system should not deviate significantly from the norm.

Flight Specifications

The survey area flight line specifications are provided in *Table 3* (line direction is with respect to the UTM zone reference frame).

Table 3: Flight line specifications

	Line Direction	Line Spacing (m)
Traverse Lines	N15°W	200
Control Lines	N75°E	2,000

Terrain Clearance

Flying guidance was provided primarily by SGNav, a flexible and simple navigation system specifically designed by SGL for the airborne geophysical environment. Following the pre-planned survey lines, SGL's SGNav system guides the pilots from their point of departure to the start of a specific line, directs them along the survey line, and then to the next line or any other line of their choosing. While flying along a line, the SGNav system shows the pilots the correct x and y location and their altitude on a small LCD screen mounted in the pilot's line of vision.

Additional navigation parameters are displayed, such as DTS (distance to start of line), DTE (distance to end of line), TMG (track made good), SPD (aircraft ground speed), XHT (up/down error), DTK (desired heading), TTS (time to start of line), TTE (time to end of line), TKE (track error).

The target height was set to 60 metres above ground level in accordance with the IAA permit. The altitude measurements were provided by an aviation radar altimeter. The system is equipped with a safety pull up mode that warns the pilots if the clearance is below a pre-determined height, set at 50 metres above ground level in this case. Each survey line is flown as close to the target height as possible so as to maximize the quality and coverage of the frequency-domain EM data which drops off rapidly in signal strength with distance from the source. FEM data quality is very good up to altitudes of about 75 m above ground whilst data collected above 150 m is usually unreliable due to reduced coupling. For this reason, the altitude in adjacent lines and at intersections of lines is not consistent, as would normally be preferred for aeromagnetic data acquisition.

A Garmin GNS430/530 was employed as a second guidance system for this survey with dual receiver navigation system that uses a Jeppesen NavData database. A Garmin was installed on each pilot's yoke that displayed the survey lines and also let the pilots know which lines have already been flown. Another important use for this GPS system was to mark pre-determined areas that pilots had to avoid flying low over. This included towns, farms, equestrian centres etc. Each pre-determined high-fly area had a buffer around it to allow the plane to climb to a higher altitude before reaching the area. The method for dealing with areas to be avoided is discussed in more detail in the Public Relations and Flying section below.

Public Relations and Flying

A public relations (PR) campaign was set up by GSI to inform the public about the Tellus survey. A website was set up showing the survey area and the layout of the flight lines, along with some information about the survey. Each week the website was updated with lines that SGL planned to fly that week. This information was submitted to the PR representatives each week by the crew. There was also a phone hotline set up where the public could call with concerns, usually issues related to low flying. People also had the option to become a 'notify' or a 'high-fly'. The people on the 'notify' list were notified before each day that SGL planned to fly over their property. The people on the 'high-fly' list were generally not notified but the plane flew at 214 m or 700 ft over their property to avoid disruption of people and animals. In such a case the person gave the GPS coordinates of their property to the PR group, who in turn passed it along to the crew. This polygon was then input into the Garmin GPS along with a buffer area. This allowed the pilots to see the areas they needed to avoid during the flight and plan accordingly. High-Fly polygons, to be flown at 305 m or 1000 ft, were also made for large towns and cities (with a population of 2000 people or greater) without previous request from any specific person. In some cases, the pilots climbed over a built-up area that was not marked in their GPS to avoid complaints from the public.

6. OTTAWA SYSTEMS TESTS

Altimeter System Tests

Radar And Laser Altimeter Calibration

A test flight to calibrate the radar and laser altimeters was flown on June 9, 2020 at Gatineau Airport, Gatineau, QC. Five passes were conducted over the runway at heights from 40 to 120 m above ground at various levels. The altimeter values were compared to the post-flight differentially corrected GPS altitude information for calibration. An ideal altimeter would yield a slope of 1 and an intercept of 0. The Collins radar altimeter slope was 0.9990 and the intercept -0.6215 m. The laser altimeter slope was 1.0020 and the intercept was 0.1228 m. These results are within the expected accuracy of the altimeters. Please refer to *Figure 5* which illustrate the results of the altimeter test.

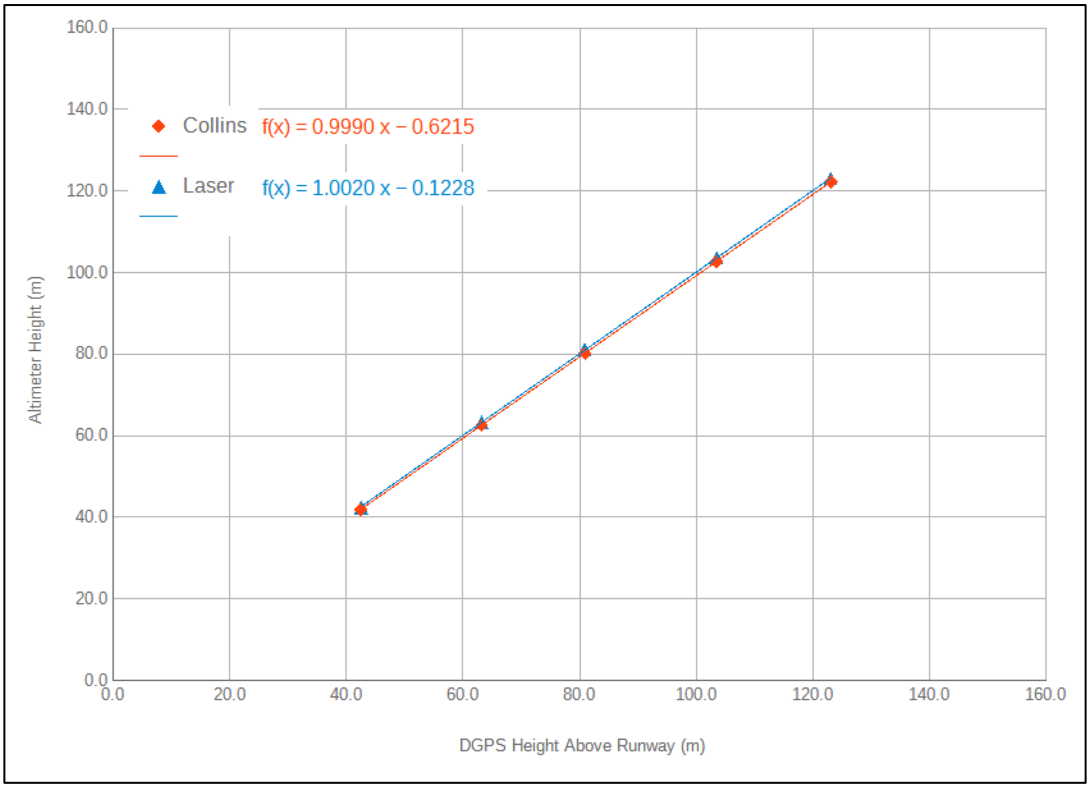


Figure 5: Altimeter test

Magnetometer System Tests

Magnetometer Heading Test

On June 16, 2020, before the aircraft ferried to Ireland, a heading test was performed over the Morewood test site in Ontario, Canada. The heading test flight lines were pre-planned, and reference ground magnetic data were obtained through the use of the SGL head office reference station.

Heading errors are calculated as the difference in variation from the average between data acquired when flying in opposite directions. The results of the heading test are presented in *Table 4*. The test determined an average north-south heading error of 0.83 nT and an average east-west heading error of 1.45 nT for the tail magnetometer. The heading error remains consistent through the duration of the survey, and is fully corrected in the normal airborne magnetic data during processing.

No heading test result is reported for the wingtip magnetometer.

Table 4: Tail magnetometer heading test

Aircraft type:	DHC6 Twin Otter	Date:	June 16, 2020
Registration:	C-GSGF	Height flown:	1500 ft AGL
Field Location:	Republic of Ireland	Magnetometer type:	Geometrics G-822A
Organization:	Sander Geophysics	Compensator:	SGL AIRComp
Pilot:	Todd Svarckopf	Sampling rate:	10/s
		Data acquisition system:	Sander SGDAS-3
Line #	**Direction**	**Diurnally and IGRF Corrected Data (nT)**	**Variation From Average**
2001.02	N	5.16	0.44
2001.01	S	4.20	-0.52
201.02	E	5.79	1.07
201.01	W	3.61	-1.11
2001.04	N	5.05	0.33
2001.03	S	4.35	-0.37
201.04	E	5.15	0.43
201.03	W	4.43	-0.29
Average		4.72	
Average Traverse Line Heading Error		0.83 nT	
Average Control Line Heading Error		1.45 nT	

Compensation Calibration

Compensation calibrations determine the magnetic influence of aircraft and its maneuvers. During the compensation calibration flight, the aircraft performs sets of three pitches (+/-5º), rolls (+/-10º), and yaws (+/-5º), while flying in the four flight line directions at high altitude over a magnetically quiet area. The coefficients calculated from the calibration are applied to the acquired magnetometer data to measure the effectiveness of the compensation system in mitigating the magnetic interference.

The total compensated signal noise resulting from the twelve maneuvers, referred to as the Figure of Merit (FOM), is calculated from the maximum peak-to-peak value resulting from each maneuver. A compensation calibration was performed on June 9, 2020 for the tail magnetometer before the aircraft left Ottawa. *Table 5* shows the compensation calibration test result for the tail magnetometer. See *Figure 6* for an illustration of the compensated and uncompensated data acquired during the compensation calibration.

Table 5: Magnetic compensation calibration test and results

Date	FOM (nT)
June 9, 2020	0.73

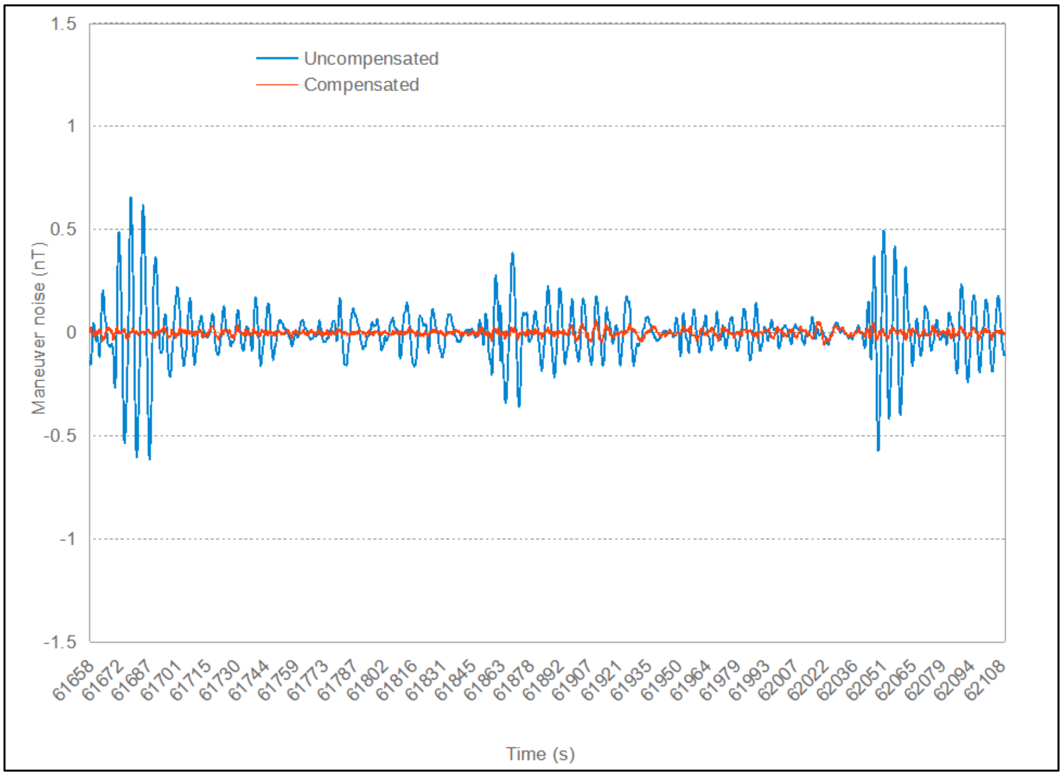


Figure 6: Tail magnetometer compensation calibration test, June 9, 2020

Spectrometer System Tests

Ground Calibration Pads Test

The stripping ratios for the gamma-ray spectrometer were determined on July 7-8, 2020 before the aircraft departed Ottawa. The Geological Survey of Canada (GSC) calibration pads, which are stored at the SGL hangar in Ottawa, were used. The tests were performed with the detectors installed in survey configuration on board the aircraft. Each detector was tested separately and the test results were averaged to create stripping ratios for this system. See *Table 6* for a complete list of stripping ratios.

The following procedure was carried out:

- Pre-pads source test, one thorium source below pack;
- Pads test carried out in order: background, potassium, uranium, and thorium (seven minutes recording each);
- Post-pads source test, one thorium source below pack.

Table 6: Spectrometer stripping ratios

	Crystal Pack A	Crystal Pack B	Crystal Pack C	Crystal Pack D	Overall System
Thorium into Uranium (α)	0.2782	0.2788	0.2761	0.2797	0.2782
Thorium into Potassium (β)	0.4215	0.4262	0.4081	0.4175	0.4183
Uranium into Potassium (γ)	0.7931	0.7961	0.7739	0.7647	0.782
Uranium into Thorium (a)	0.0429	0.0497	0.0443	0.0443	0.0453
Potassium into Thorium (b)	0	0	0	0	0
Potassium into Uranium (g)	0.0078	0.0033	0.0018	0	0.0032

Attenuation Test

The exponential height attenuation coefficients for the spectrometer were calculated using the data acquired during a pre-survey test flight over the GSC test range at Breckenridge, Quebec near Ottawa on May 16, 2018. The calibration flights were carried out from approximately 150 m to 300 m mean terrain clearance at 15 m and 30 m intervals. A series of background measurements were made by flying the same altitudes over the Ottawa River to determine the background due to cosmic radiation, radon decay products in the air and the radioactivity of the aircraft and equipment.

After correction for background and stripping, the variation in count rate with effective height was used to determine the attenuation coefficients shown in *Table 8*. The data from the test that is corrected to 60 m above the ground using these coefficients are given in *Table 7*. Results of the attenuation test are shown in *Figure 7*.

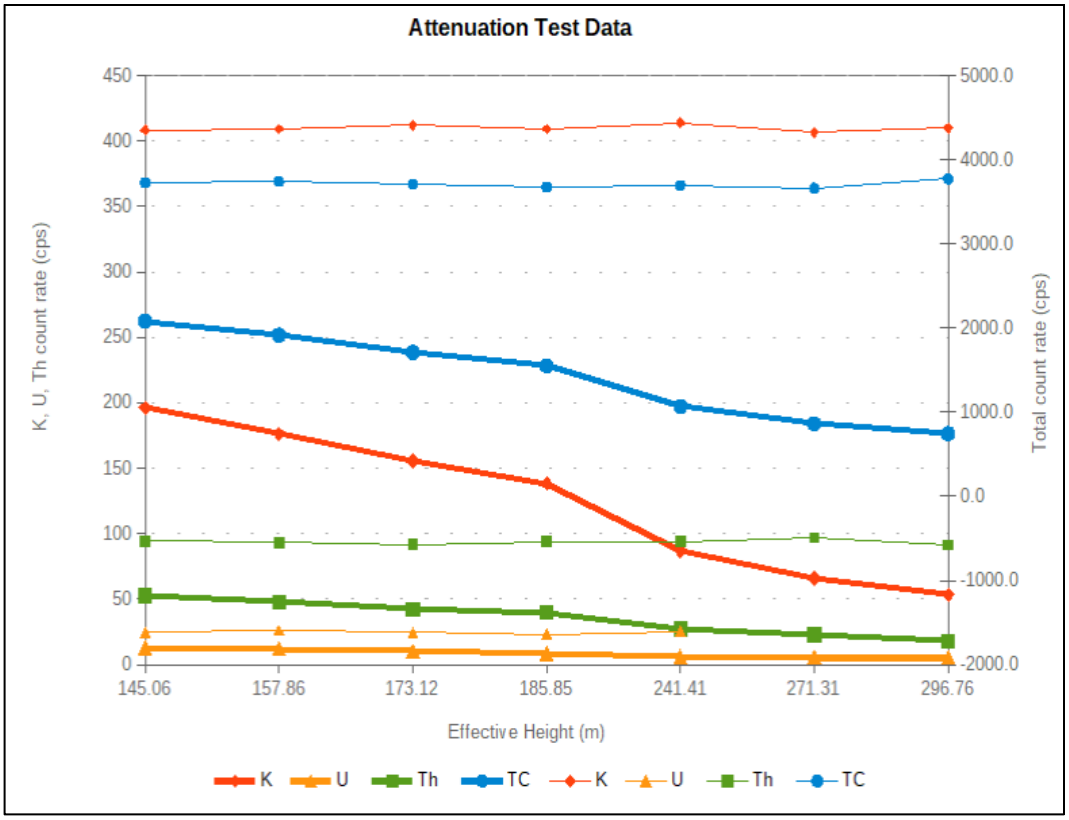


Figure 7: Spectrometer attenuation test: thick lines are recorded data, thin lines are data corrected to an effective height of 60 m using the attenuation coefficients derived.

Table 7: Spectrometer calibration test data – height corrected values (at 60 m effective height)

Altitude at STP (m)	Total Counts (cps)	Potassium (cps)	Uranium (cps)	Thorium (cps)
296.76	3772.1	409.8		91.3
271.31	3661.0	406.5		96.9
241.41	3694.5	414	25.3	93.9
185.85	3674.8	408.9	23.1	93.9
173.12	3708.0	411.9	24.6	91.8
157.86	3741.2	409.1	26.2	93.4
145.06	3725.9	408.2	24.6	94.5

Table 8: C-GSGV Spectrometer calibration test data

	Coefficients (m^{-1})
Total	-0.006849
Potassium	-0.00861
Uranium	-0.007837
Thorium	-0.006836

System Sensitivity

A pre-survey test flight to determine the gamma ray spectrometer sensitivity was carried out over the GSC test range at Breckenridge, Quebec on May 16, 2018 (the same test flight performed to determine attenuation). The test flight served to determine system sensitivities through comparison of airborne data with data acquired on the ground.

The ground measurements were made using an Exploranium portable gamma-ray spectrometer, acquired at 25 different sites along the 10 km length of the calibration range. Measurements were also made using the portable spectrometer on a boat on the Ottawa River to determine background radiation due to cosmic radiation, radon decay products in the air and any radioactivity of the equipment. The background was subtracted from the ground measurements and the ground concentrations of potassium, uranium and thorium were determined by calibration of the portable spectrometer using the GSC calibration pads located at Ottawa Airport.

The sensitivities of the airborne system for potassium, equivalent uranium, and equivalent thorium were calculated by dividing the average count rates corrected to an effective height of 60 m above ground by the measured ground concentrations. The results are presented in *Table 9*.

Table 9: Spectrometer system sensitivities

	Average counts at 60 m (cps)	Ground Concentrations	Sensitivities
Potassium	409.8	1.79%	228.93 cps/%
Equivalent Uranium	24.7	1.04 ppm	23.79 cps/ppm
Equivalent Thorium	93.7	7.61 ppm	12.31 cps/ppm

7. A9 BLOCK SYSTEMS TESTS

Magnetometer System Tests

Compensation Calibration

Compensation calibrations determine the magnetic influence of the aircraft and its manoeuvres. During the compensation calibration flight, the aircraft performs sets of three pitches (+/-5º), rolls (+/-10º), and yaws (+/-5º), while flying in the four flight line directions at high altitude over a magnetically quiet area. The coefficients calculated from the calibration are applied to the acquired magnetometer data to measure the effectiveness of the compensation system in mitigating the magnetic interference.

The total compensated signal noise resulting from the twelve manoeuvres, referred to as the Figure of Merit (FOM), is calculated from the maximum peak-to-peak value resulting from each manoeuvre. A compensation flight was performed on May 6, 2021 at high altitude over the sea. *Table 10: Magnetic compensation calibration test and results* shows the compensation calibration test results for the tail magnetometer. See *Figure 8* for an illustration of the compensated and uncompensated data acquired during the test.

No compensation calibration result is reported for the wingtip magnetometer which is considered redundant.

Table 10: Magnetic compensation calibration test and results

Date	Flight	FOM (nT)
May 6, 2021	1045	0.73

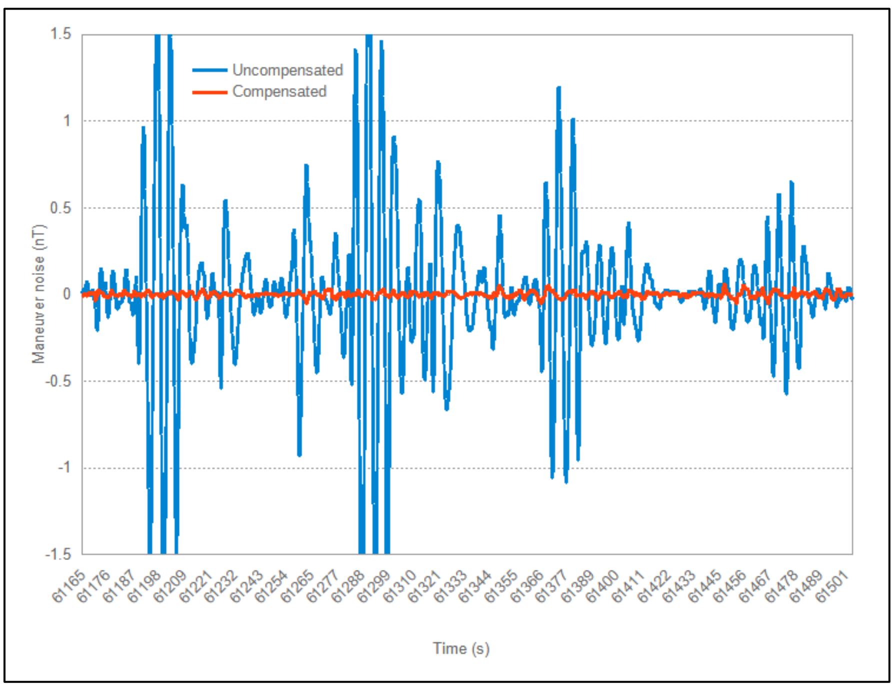


Figure 8: Tail magnetometer compensation calibration test, May 6, 2021

Spectrometer System Tests

Cosmic and Aircraft Background

A cosmic and aircraft background test was performed for the spectrometer on October 9, 2020, over the sea near Waterford. The test flight consisted of flying at heights of approximately 1500 m to 3500 m above sea level at 300 m intervals, recording between 3 and 6.5 minutes of data at each altitude. Coefficients are determined by linear regression of cosmic counts versus each spectral window as described in the IAEA Report 323 (1991). *Table 11* lists the computed cosmic and aircraft background coefficients. *Figure 9* shows the cosmic test results.

Table 11: Cosmic Coefficients

	Cosmic Stripping Factor	Aircraft Background (cps)
Total	1.3020	10.4565
Potassium	0.0694	20.6617
Uranium	0.0585	-4.5696
Thorium	0.0648	-5.2725
Upward	0.0112	-0.7836

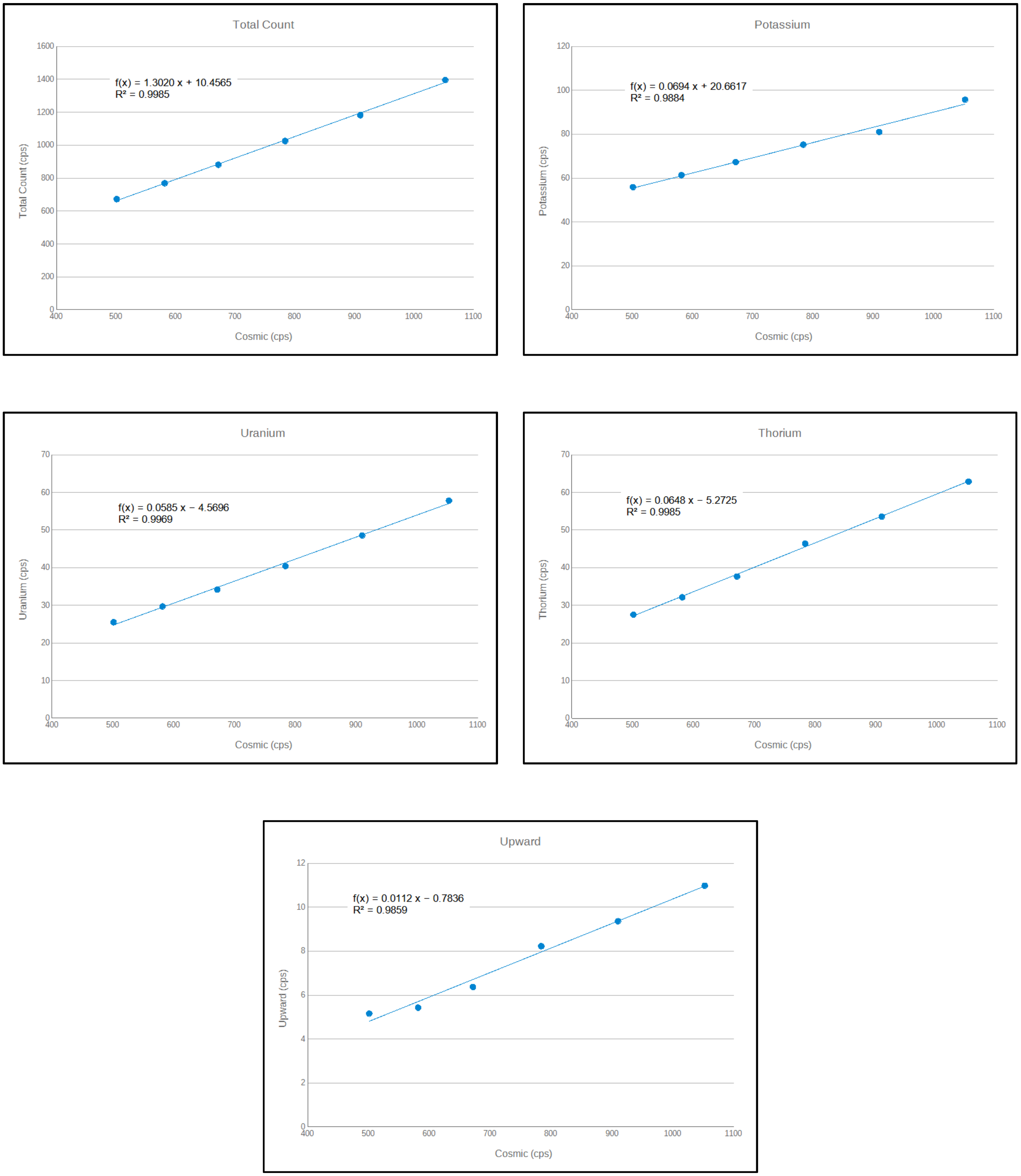


Figure 9: Cosmic test results

Radon Background Calibration

Radon background was monitored through the use of three upward looking detectors. Coefficients relating the count rate in the uranium window from the upward detectors to the count rate in the potassium, uranium, thorium and total count windows from the downward facing detectors were determined using several test lines flown over areas of water that were acquired during operations for the A5 and A6 Blocks that were flown in 2018 and 2019. Due to a paucity of suitable bodies of fresh water of sufficient size, data was acquired over the upper reaches of Bantry Bay and the Kenmare River Estuary where it was expected that the influence of the freshwater rivers would be strongest. See *Figure 10*.

Figure 10: Location of radon calibration sites over upper Bantry Bay and upper Kenmare River Estuary

The data was also acquired at altitudes of 235 to 320 m above the water to alleviate any effects from potassium that may have occurred due to the influence of sea water.

The cosmic and background corrected data from each of the up (u_r), thorium (T_r), potassium (K_r) and total (I_r) windows are plotted against the counts in the uranium (U_r) window for each over water line flown. The coefficients determined are presented in *Table 12*. Linear regressions of these plots provide the calculated radon coefficients and are shown in *Figure 11*.

Table 12: Calculated radon correction coefficients

	a	b
$I_r = a_I U_r + b_I$	21.0725	52.0705
$K_r = a_K U_r + b_K$	1.6125	3.0601
$T_r = a_T U_r + b_T$	-0.002	1.8466
$u_r = a_u U_r + b_u$	0.2124	0.5877

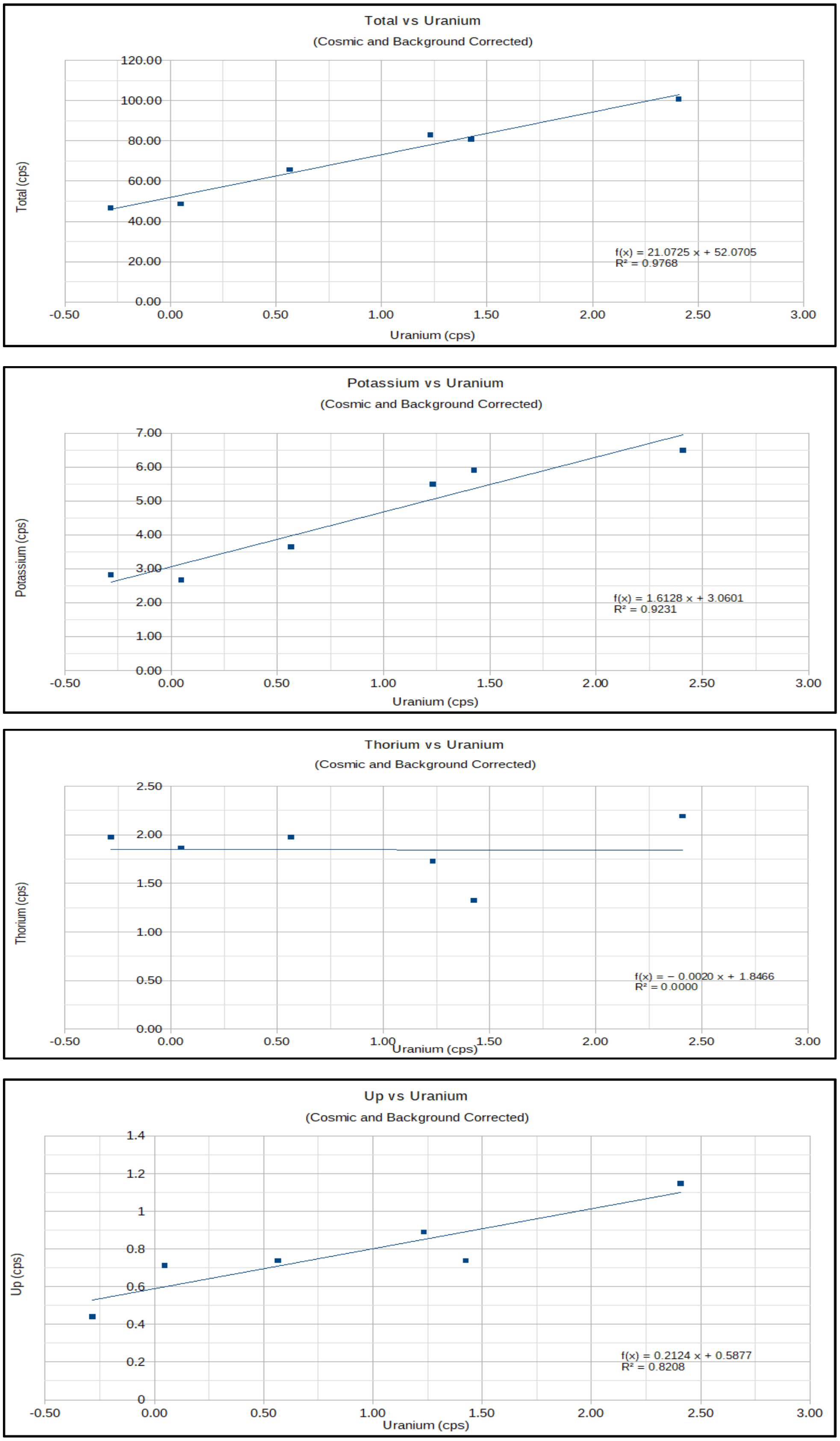


Figure 11: Radon test results

Ground Component

The ground component coefficients are used to quantify the response of the upward looking detector to radiation from the ground using the technique described in IAEA Report 323. This involves computing two coefficients based on the counts in the uranium and thorium windows as follows:

$$u_g = a_1 U_g + a_2 T_g$$

where: u_g is the upward window count from the ground
U_g is the downward uranium window count
T_g is the downward thorium window count
a_1 and a_2 are the ground coefficients

The ground component coefficients are determined from the full survey data set and those used for this project are listed in *Table 13*

Table 13: Spectrometer ground component coefficients

a_1 (uranium)	a_2 (thorium)
0.032891	0.024257

Daily Source Tests

Thorium and uranium source tests were performed at the start and end of each production day. A source was positioned beneath each crystal pack. Data from the thorium, uranium, and background windows were recorded for 180 seconds during each test. Operations were conducted from the Waterford Airport. Recorded data were dead-time and background corrected and statistics were compiled (see *Figure 12* and *Figure 13*). The data is split into two groups that reflect different procedures that were employed. Thorium and Uranium source test results were within +/-5% of the mean value. The coherence of the data indicates that the system is operating correctly.

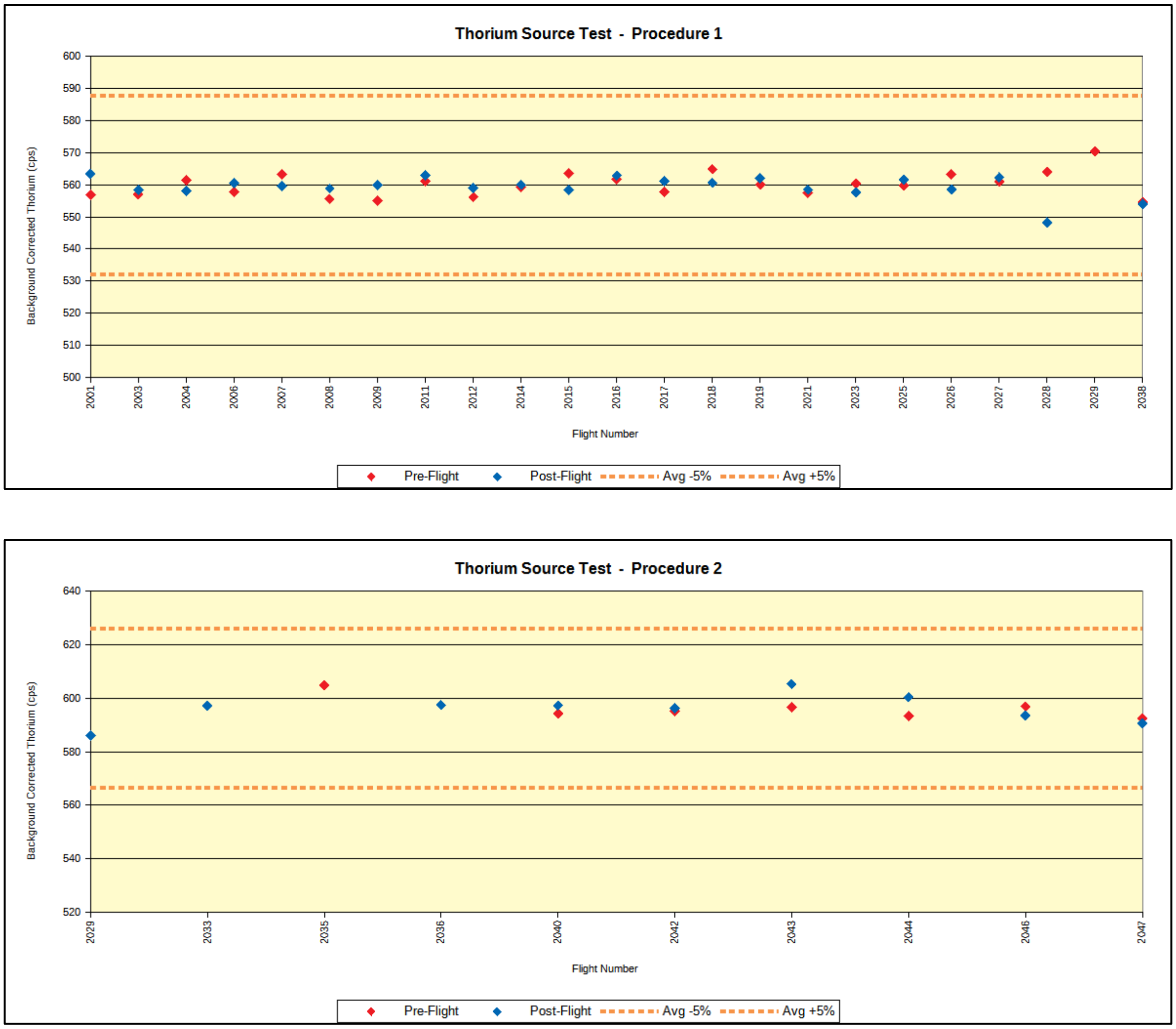
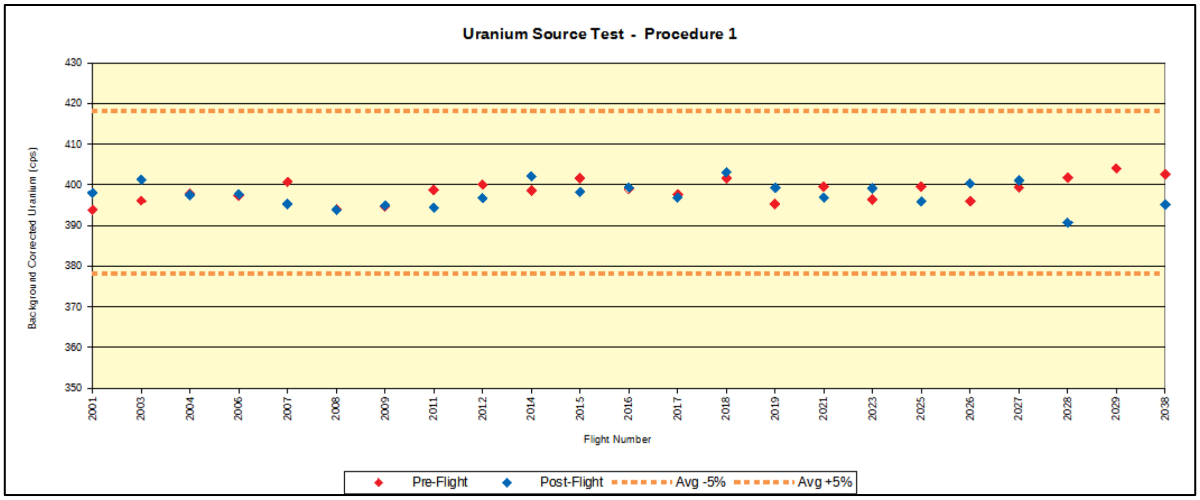


Figure 12: Thorium source tests from Waterford



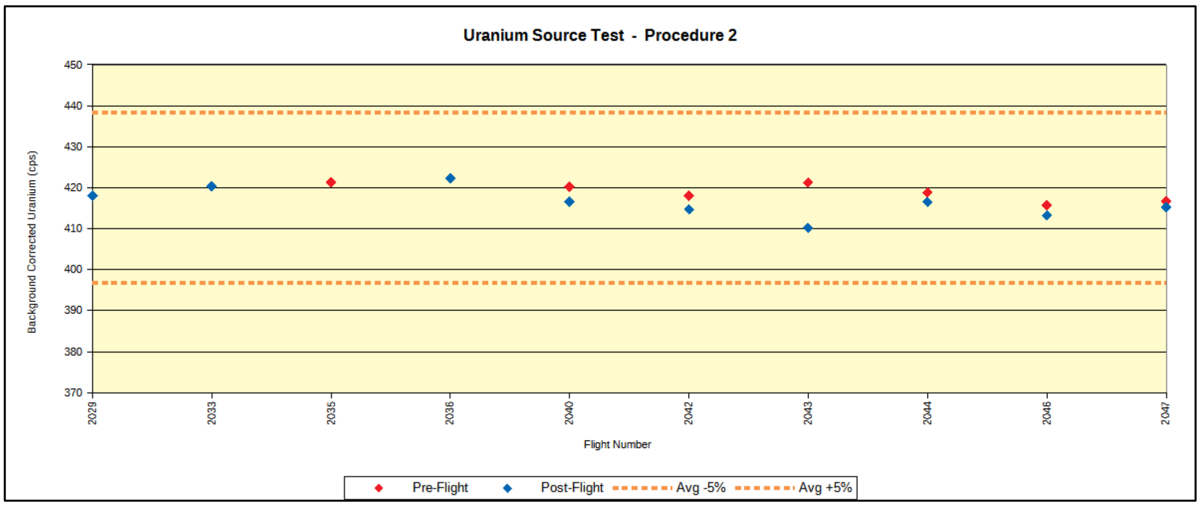


Figure 13: Uranium source tests from Waterford

Frequency-Domain Electromagnetic System Tests

EM System Orthogonality

Prior to each flight, the phase shift between the in-phase and quadrature parts of the EM response is verified and adjusted if required. For each frequency, two pulses of constant amplitude are artificially generated, the first being perfectly in-phase with the primary field, and the second being phase shifted by 90 degrees. Therefore, when the phase orthogonality is properly adjusted, no quadrature response should be observed during the first pulse, and no in-phase response should be observed during the second. This test is usually performed at 300 m or more above the ground to avoid any EM response from the ground and to minimize cultural interference. In addition, the compensation of the primary field is also verified. The primary field enables EM data to be recorded with reference to an arbitrary zero-level low enough to ensure that the full range of the receiving device can be utilized. The orthogonality check is also performed following the flight, while ferrying back to the base. An example of the orthogonality check is shown in *Figure 14*.

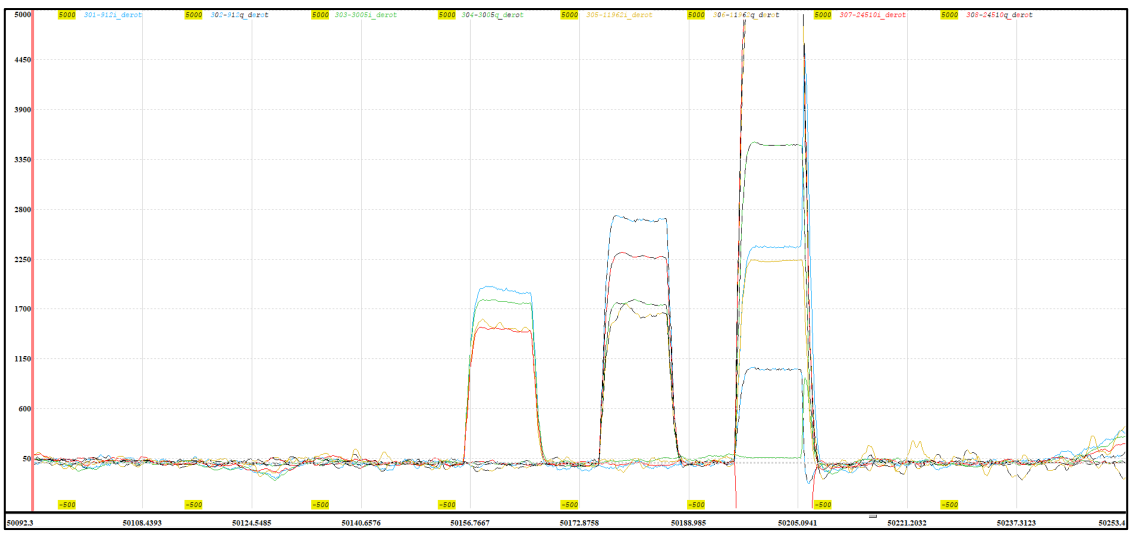


Figure 14: Orthogonality check for the four frequencies

Each pulse represents the in-phase and quadrature response for each of the four frequencies, followed by a single large pulse for all frequencies. For the first two pulses, a well-adjusted system will only show a response in the single channel expected, as illustrated here.

EM Over-Seawater Calibration

The frequency domain electromagnetic system was calibrated following procedures described by Hautaniemi *et al* (2005). For surveys previous to 2018, a test site was chosen over Donegal Bay, in an area where water conductivity and temperature have been measured several times over the years, at every meter from surface to sea floor, by the Irish Marine Institute. The water depth reaches over 60 m, ensuring that the bottom sediments do not contribute to the EM response. Conductivity data from two different stations taken at three different years were analyzed, and proved conductivity profiles to be essentially consistent at the two stations and therefore can be assumed to be constant between them. The calibration line location (in red) and the two sampling stations

(CE10003_056 and CE10003_057) are shown in *Figure 15*. This 4.5 km long calibration line was flown at several heights.

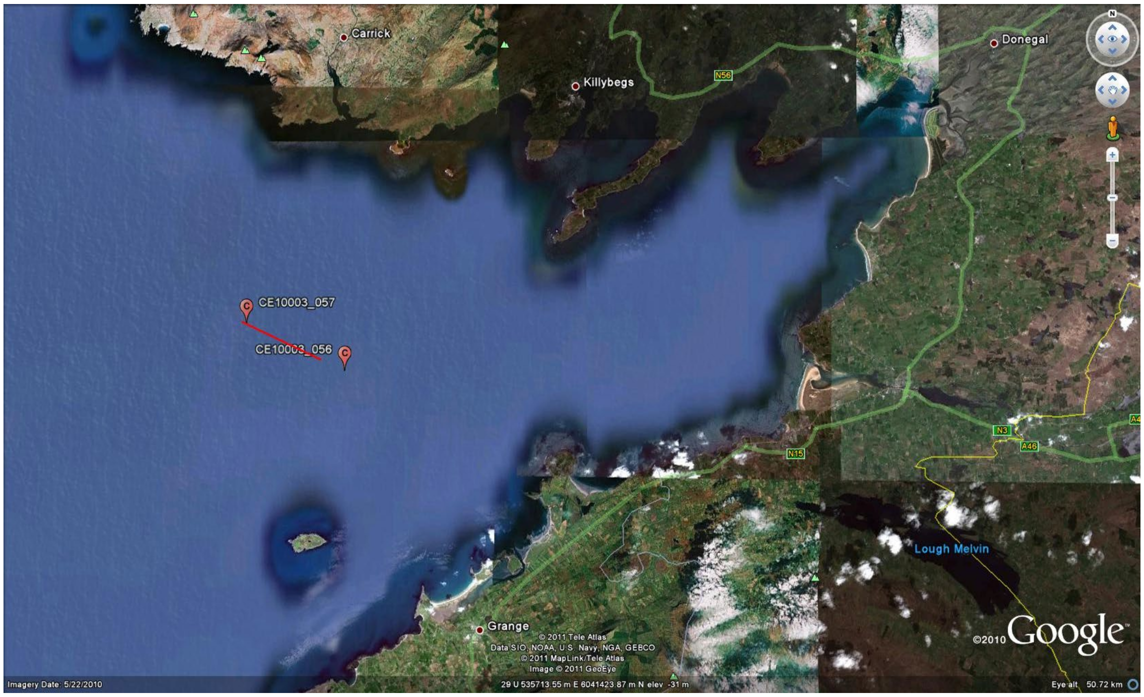


Figure 15: Seawater test line location (red line)

The conductivity data was analyzed to estimate the conductivity variation with depth. (*Figure 16*)

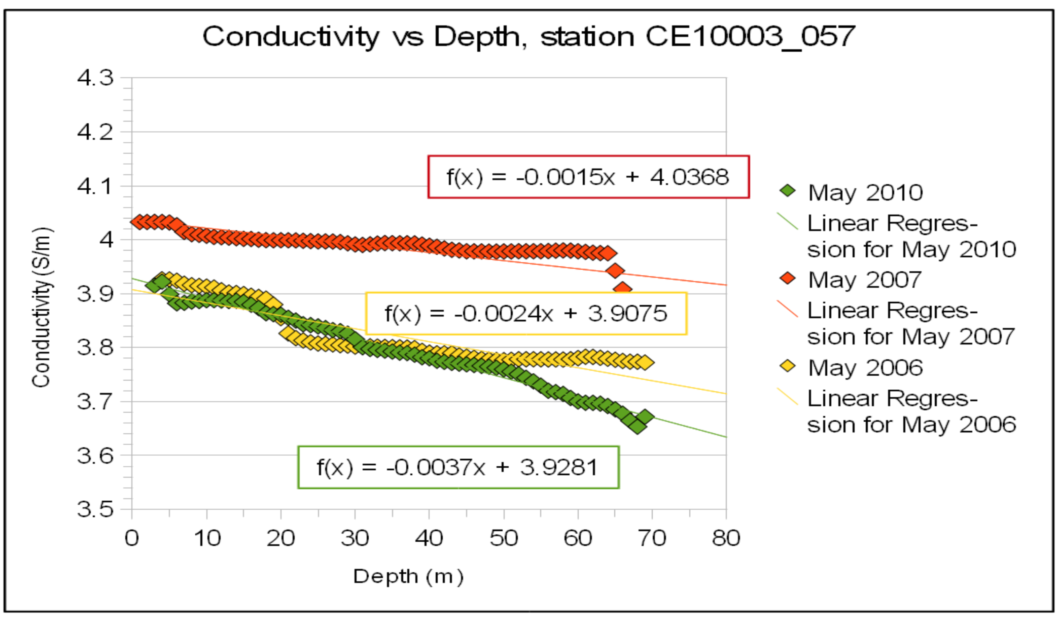


Figure 16: Conductivity variation with depth

As well, the conductivity change with respect to temperature was analyzed over three different years. (*Figure 17*)

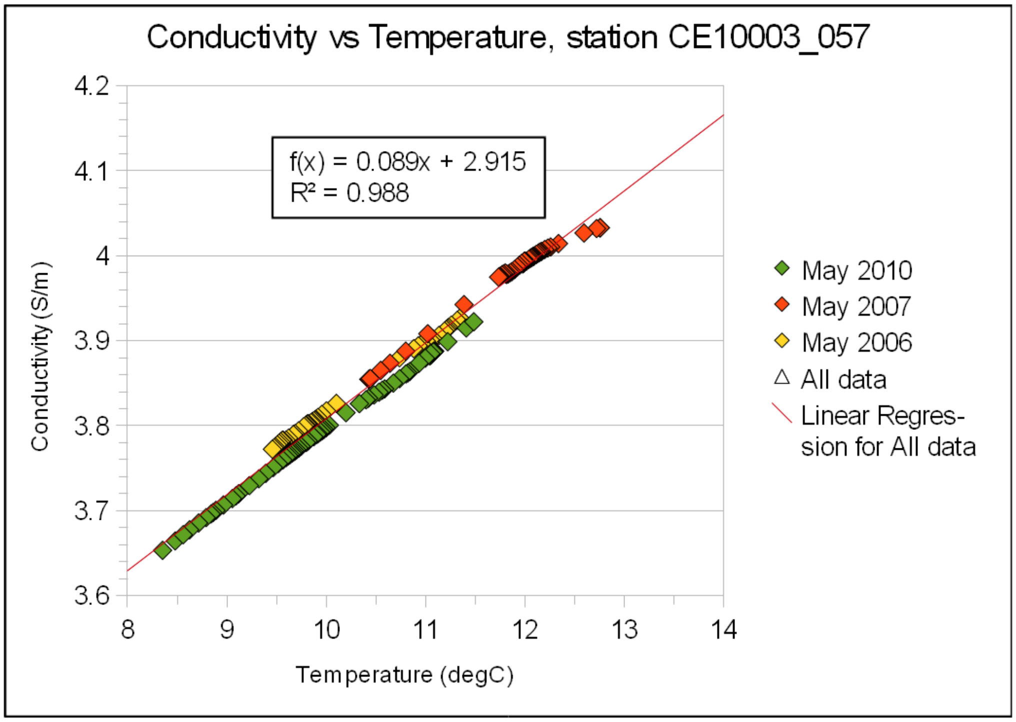


Figure 17: Conductivity variation with temperature

Starting in 2018, a new test site was selected just south of Waterford due to its proximity to this project (see *Figure 18*). Sea-surface salinity at the Waterford site, as provided by the Irish Marine Atlas, is within 0.1g/l of the Donegal site (as measured in April, 2017), hence this new test site will have very similar resistivity and thermal characteristics to the Donegal Bay location outlined above. The Waterford test line includes an on-land portion to replace the “Bundoran” test line, as well as an over-sea-water portion for the EM calibration test line. The central test line is simply extended over sea water and flown at multiple altitudes. The land and shallow portions of the test line are omitted when tabulating the calibration test results. The yellow box in the figure outlines the data used in the over sea water test portion. The skin depth of all four frequencies are less than half the water depth so the sea-floor bottom has no impact and the homogenous half space model is valid. The water depth in the seawater test portion is greater than 22.5m, for which typical sea-floor bottom resistivity of 1.0 ohm-m would make less than 0.1% difference in the low-frequency in-phase amplitude, relative to deeper water.

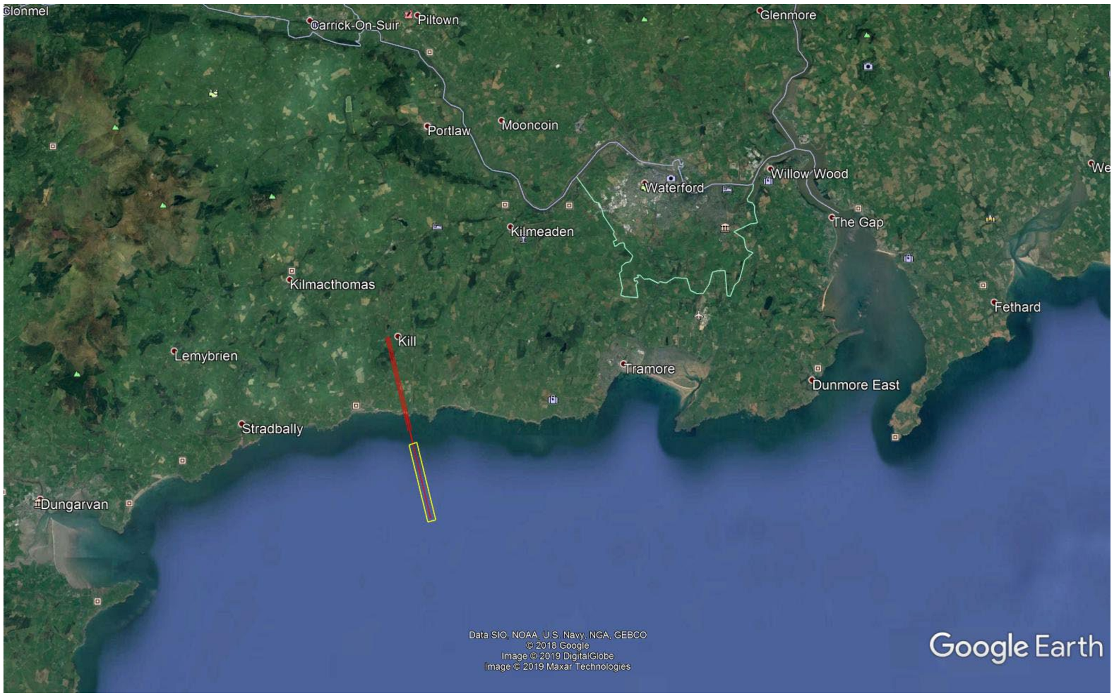


Figure 18: Waterford land/seawater test line location (red line, deep sea section indicated by Yellow box)

Surface water temperature measured on the same day the calibration flight took place (17.461 ºC, measured at buoy M5 located approximately 65 km south east of the Waterford test line (51.6900ºN, 06.7040ºW) on July 16, 2021 as published by the Irish Marine Institute) enabled the estimation of the water conductivity close to the surface ([0.089 S/m ºC * 17.461 ºC] + 2.915 S/m = 4.469 S/m). Based on the average conductivity decrease with depth observed over the three years in Donegal Bay, it was possible to estimate the water conductivity at a depth of 30m ([-0.0025 S/m2 * 30 m] + 4.469 S/m = 4.394 S/m), and the average conductivity between the surface and a depth of 30 m at the calibration site (4.431 S/m). Slight changes in conductivity below 30m are negligible. This conductivity was used to create a single layer model (half-space), which was employed to calculate the EM response for each component of each frequency, for the range of altitudes covered during the calibration flight. The calculation was performed with the software Airbeo, developed by AMIRA. The results are shown in *Figure 19*.

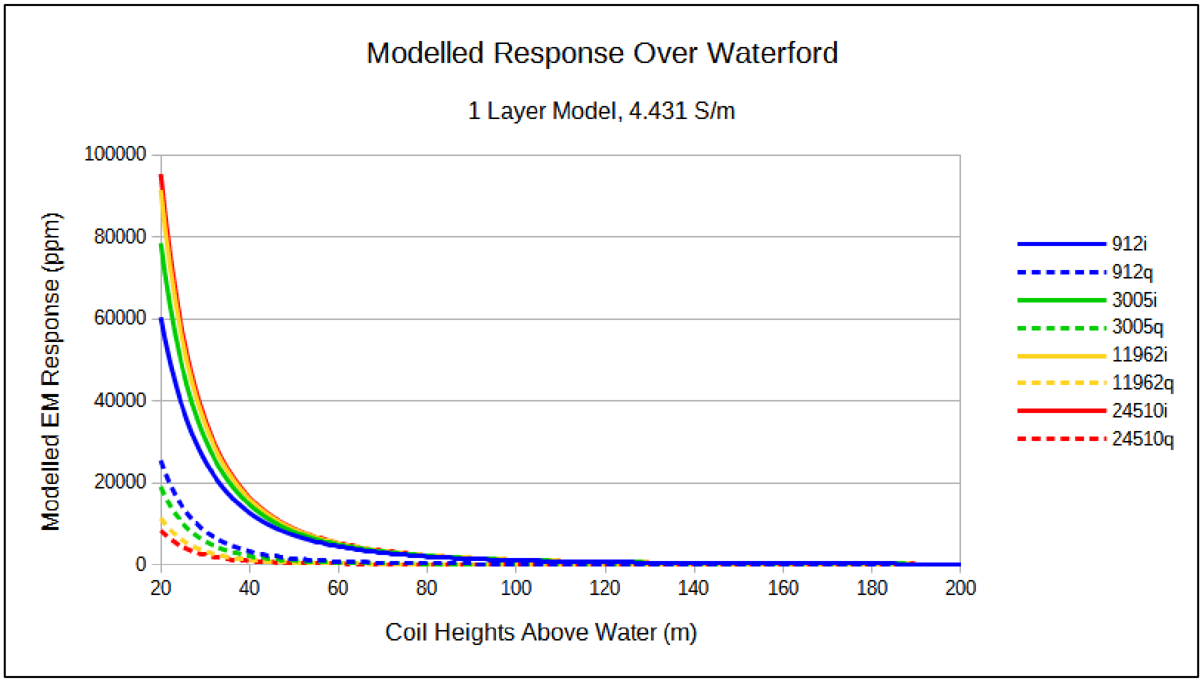


Figure 19: Modelled EM response vs. Coil height above sea water near Waterford

This shows how sensitive the EM response is with respect to separation distance between the system and the water. It is therefore important to use accurate clearance information to perform the calibration. The radar altimeter was properly calibrated over the runway at Gatineau Airport in Quebec, Canada. Moreover, the altimeter data was corrected for the distance between the radar system and the EM coils. Given the wide footprint of the radar, the use of the strongest return when recording altitude, and the relatively low flying altitude, attitude corrections were deemed negligible. The EM data was also corrected for lag effects.

The receiver measured voltage (V units) recorded along the calibration line were plotted against the theoretical secondary to primary field coupling ratio (ppm units), and the calibration coefficients (ppm/V units) were obtained through a linear regression. In order to ensure that the measured in-phase data used for the calibration is indeed entirely in-phase, the in-phase/quadrature orthogonality was verified before and after the calibration flight. This particular post-flight orthogonality test result is shown in *Figure 20*.

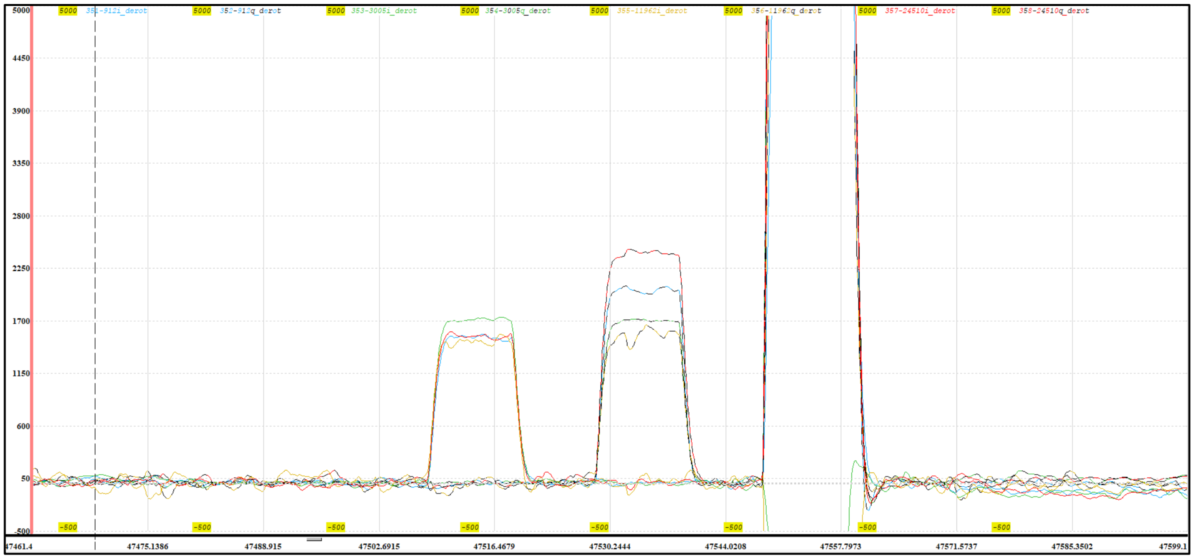


Figure 20: Post flight orthogonality check from the FEM calibration test flight

The coefficients obtained for each frequency are outlined in *Table 14*. These coefficients are used for all flights on the A9 Block. The plots showing the fit obtained for the in-phase response at each frequency are presented in *Figures 21-24* (note that the quadrature signal is not used due to its very low amplitude over sea water).

Table 14: Calculated conductivity coefficients for each frequency (ppm/volt)

Frequency	912 Hz	3005 Hz	11962 Hz	24510 Hz
Coefficient	5646	5399	5649	5882

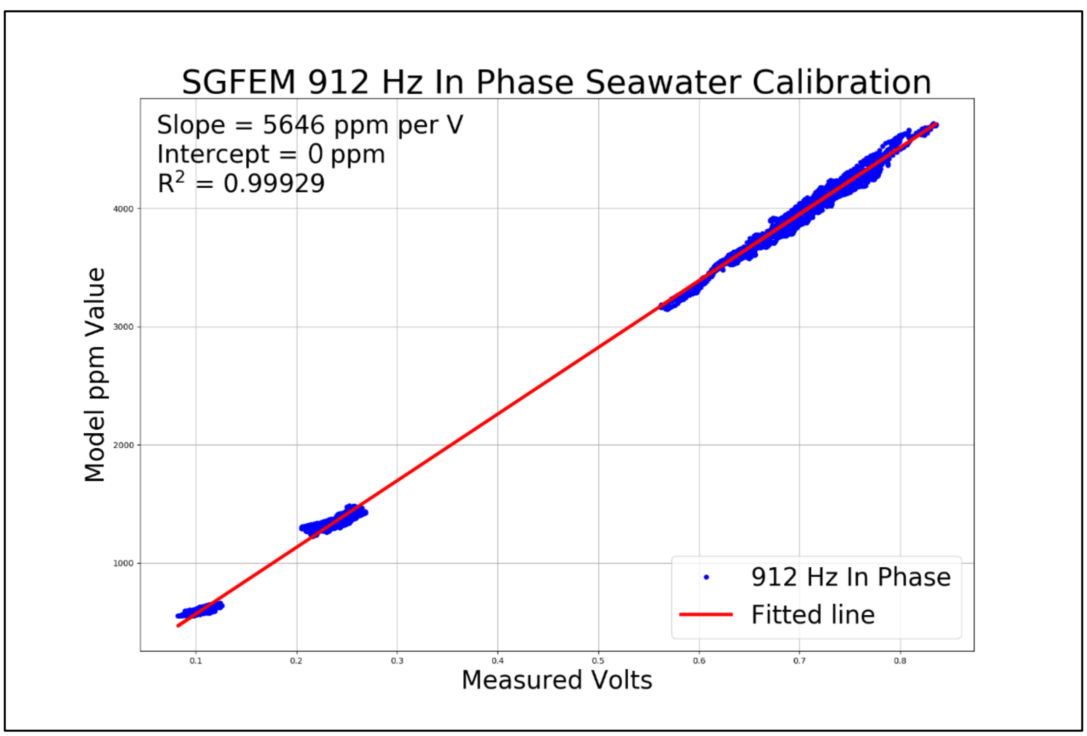


Figure 21: SGFEM 912 Hz in phase seawater calibration

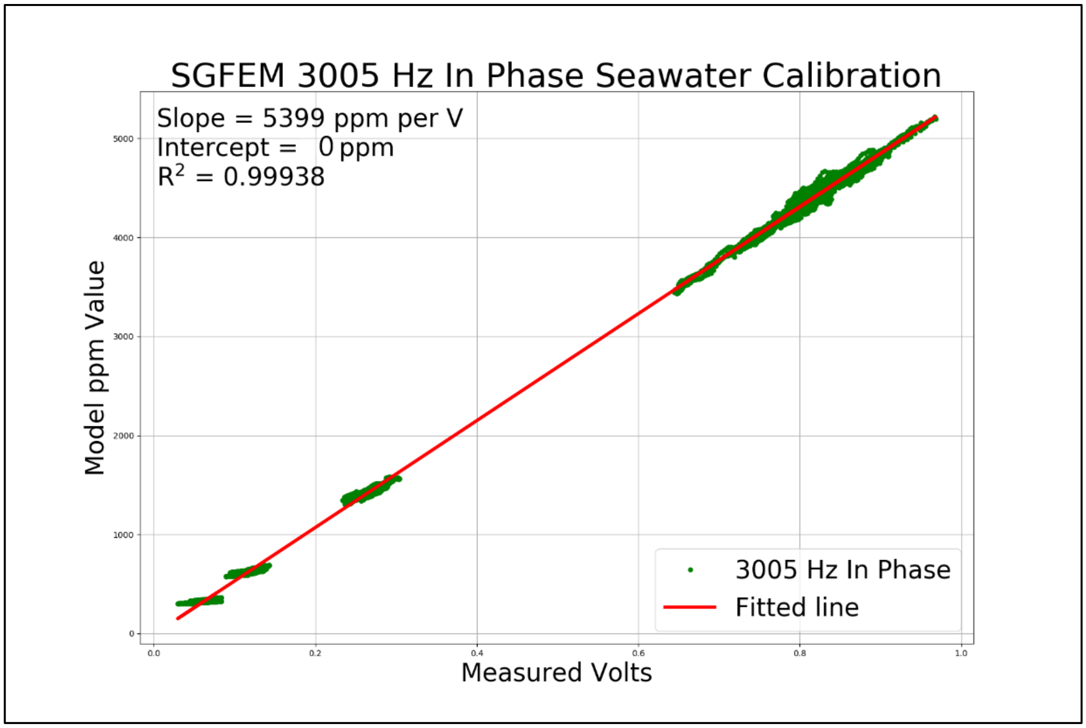


Figure 22: SGFEM 3005 Hz in phase seawater calibration

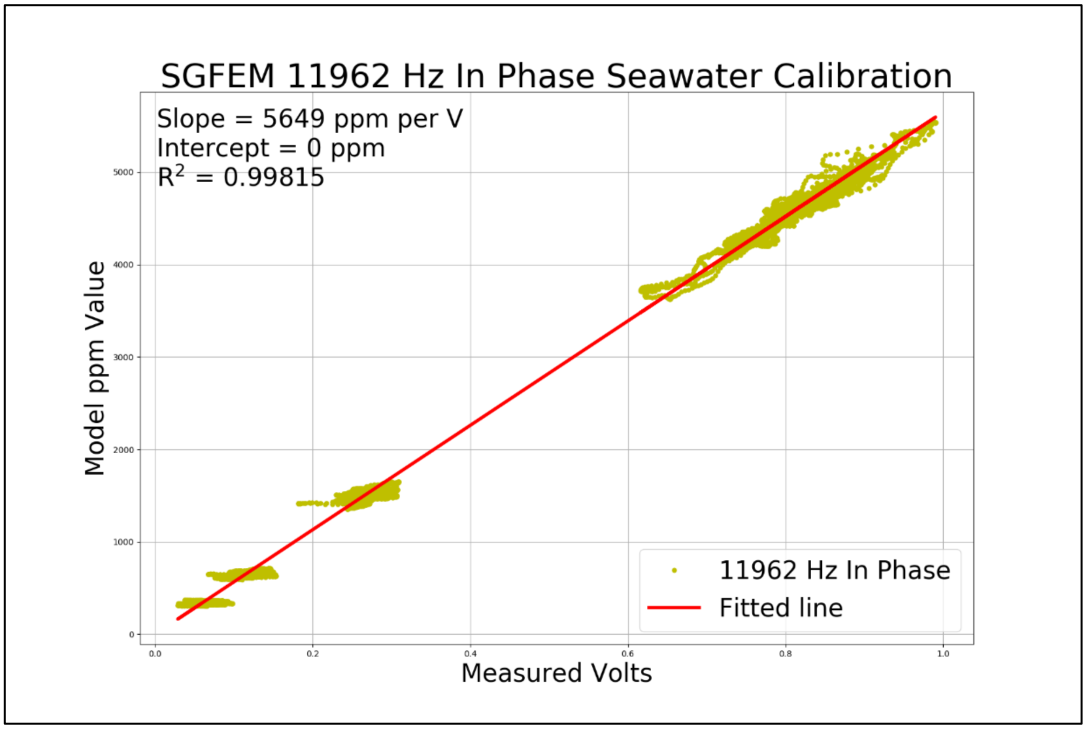


Figure 23: SGFEM 11962 Hz in phase seawater calibration

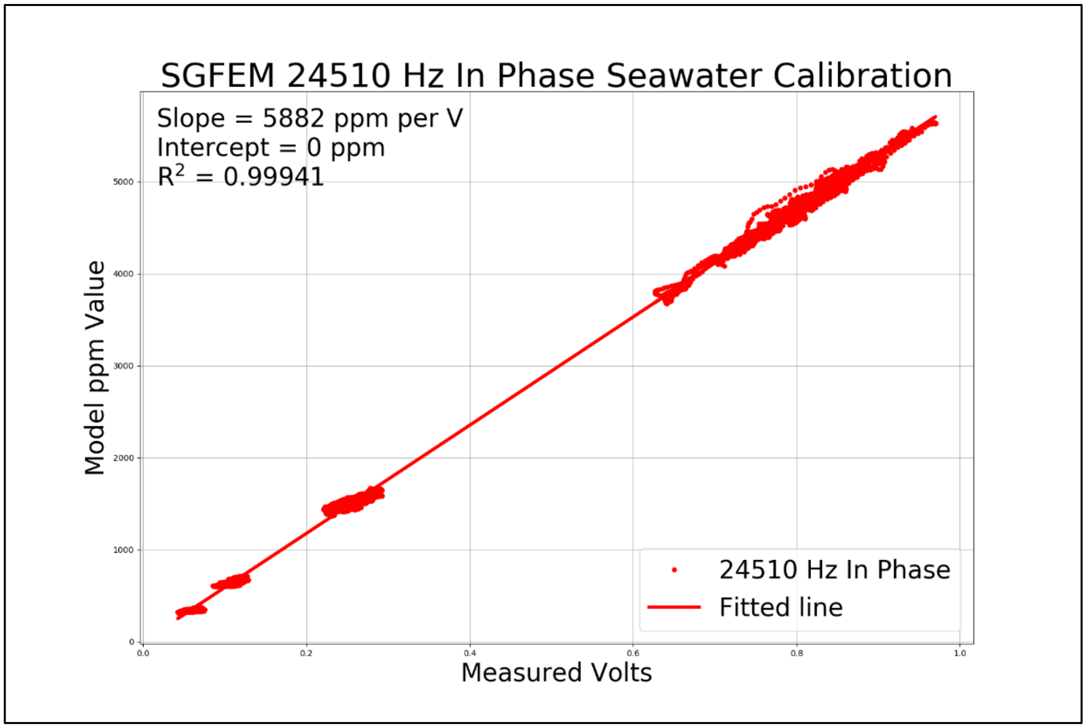


Figure 24: SGFEM 24510 Hz in phase seawater calibration

EM Instrumentation Lag

The lag in the EM data is a function of two components, a static lag due to signal processing and a speed-dependent dynamic lag due to the physical offset of the EM coils and the GPS antenna. The static lag is known to be 0.70 s from the filters applied during signal processing. The dynamic lag is equal to the offset of the coils and GPS reference point along the long axis of the aircraft, known to be 2.888 m, divided by the flying speed. For a speed of 60 m/s the dynamic lag will average 0.048 s, for a total lag of 0.748 s.

EM Transmitter Noise

The effect of the FEM transmitter on the magnetic response was verified for the tail and wing sensors, while flying at high altitude (about 10,000 ft.). This was done by turning the EM transmitter OFF, then back ON. *Figure 25* and *Figure 26* show that the EM transmitter induces no effect on the magnetic signal from either sensor.

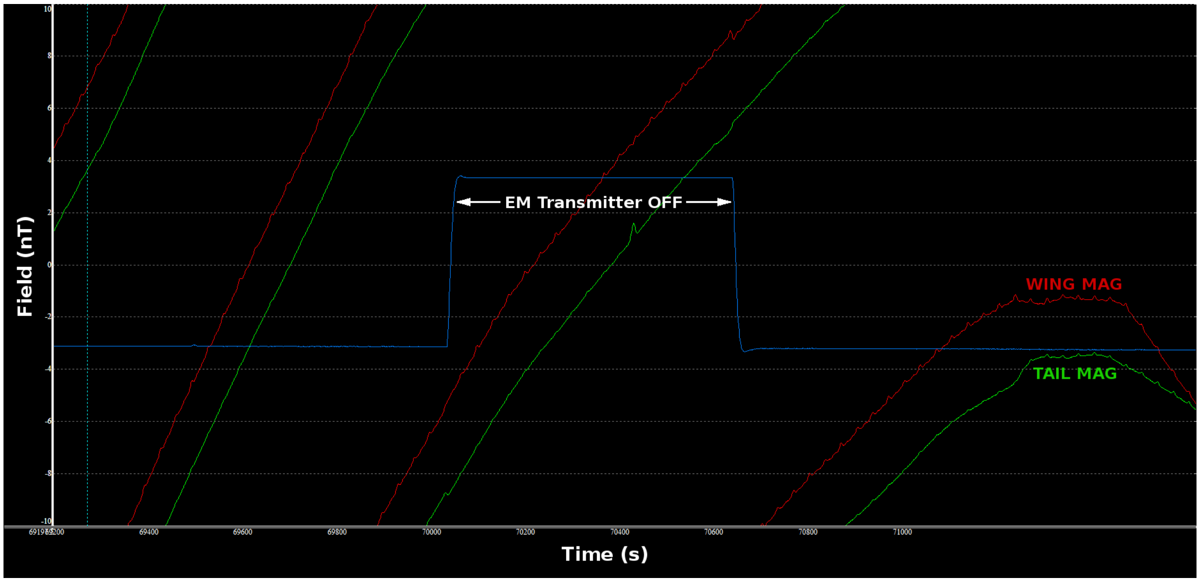


Figure 25: EM transmitter noise test, showing tail and wing magnetic sensor traces

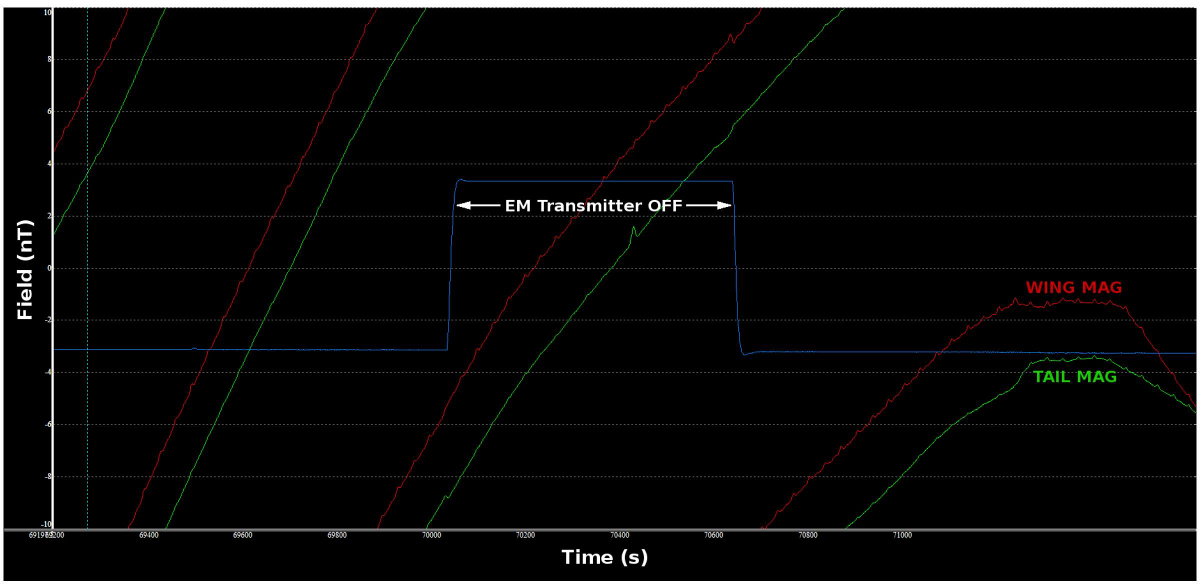


Figure 26: EM transmitter noise test, showing the 4th difference of the tail and wing magnetic sensor traces

8. FIELD OPERATIONS

Operational Base

Flight operations for this project were performed from Waterford Airport (EIWF). The Block A9 required 46 production flights, from July 25, 2021 to September 21, 2021. Weekly reports are provided in Appendix VI.

Reference Stations

Two reference stations were installed for this project. GND1 was located at the airport south of the CHC hangar behind the fuel farm and GND2 was located at a farm just north of Dunmore East. *Figure 27* shows an image of a standard SGL reference station setup.

Figure 27: A standard SGL reference station setup with a magnetometer pole and a tripod mounted GPS antenna

The positions of all reference station GPS antennas were calculated using Precise Point Positioning (PPP) Corrections using the algorithm developed by NRCAN, that has been incorporated in to SGL's suite of software (http://webapp.geod.nrcan.gc.ca/geod/tooloutils/ppp.php).

The position of the GPS antennas of the reference stations after differential correction is shown in *Table 15*.

Table 15: GPS reference station location in the WGS-84 datum

Station	Latitude	Longitude	Elevation
GND1	N 52° 11’ 23.5”	W 07° 04’ 47.2”	83.7 m
GND2	N 52° 09’ 21.0”	W 07° 00’ 39.5”	107.6 m

Lists of the lines as acquired for each data set are provided in Appendix VII. Due to re-flights for specific data issues, the lines selected for each data type (FEM, magnetic, spectrometer) are not identical.

Operational Issues

The project was completed efficiently closely following the flying of the adjacent A8 block.

As usual, the weather provided the main challenge for airborne operations throughout acquisition in the A9 Block. Aside from a few extended periods of rainy weather, survey flights were able to be flown most days. Any delays, flight cancellations or shortened flights were generally caused by rain, poor visibility or wind.

Other delays to the project were caused by a short closure of the Waterford airport, and logistical difficulties of flying in the air space controlled by Cork Air Traffic Control.

The area included a military firing range, the Kilworth, Co. Cork Danger area, EID6, with coordinates listed in *Table 16* and illustrated in *Figure 28*. Special permission to fly over this area was obtained, with the requirement to black out the video recorded over the area.

Five lines, 9059 to 9063, were flown two kilometres shorter than planned in the north due to a landowner refusing overflight permission.

Table 16: Coordinates of Military Firing Range EID6

	Latitude, Longitude
NW Corner	N 52˚ 14’ 00.0”, W 008˚ 15’ 05.0”
NE Corner	N 52˚ 14’ 30.0”, W 008˚ 12’ 00.0”
SE Corner	N 52˚ 13’ 05.0”, W 008˚ 11’ 40.0”
SW Corner	N 52˚ 14’ 00.0”, W 008˚ 15’ 05.0”

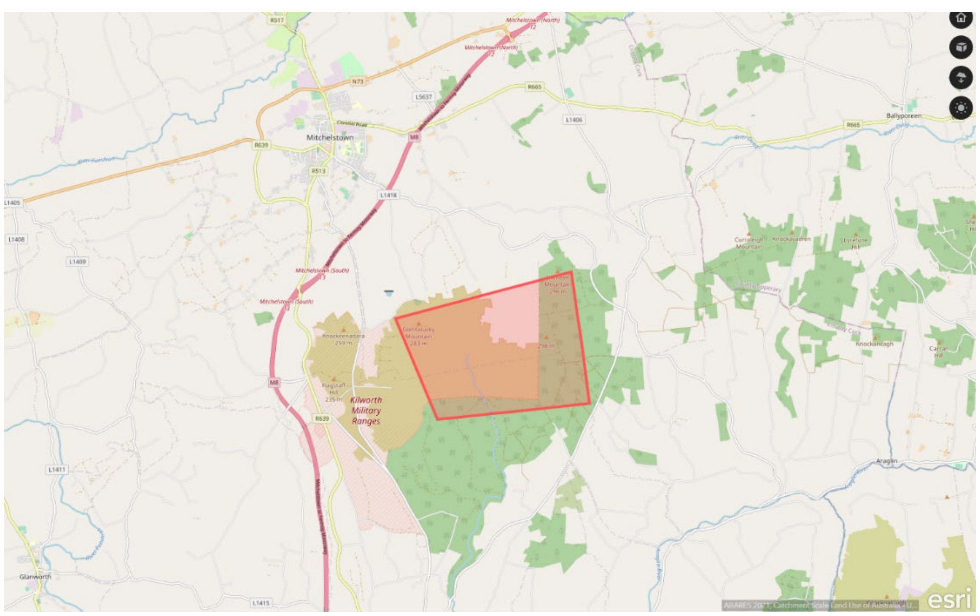


Figure 28: Location of Military Firing Range EID6

Re-flights are listed in Appendix VIII.

Field Personnel

The technical personnel of SGL that participated in field operations are given in *Table 17*.

Table 17: Field Personnel

	Name	Dates on Field
Operations Manager	Kevin Charles	n/a
Field Crew Chief	Alison McCleary	July 18, 2021 – end of project
Technician	Craig McMahon	July 18, 2021 – August 30, 2021
Technician	Sean O'Rourke	August 30, 2021– end of project
Lead Pilot	Steve Gebhardt	July 18, 2021 – end of project
Pilot	Charles Dicks	July 18, 2021 - July 27, 2021
Pilot	Steven Hyde	July 18, 2021 – August 30, 2021
Pilot	Todd Svarckopf	July 31, 2021 – end of project
Pilot	Jeff Tucker	July 12, 2021 – end of project
AME	Darren McBeth	July 24, 2021 – September 16, 2021
AME	John Burnham	September 15, 2021 – end of project

9. DIGITAL DATA COMPILATION

Preliminary processing for on-site quality control was performed in the field as each flight was completed. This included verifying the data on the computer screen, profiling all of the data channels, and creating preliminary data grids.

Magnetometer Data

A magnetic data flowchart is presented in *Figure 29*.

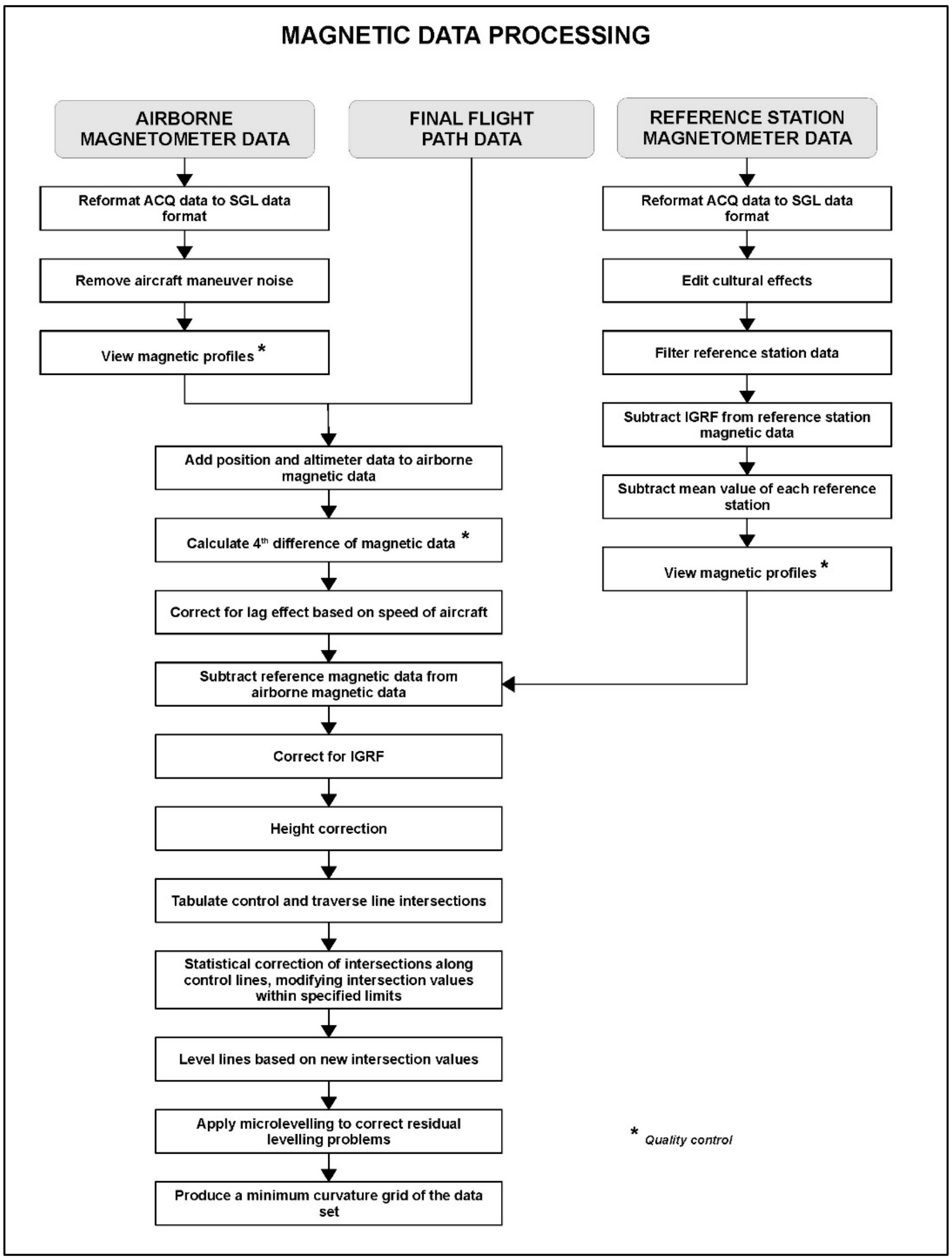


Figure 29: Magnetic data processing flow chart

All final magnetic data is from the magnetometer housed in the tail stinger at the rear of the aircraft. The airborne magnetometer data were recorded at 160 Hz, and down sampled to 10 Hz for processing. Compensation for the effect of aircraft maneuvers on the magnetic data was performed for each flight using an analysis of the data acquired for that flight. For the A9 block data, this method of compensation delivered improved compensation results.

All magnetic data were plotted and checked for any spikes or noise. A dynamic lag correction averaging 0.18 s depending on the instantaneous velocity of the aircraft was applied to each data point. The aircraft speed dependent dynamic lag was calculated using SGL's Dynlag software.

The ground-based reference magnetometer data were inspected for cultural interference and edited where necessary. All reference station magnetometer data were filtered using a 369 point low pass filter (see Appendix IX) to remove any high frequency signal, but retain the low frequency 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 and the recorded date for each flight. The mean residual values of the reference stations calculated to be 161.550 nT for GND1 and 15.1521 nT for GND2 were subtracted from the ground station data to remove any bias from the local anomalous field. Diurnal variations in the airborne magnetometer data were removed by subtracting the corrected reference station data. Reference station GND2 was used to provide ground reference data for most of the survey lines. Survey lines corrected using GND1 are listed in Appendix X. In some cases, data were drawn from different stations for different parts of a line.

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 IGRF model. The altitude data used for the IGRF corrections are DGPS heights above the GRS-80 ellipsoid.

Height Correction

The survey was flown in radar guidance mode in order to stay as close to the target survey altitude of 60 m as much as possible. This approach was adopted in order to optimize the acquisition of frequency-domain electromagnetic (FEM) data which is known to drop off in signal strength rapidly. Little reliable FEM data is acquired at heights of 200 to 250 m above ground depending on the signal frequency and the conductivity of the ground, and the lower the survey is flown, the higher the signal to noise ratio for all frequencies.

By adopting a flying strategy optimized for FEM data, drape flying was not possible, resulting in survey lines flown at different altitudes in adjacent lines and at intersections between traverse and control lines. Inevitably this results in differences in the spectral content of airborne magnetic data where the survey height above ground was inconsistent. 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, a consistent surface that will be used as a reference height needs to be defined. This can be a surface of constant height with respect to the ellipsoid or a "virtual" drape surface. The drape surface approach has the advantage of retaining as much of the recorded signal content as possible whilst achieving consistency of height at intersections and smoothly varying heights between adjacent lines. The reference drape surface was made based on a grid of the height of the survey lines as actually flown. Due to some large miss-matching in height over some of the hills in the survey area, the surface was based on traverse lines only so as to avoid unnecessary loss of high frequency signal when control lines only were flown high. The resultant surface is then converted to a smooth drape using a climb rate of 500 feet/nMile. This ensures that the reference surface is always at or slightly higher than the altitude as flown so that all corrections for height can be achieved using a stable upward continuation operation. Any control lines flown above the reference surface were left unaltered due to the instability of downward continuation.

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:

$$T + (T' h)/1! + (T'' h2)/2! + (T''' h3)/3! + (T'''' h4)/4!$$

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 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.

A profile-based method was used because high frequency cultural effects in this survey block were not well sampled in the cross-line direction. The height correction is then applied to the unlevelled data, and final levelling is then performed.

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)

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, plotting profiles of corrections along lines, and examining levelling statistics to check for steep correction gradients.

Micro-Levelling

Micro-levelling was applied to remove any residual diurnal and/or height related artifacts from the data. This was achieved by using directional filters to identify and remove artifacts that are long wavelength parallel to survey lines and short wavelength perpendicular to survey lines. A limit of +/- 4.0 nT was set for micro-levelling corrections. The strong micro level correction was required due to areas where high gradients combine with large height differences to cause strong local artifacts.

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 50 m grid cell size appropriate for survey lines spaced at 200 m.

Magnetometer Power Line Monitor

A magnetometer power line monitor data channel is included that is derived from the 160Hz magnetic data. This channel is derived from a frequency-domain band pass filter centered on 3 samples (0.01875 s). This step extracts the 50Hz power line signal that is observed in the magnetometer while suppressing all other signal. The absolute value is taken from the output of the band pass filter and is passed through a median slope time-domain filter with a window of 8 samples (0.05 s) effectively measuring the size of the noise envelope. The magnetometer power line monitor channel is not very sensitive to interference from spurious sources such as radio transmitters and is also able to detect power lines with less current. The magnetometer power line monitor data channel is included with the frequency-domain electromagnetic data.

Spectrometer Data

A spectrometer data compilation flowchart is presented in *Figure 30*.

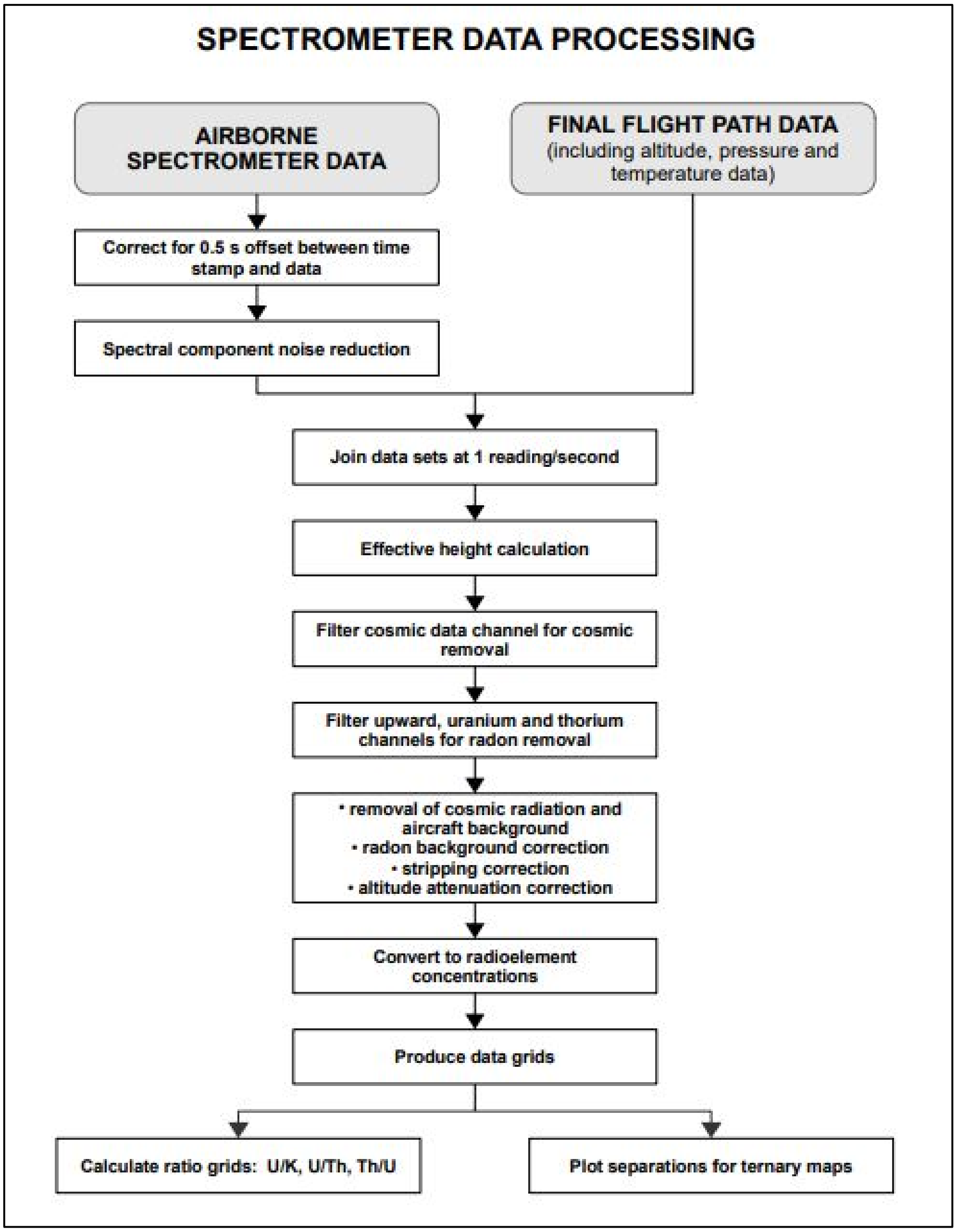


Figure 30: Spectrometer data processing flow chart

A 0.5 second shift was applied to all data to correct for the time delay between detection and recording of the airborne data. The data were recorded at 1 Hz in asynchronous mode, and subsequently interpolated to 1 Hz synchronous data on the exact second.

Spectral Component Analysis

Raw 1024 channel spectrometer data were analyzed using noise adjusted singular value decomposition (NASVD; J. Hovgaard and R L. Grasty paper 98; Geophysics and Geochemistry at the Millennium, Proceedings of the 4th Decennial International Conference on Mineral Exploration, 1997). Normalization with respect to the count rate is achieved by dividing each measured spectrum by the standard deviation of the best fit of the mean spectra, component zero. The NASVD method determines the components in order of significance with respect to the amount of variance in the data they describe. Each component is a spectrum with 1024 channels. In theory, there are as many components as there are channels. Variation in the signal is accounted for by the low order components, and variation due to noise is accounted for by the higher order components. Spectra are reconstructed from the low order signal only components, and the count rates in the standard windows are recalculated.

For this survey, components 0 – 4, 13, 15-18, 21 and 22 were retained. See Appendix XI.

Standard Corrections

Spectrometer data were corrected as documented in the Geological Survey of Canada Open File No. 109 and the IAEA report “Airborne gamma-ray spectrometer surveying; Technical Report Series No. 323 (International Atomic Energy Agency, Vienna). The gamma-ray spectroscopy processing parameters are shown in *Table 18*. Parameters are adjusted during processing through analysis of the corrections applied, and therefore may differ from those determined from calibration test flight data. The cosmic test results returned negative aircraft background values for the uranium, thorium, and upward regions of interest. These negative values are only indicative of error in the estimates. Since negative background is a physical impossibility, we set the coefficients to zero. For the radon background component b, the test results indicate a small positive background, but these values too have errors associated with them. Through analysis of the data during processing it was determined that the data is over-corrected if these backgrounds are applied, and accordingly they were also adjusted to zero.

Table 18: Spectrometer processing parameters

Spectrometer Processing Parameters		
Window	Cosmic Stripping Ratio (b)	Aircraft Background (a)
Total	1.2728	10
Potassium	0.065	19.2299
Uranium	0.042	0
Thorium	0.0491	0
Upward	0.0072	0
Radon Component	a	b
Total (I_r)	15.4608	0
Potassium (K_r)	0.7635	0
Thorium (T_r)	0.0707	0
Up (u_r)	0.21	0
Ground Component	a_1	a_2
Up (u_g)	0.032891	0.024257
Stripping Ratios	Contribution on the Ground	Effective Height Adjustment (m^{-1})
α	0.2782	0.00049
β	0.4183	0.00065
γ	0.782	0.00069
a	0.0453	
b	0	
g	0.0032	
Attenuation Coefficients (m^{-1})		
Total	-0.006849	
Potassium	-0.0087	
Uranium	-0.007337	
Thorium	-0.006636	
Sensitivities		
Potassium	228.93 cps/%	
Uranium	23.79 cps/eU ppm	
Thorium	12.31 cps/eTh ppm	

Before gridding, the following corrections were applied to the spectrometer data in the order shown:

Calculation of Effective Height Above Ground Level (AGL)

Clearances obtained by the subtracting the SRTM measurements from the aircraft DGPS altitude in conjunction with barometric altitudes were used to calculate the effective height. A frequency-domain filter was used to filter the 10 Hz barometric altimeter data and temperature data. The former was then converted to equivalent pressure and used with the filtered temperature to convert the clearance data to effective height at standard pressure and temperature (STP) as follows:

$$h_e = h \times \frac{273.15}{T + 273.15} \times \frac{P}{101.325}$$

where, h_e = the effective height
h = the clearance above ground in metres
T = the air temperature in degrees Celsius and
P = the barometric pressure in millibars.

Height Adaptive Filter

Adaptive filters were applied starting at 250 m effective height to improve the signal-to-noise ratio for potassium, thorium, uranium and total count. A moving average filter is applied to data and the degree of filtering applied increases gradually up to a maximum of a 9 point running average starting at 350 meters. Data collected at a high terrain clearance are often considered unreliable due to the low count rates and consequent low signal to noise ratio. For this survey a maximum of 450 m, 450 m, 300 m, and 450 m effective height for total counts, potassium, uranium and thorium respectively was deemed appropriate.

Removal of Cosmic Radiation and Aircraft Background rRadiation

A 67-point low pass filter (see Appendix IX) is applied to 1 Hz cosmic data to reduce statistical noise. Cosmic radiation and aircraft background radiation are removed from each spectral window using the cosmic coefficients and aircraft background values determined from test flight data using the following equation:

$$N = a + bC$$

where, N = the combined cosmic and aircraft background in each spectral window,
a = the aircraft background in the window,
b = the cosmic stripping factor for the window, and
C = the cosmic channel count.

Radon Background Corrections

A 199-point running average filter is applied to 1 Hz downward uranium, downward thorium and upward uranium count data for the purposes of the radon correction only. The radon component in the uranium window is calculated using the radon coefficients determined from the survey data using the following equation:

$$U_r = \frac{u - a_1 U - a_2 T + a_2 b_T - b_u}{a_u - a_1 - a_2 a_T}$$

where, U_r	=	the radon background measured in the downward uranium window,
u	=	the filtered observed count in the upward uranium window,
U	=	the filtered observed count in the downward uranium window,
T	=	the filtered observed count in the downward thorium window,
a_1 and a_2	=	the ground component coefficients,
a_u and b_u	=	the radon coefficients for uranium,
a_T and b_T	=	the radon coefficients for thorium.

The radon counts in the uranium upward window and the potassium, thorium and total count downward windows are calculated from Ur using the following equations:

$$u_r = a_u U_r + b_u$$
$$K_r = a_K U_r + b_K$$
$$T_r = a_T U_r + b_T$$
$$I_r = a_I U_r + b_I$$

Where u_r is the radon component in the upward uranium window, K_r, U_r, T_r and I_r are the radon components in the various windows of the downward detectors, and a and b are the radon calibration coefficients.

Stripping

The stripping ratios for the spectrometer system are determined experimentally. The stripped count rates for the potassium, uranium and thorium downward windows are calculated using the following equations:

$$N_K = \frac{n_{Th}(\alpha\gamma - \beta) + n_U(\alpha\beta - \gamma) + n_K(1 - a\alpha)}{A}$$

$$N_U = \frac{n_{Th}(g\beta - \alpha) + n_U(1 - b\beta) + n_K(b\alpha - g)}{A}$$

$$N_{Th} = \frac{n_{Th}(1 - g\gamma) + n_U(b\gamma - a) + n_K(ag - b)}{A}$$

where A has the value:

$$A = 1 - g\gamma - a(\alpha - g\beta) - b(\beta - \alpha\gamma)$$

and where,

n_K, n_U and n_{Th}	=	the unstripped potassium, uranium and thorium downward windows counts,
N_K, N_U and N_{Th}	=	the stripped potassium, uranium and thorium downward windows counts,
α, β, and γ	=	the forward stripping ratios, and
a, b and g	=	the reverse stripping ratios.

α, β, and γ are adjusted for effective height (as calculated above) by standard factors given in *Table 18* Spectrometer Processing Parameters.

Altitude Attenuation Correction

This correction normalizes the data to a constant terrain clearance of 60 m above ground level (AGL) at standard temperature and pressure (STP). Attenuation coefficients for each of the downward windows were determined from test flights. The measured count rate is related to the actual count rate at the nominal survey altitude by the equation:

$$N_s = N_m\left(e^{\mu(h_o - h)}\right)$$

where, N_S	=	the count rate normalized to the nominal survey altitude, h_o,
N_m	=	the background corrected, stripped count rate at effective height h,
μ	=	the attenuation coefficient for that window,
h_o	=	the nominal survey altitude, and
h	=	the effective height.

The effective height was determined in step 2.

Scaling and Shifting of Uranium Data

In order to compensate for residual uncorrected radon in some of the uranium data, scale factors and/or shifts were applied to certain sections of the uranium data channels. This is required when radon below the aircraft is poorly modelled by the upward detectors, perhaps due to radon accumulating in valleys below the aircraft or due to changing moisture contents of the soil in specific regions of the area. A list of shifts and factors applied can be found in Appendix XII.

Differential Polynomial Fitting

To adjust for variable signal due to changing conditions and/or residual uncorrected background, a levelling method know as differential polynomial fitting (DPF, Beiki et al. 2010, Geophysics v.75, No.1) was applied prior to gridding the data. DPF fits a 2D polynomial to a circular window that incorporates data from adjacent lines, and a 1D polynomial of the same length along the line to be levelled that coincides with the centre of the circle. The length of the polynomials were 600 m (300 m radius from the centre to either side of the survey line, and the same equivalent distance along the line). The difference between the two fitted polynomials provides a levelling correction which is effective at addressing the short wavelength residual miss-matches of gamma-ray data on adjacent lines. Corrections for total count, potassium, uranium and thorium were limited to ±50 counts/s, ±0.1 %, ±0.1 ppm, and ±0.1 ppm respectively. All corrections were low-pass filtered with a cosine tapered filter (0% pass at 23 s, 100% pass at 43 s) before they were applied.

A second iteration of DPF was applied only to areas of high-flown data. High flown data is considered to be above 200 m, 260 m, 175 m, and 200 m effective height for total counts, potassium, uranium and thorium respectively. Corrections for total count, potassium, uranium and thorium were not limited. All corrections were low-pass filtered with a cosine tapered filter (0% pass at 23 s, 100% pass at 43 s) before they were applied.

Conversion to Radio Element Concentration

Sensitivities are determined experimentally from the flight data. The spectrometer system employed was identical to that used for surrounding survey blocks that were flown before the A9 Block. Derivation of the sensitivities used for the system is described earlier in this report in the section Spectrometer System Tests: System Sensitivity. Block A9 and bordering blocks were planned with an overlap of approximately 1 km along most of their boundary. Analysis of data in the overlap area was used to determine scaling coefficients that allowed the corrected data in counts per second for Total Count and in concentration for individual elements to match across block boundaries. These scaling factors are given in *Table 19*. The transition between the adjacent blocks and A9 block is not apparent when these values are employed, inferring that they are reasonable.

To account for the naturally noisier character of the uranium data, an additional smoothing was applied to the data. To achieve this, the uranium grid was spatially filtered with an 800 m mid-point low pass cosine filter. The resultant adjustment was recovered by deriving a grid of the difference and sampling this back to the profile data. The resultant difference channel was applied as a correction to the unfiltered uranium channel. Finally, the adjusted uranium channel was low-pass filtered with a cosine tapered filter (0% pass at 5 s, 100% pass at 10 s).

Table 19: Scaling factors applied to A9 data

Total counts	Potassium	Uranium	Thorium
0.92	1.35	0.82	1.2

The units of the count rates in each spectral window are converted to “apparent radio element concentrations” using the following equation:

$$C = \frac{N}{S}$$

where, C = the concentration of the element(s)

N = the count rate for the window after correction for dead-time, background, stripping and attenuation

S = the broad source sensitivity for the window

Potassium concentration is expressed as a percentage and equivalent uranium and thorium as parts per million of the accepted standards. Uranium and thorium are described as “equivalent” since their presence is inferred from gamma-ray radiation from daughter elements (^{214}Bi for uranium, ^{208}Tl for thorium).

Data Gridding

The grids of gamma-ray data 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). The final grids of the gamma-ray data were created with 50 m grid cell size appropriate for survey lines spaced at 200 m. Data within cells are averaged prior to applying the minimum curvature algorithm.

Frequency-Domain Electromagnetic Data

A flowchart showing all the data processing steps can be found in *Figure 31*.

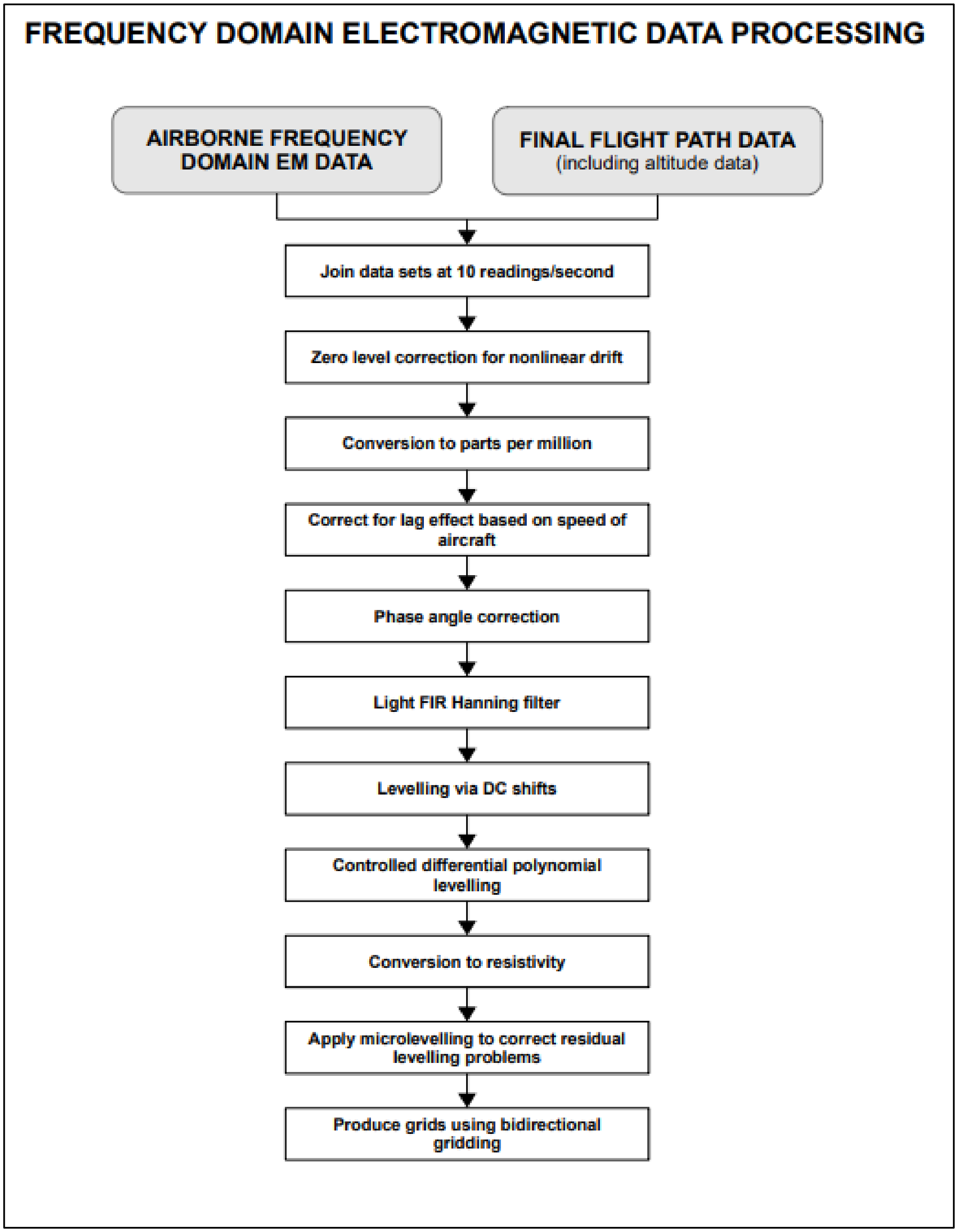


Figure 31: Frequency domain electromagnetic data processing flowchart

The airborne electromagnetic data were recorded in volts at 40 Hz, and down sampled to 10 Hz for processing. The data were recorded at four frequencies (912 Hz, 3005 Hz, 11962 Hz and 24510 Hz) each with two components, in-phase with the source pulse and out of phase "quadrature" each expressed as volts. The data were visually inspected for spikes and noise. Identification of cultural interference is assisted by the Power Line Monitor, and radio calls are detected and recorded in a flag channel that is 1 when a call is made, and 0 otherwise.

Conversion to PPM

Data in volts are converted to parts per million (ppm) of the source signal using the calibration coefficients described in the section "EM Over Seawater Calibration" earlier in this report (see *Table 14*). The sea water calibration assumes a homogeneous half space which allows modelling in ppm, which when compared to the measured voltages allows calibration coefficients to be determined.

Lag

A +0.70 s static lag correction due to signal processing was applied to each data point. In addition, a variable lag correction is applied that is a function of speed and the physical offset between the GPS antenna on the aircraft cabin and the electromagnetic pods as measured along the long axis of the aircraft, known to be -8.433 m. Therefore, the total lag applied is equal to (0.70 - (8.433/v)) s where v is the instantaneous velocity of the aircraft in m/s. The aircraft speed dependent lag is calculated using SGL's Dynlag software.

Interactive Single Flight, Zero Level Correction for Non-Linear Drift

The zero level of the system can drift, possibly due to variations in the temperature of the air outside and inside the aircraft, and of the instrument components. To correct for drift, SGL uses a method similar to that described by Leväniemi et. al (2009, Journal of Applied Geophysics, 67, 219-233). The data is often zero when the survey aircraft is more than 250 m above ground, and we can use these regions to define a curve of corrections which brings the data to the correct level on a flight-by-flight basis. The start and end of the correction curve for each flight are set to coincide with the zero-level calibration pulse procedure which is performed at approximately 350 m above ground before and after flying the survey lines. Intermediate points during production were determined when the aircraft ascended to flying heights of over 120m to 250 m above ground, particularly when flying over obstacles or ferrying between sections of the survey block. The EM response data at the start, end and intermediate points are shifted until they are zero. Shifts between the known zero points are interpolated using an akima spline to define the full correction curve in between. A separate correction curve is required for the in-phase and quadrature data of each frequency and is subtracted from the observed data. The drift curve is centred on the noise envelope of the data, which varies between frequencies (see below), therefore when the base level is near zero some negative data will occur.

Derotation

The pre and post flight phase orthogonality test is used to verify that the in-phase and quadrature data are at 90° to each other (see "EM Source Orthogonality" earlier in this report). If an in-phase response is detected in the quadrature signal for any frequency, or vice versa, for a given flight, a derotation correction is applied on a flight-by-flight basis, linearly interpolated between the pre- and post-flight calibration. The following formulae are applied to each component and frequency as necessary:

$$I' = I \cos\theta_i + Q \sin\theta_i$$

$$Q' = Q \cos\theta_q - I \sin\theta_q$$

where:

I = Observed in-phase signal,
I' = Derotated in-phase signal,
Q = Observed quadrature signal,
Q' = Derotated quadrature signal,
and
θ_i,θ_q = angle of rotation from orthogonality.

θ_i, and θ_q are determined experimentally until the rotation effect is removed from the orthogonality test data. The average of the rotations applied to the in-phase data was -1.3˚ with a standard deviation of 4.6˚. The average of the rotations applied to the quadrature data was -1.0˚ with a standard deviation of 2.8˚. The largest rotations were applied to the 25 kHz data.

Filtering

A 1 second (10 sample) Hanning FIR low pass filter is applied to each component and frequency of EM signal to reduce the high-frequency (out of the earth signal range) noise envelope.

Levelling

Data from each flight is split into lines for the purpose of levelling. Averages of parts of each line that correspond to areas of low resistivity are calculated by line in order to determine zero order ("D.C. shift") correction to each survey line. Subtracting the DC shift brings each line to a level with neighboring lines. The entire data set is then re-corrected by adding back the overall average D.C. shift previously applied. Following the zero order corrections, differential polynomial levelling following the method of Beiki et al. (2010, Geophysics, Vol. 75, No. 1, L13-L23) is used as an additional set of corrections. The algorithm is based on polynomial fitting of data points in 1D and 2D sliding windows. The levelling error is taken as the difference between 1D and 2D polynomial fitted data at the centre of the windows. Polynomials of order 1 were used along with a search radius of 600 metres for all components, and the long wavelength (>200s) correction for the line is applied to bring each line to the same zero-base level. Manual adjustments to the line-by-line levelling are applied to render correctly levelled apparent resistivity.

Conversion to Resistivity

High-range resistivity results are comprised of the results of two resistivity algorithms: a pseudo-layer resistivity for areas of strong signal (i.e. low resistivity) (Fraser, 1978), and an amplitude-altitude algorithm for areas of low signal (i.e. high resistivity).

The pseudo-layer resistivity algorithm uses an interpolation of an in-phase/quadrature nomogram (created at 22 intervals per decade of resistivity) to find the apparent resistivity and apparent height of the sensor above ground (see *Figures 32-35*). As shown by Fraser, the pseudo-layer algorithm measures more accurately the resistivity of the thickest layers of the geology, typically the bedrock under the overburden.

Since the pseudo-layer algorithm resistivity is primarily dependent on the ratio of in-phase and quadrature, and the in-phase is low signal over resistive ground, the pseudo-layer algorithm may become unstable when there is still good signal in quadrature. At this point we substitute an amplitude-altitude algorithm, since the total amplitude of the signal is still above noise. The draw-back of the amplitude altitude algorithm, and the reason that it is not used everywhere, is that the amplitude of the EM signal is dominated by the near-surface geology, so the maximum depth of sensitivity is less than the pseudo-layer algorithm. The two methods are each used when they are most appropriate and the combined result of both methods is termed "extended range apparent resistivity". A gradual transition from the pseudo-layer derived resistivity to the amplitude-altitude method is employed if either the in phase signal drops below 100ppm or the amplitude (√(in-phase2 + quadrature2)) drops below 141 ppm.

The combined extended range apparent resistivity algorithm provides the highest range of apparent resistivity measurements available from any airborne EM system, including the highest accuracy for bedrock resistivity in areas of moderate to high conductivity, and extended range of resistivity over resistive geology.

The resultant minimum and maximum values for each frequency range from a low of 0.1 ohm-m to a value in ohm-m approximately equal to the frequency of the signal, summarized in *Table 20*.

Table 20: Resultant minimum and maximum values for each frequency range

Frequency (Hz)	912	3005	11962	24510
Minimum (ohm-m)	0.1	0.1	0.1	0.1
Maximum (ohm-m)	912	3005	11962	24510

Values that fall outside these ranges are considered invalid, and are nulled.

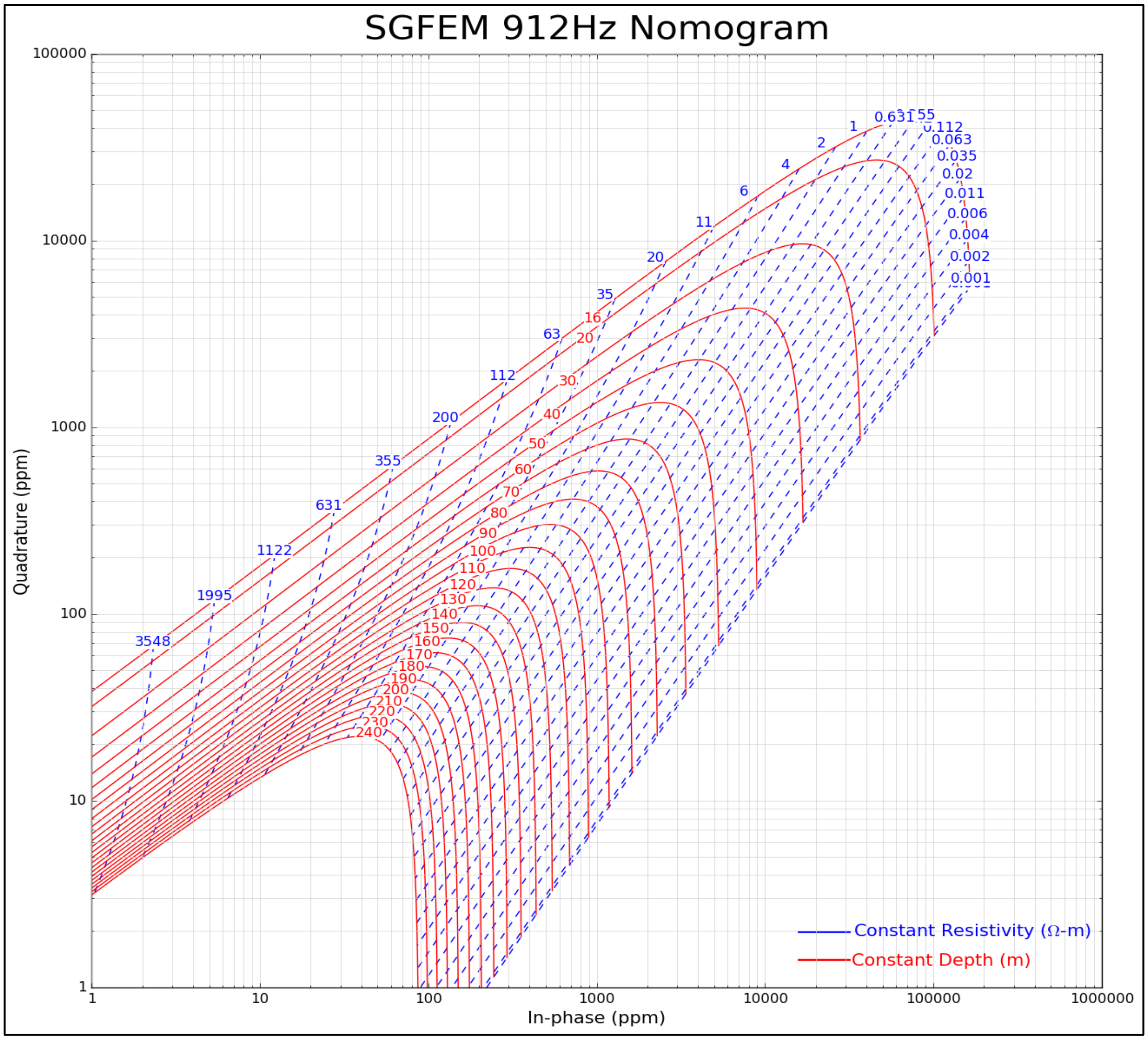


Figure 32: SGFEM 912Hz Nomogram

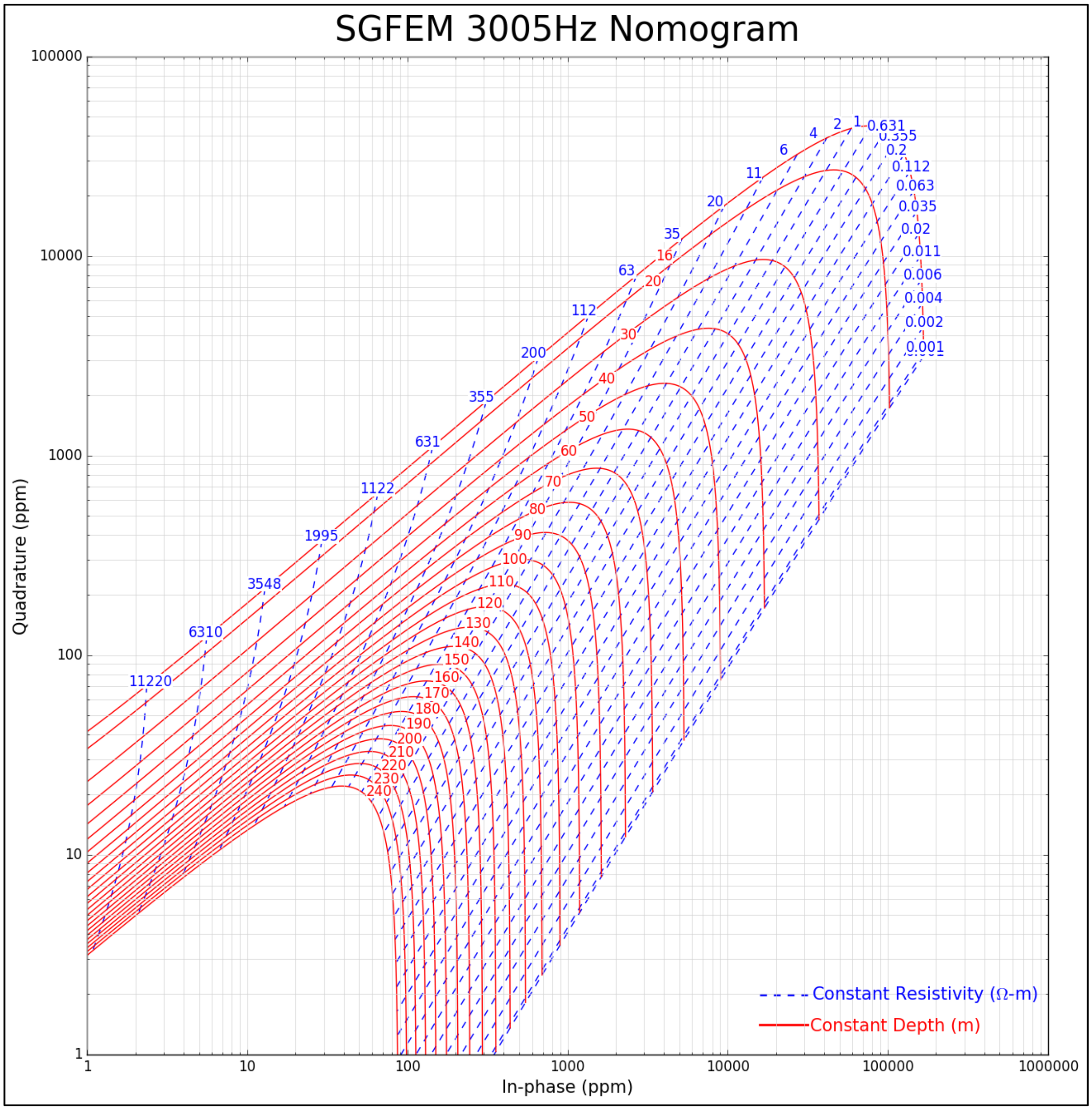


Figure 33: SGFEM 3005Hz Nomogram

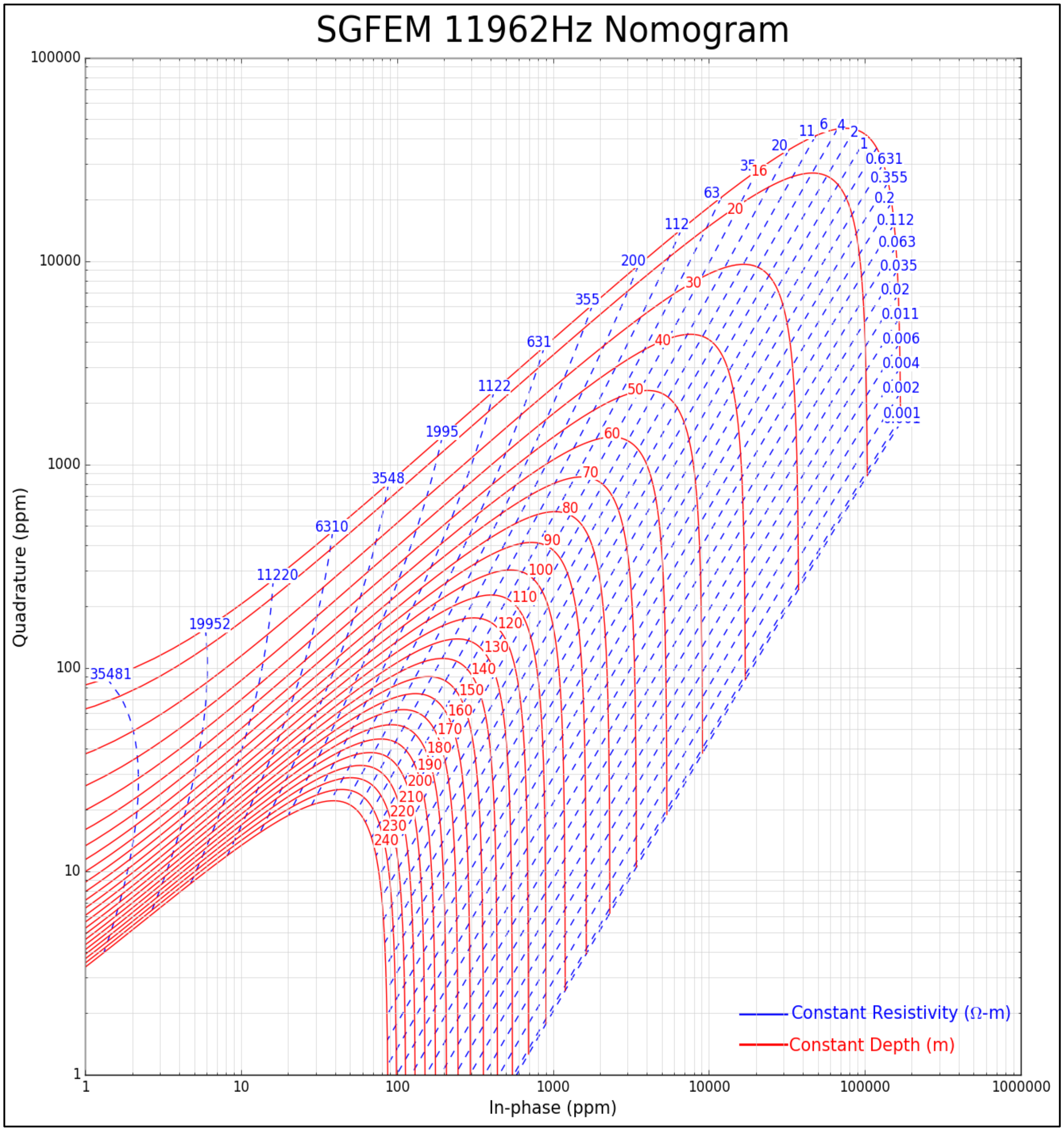


Figure 34: SGFEM 11962Hz Nomogram

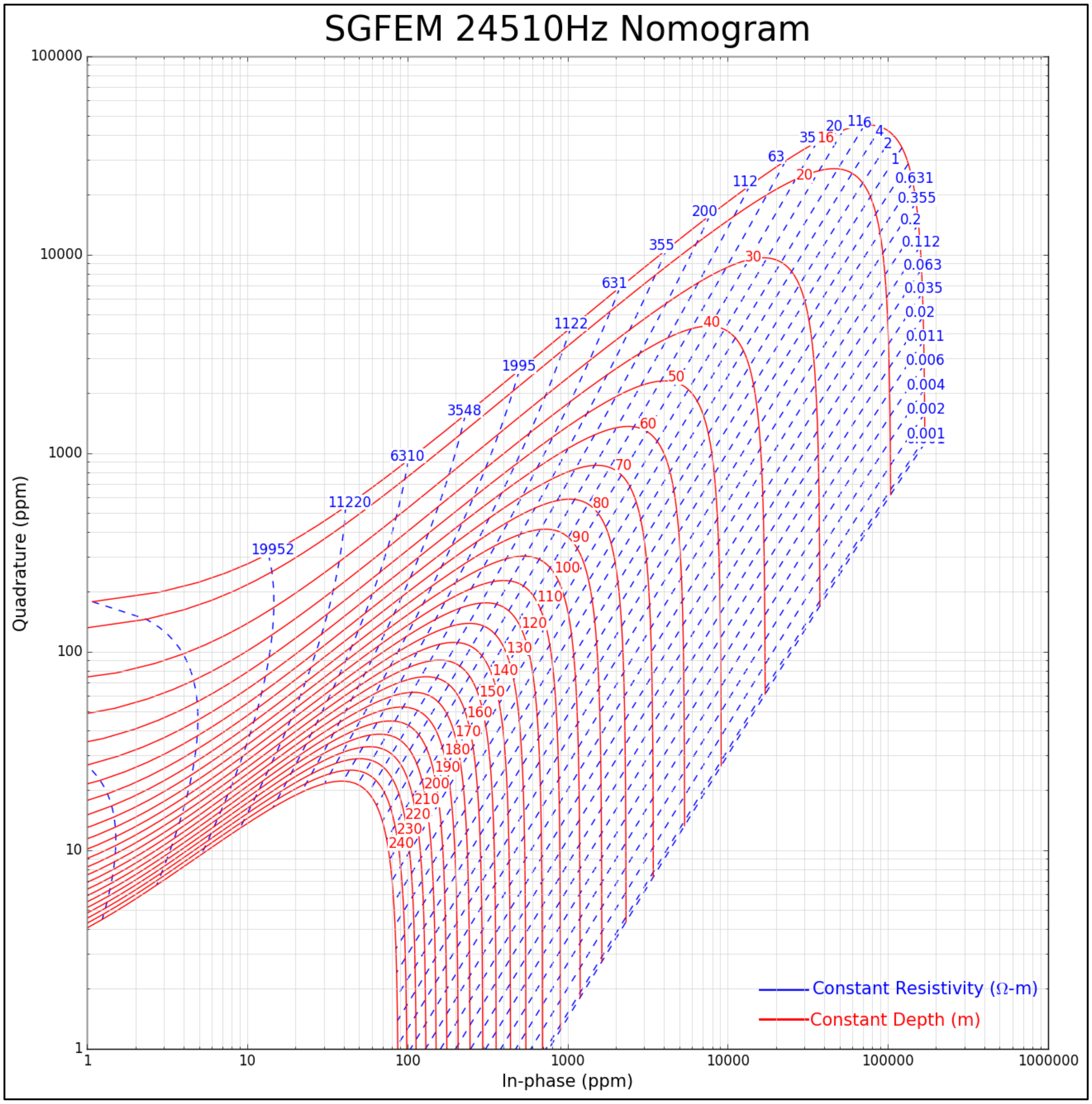


Figure 35: SGFEM 24510Hz Nomogram

Micro-levelling

For the purpose of micro-levelling, the log value of each resistivity is calculated. This approach is preferred because small changes in low resistivity values are as measurable and significant as large changes in large resistivity values. Micro-levelling was applied using the log grids to remove residual levelling errors from the gridded log of resistivity data. This was achieved by using a combined directional cosine filter and high pass Butterworth filter to identify and remove artifacts that are long wavelength parallel to survey lines and short wavelengths perpendicular to survey lines. A limit of +/-0.1 log (ohm-m) was set for all micro-levelling corrections. The cut-off wavelength of the directional Butterworth filter was chosen to be 800 metres for each frequency and component. The micro-levelling corrections are converted back to ohm-m and applied to the resistivity data.

Gridding

All grids were made using a bi-directional Akima spline gridding routine which is appropriate for the high range of EM data. The final grids of the electromagnetic data were created with 50 m grid cell size appropriate for survey lines spaced at 200 m.

Conductivity Depth Images

The Conductivity Depth Image (CDI) used here is a type of apparent resistivity section first defined by Sengpiel (1988, Geophysical Prospecting v.36 p.446-459) then refined in Sengpiel and Siemon (1998, Exploration Geophysics v.9 p.133-141). The conductivity depth section is created by assigning "a centroid depth z* to the half-space resistivity ρa" (Sengpiel and Siemon, 1998).

The centroid depth $z^* = D_a – h_0 + p_a/2$

where:

D_a is the apparent height above ground in m (see above),
h_0 is the measured height above ground in m (eg. from laser or radar altimeter),
and
p_a is the skin depth = 503 √(resistivity (ohm-m)/frequency (Hz)).

At SGL we do not use the apparent depth term ($D_a – h_0$) in calculation of the centroid depth because in conditions where the measured altitude is affected by tree cover this will add an artificial error to the centroid depth. Also, in conditions of near-surface conductivity the resultant negative apparent depth ($D_a – h_0$) is not directly equivalent to the depth to the top of the layer. Therefore, in our calculations, the centroid depth is simply equal to the skin depth divided by two as defined above.

A series of profiles are created for each resistivity and centroid depth along each survey line. In cases where the profiles cross, preference is given to the shallower profile derived from the higher frequency which is considered to be more reliable. The resistivity is then linearly interpolated in the vertical direction between the profiles and the lowest resistivity profile value is projected for an additional depth equal to 25% of the depth of the lowest profile to create the full CDI.

Depth Slices

The final step is to extract resistivity at specific depths from the CDIs of each survey line and grid them using a bi-directional Akima spline gridding algorithm to provide maps of resistivity at specific depths, or so called "depth slices". Depth slices at 10m, 30m, 60m and 100m below the surface have been generated. The gridded data is micro-levelled to produce an even grid without line related artifacts.

Positional Data

A positional data flowchart is presented in *Figure 36*.

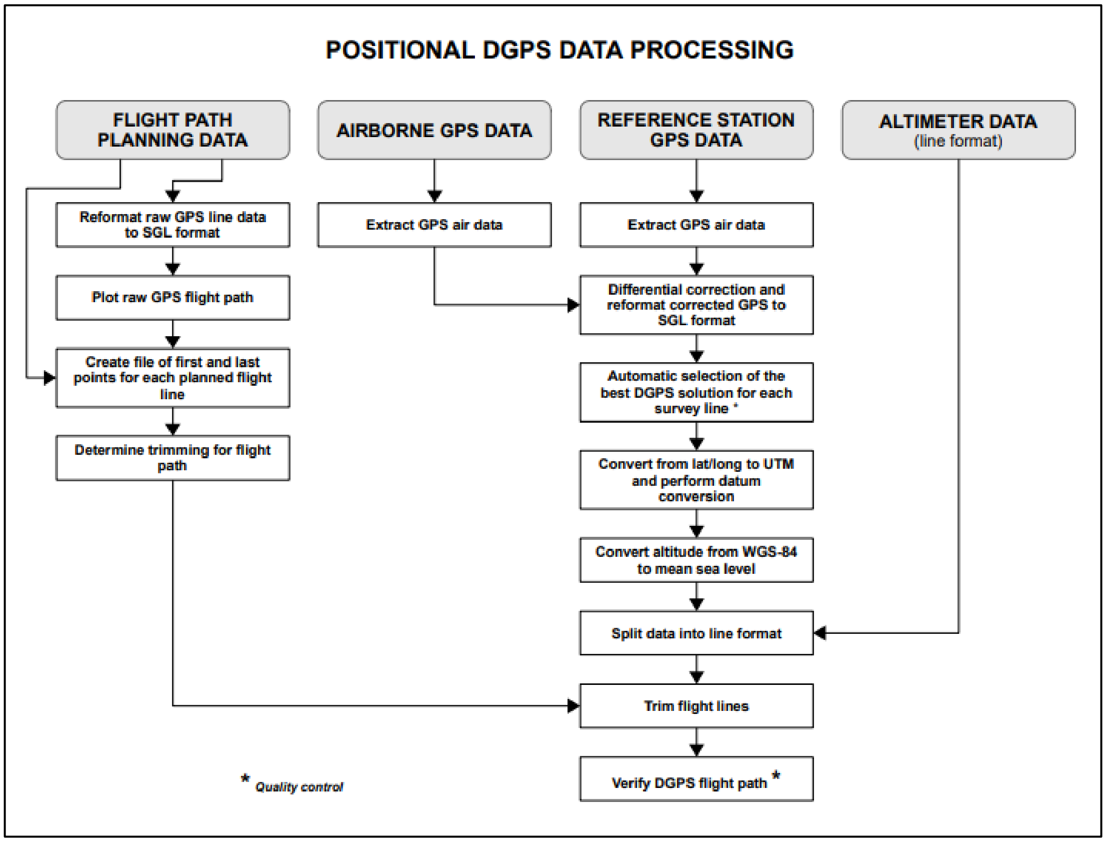


Figure 36: Positional data processing flow chart

A number of programs were executed for the compilation of navigation data in order to reformat and recalculate positions in differential mode. SGL's GPS data processing package, GPSoft, was used to calculate DGPS positions from raw 10 Hz range data obtained from the moving (airborne) and stationary (ground) receivers using combinations of L1 and L2 phase signal.

Accurate locations of the GPS antenna on the aircraft were determined by differentially correcting the airborne GPS data with respect to the SGL reference station position. 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. Positions were calculated and delivered in the WGS-84 datum, UTM projection zone UTM29N. The delivered data are also provided with x, y locations converted to the Irish National Grid (IRENET95 Datum, Irish Transverse Mercator projection). See *Table 21* and *Table 22* for the ellipsoid parameters, *Table 23* the datum conversion parameters, and *Table 24* for the projection parameters.

Table 21: Ellipsoid parameters for WGS-84

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

Table 22: Ellipsoid parameters for IRENET95

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

Table 23: Datum conversion parameters from IRENET95 to WGS-84

x shift (m)	0
y shift (m)	0
z shift (m)	0
x rotation (rad)	0
y rotation (rad)	0
z rotation (rad)	0

Table 24: Irish transverse Mercator projection parameters

Central meridian	8° West
Latitude of origin	53.5° North
False northing (m)	750,000
False easting (m)	600,000
Scale factor	0.999820

Elevation data were recorded relative to the GRS-80 ellipsoid and transformed to mean sea level (MSL) using the Earth Gravitational Model 2008 (EGM2008).

Laser Altimeter Data

The laser altimeter was modified to record terrain clearances at 20 Hz, with a maximum recorded clearance of 338 m. Laser data was corrected for attitude using pitch, roll and azimuth data recorded by the Sandel attitude and heading reference system SG102 unit. A “laser clearance” value was derived based on a combination of laser data as the primary altimeter, replaced by Collins radar altimeter data up to 600 m above ground and then by a height above ground value determined by subtracting SRTM data from the GPS altitude when there were gaps in the laser recording.

Digital Elevation Models (DEMs) with respect to Mean Sea Level (MSL) were derived from a combination of the laser clearance and the GPS altitude. The DEMs were set to zero over the sea. This zero correction was also applied to the delivered laser clearance channel. The DEM provided as a channel and as a grid is the version derived from the combination of laser clearance and GPS altitude.

10. FINAL PRODUCTS

Magnetic Line Data Format

A listing of the data channels delivered in ASCII format with a sampling rate of 10 Hz can be found in *Table 25*.

Table 25: Magnetic line data channels and format

Name	Units	Field Length	Null	Description
LINE	-	8	-	Line Number - LLLL.SR (L=line, S=segment, R=reflight)
FLT	-	5	-	Flight Number
DATE	-	10	-	Date YYYYMMDD
DAY	-	5	-	Day of year
TIME	sec	10	-	Fiducial Seconds
LAT	degree	13	*	Latitude, WGS-84
LONG	degree	13	*	Longitude, WGS-84
UTM-X	m	11		X coordinate, WGS-84 UTM 29N
UTM-Y	m	12		Y coordinate, WGS-84 UTM 29N
UTM-Z	m	10		GPS Elevation above WGS-84 Ellipsoid
ITM-X	m	11	*	X coordinate, IRENET95 ITM
ITM-Y	m	11	*	Y coordinate, IRENET95 ITM
MSL-Z	m	10	*	GPS Elevation above Mean Sea Level
GCLEAR	m	10	*	Clearance above Terrain
DEM	m	10	*	DEM from Laser & GPS with respect to Mean Sea Level
DIURNAL	nT	11	*	Diurnal Magnetic Field from reference station
UNCOMP-MAG	nT	11	*	Uncompensated Airborne Magnetic Field
COMP-MAG	nT	11	*	Compensated Airborne Magnetic Field
IGRF	nT	11	*	IGRF Correction
LAG-MAG	nT	11	*	Tail Lag Corrected Airborne Magnetic Field
DCMAG	nT	11	*	Diurnally Corrected Airborne Magnetic Field
IGRFMAG	nT	11	*	IGRF Corrected Airborne Magnetic Field
LVLDMAG	nT	11	*	Levelled Airborne Magnetic Field
MIC-MAG	nT	11	*	Microlevelled Airborne Magnetic Field

Radiometric Line Data Format

A listing of the data channels delivered in ASCII format with a sampling rate of 1 Hz can be found in *Table 26*.

Table 26: Radiometric line data channels and format

Name	Units	Field Length	Null	Description
LINE	-	8	-	Line number - LLLL.SR (L=line, S=segment, R=reflight)
FLT	-	6	-	Flight Number
DATE	-	10	-	Date YYYYMMDD
DAY	-	5	-	Day of year
TIME	sec	10	-	Fiducial Seconds
LAT	degree	13	*	Latitude, WGS-84
LONG	degree	13	*	Longitude, WGS-84
ITM-X	m	11	*	X coordinate, IRENET95 ITM
ITM-Y	m	11	*	Y coordinate, IRENET95 ITM
UTM-X	m	11	*	X coordinate, WGS-84 UTM 29N
UTM-Y	m	12	*	Y coordinate, WGS-84 UTM 29N
UTM-Z	m	10	*	GPS Elevation above WGS-84 Ellipsoid
MSLHGT	m	10	*	GPS Elevation above Mean Sea Level
GCLEAR	m	10	*	Clearance above Terrain from GPS
LASER	m	10	*	Laser Altimeter
LCLEAR	m	10	*	Clearance above Terrain from Laser & GPS
DEM	m	10	*	DEM from Laser & GPS with respect to Mean Sea Level
TEMP	degree C	11	*	Temperature
BARO	m	11	*	Barometric Pressure Altitude
E_HGT	m	11	*	Effective Height at Standard Temperature and Pressure
R_LIVE	msec	8	*	Gamma-ray spectrometer live time
R_COS	counts/s	10	*	Recorded Cosmic Count
R_UPU	counts/s	10	*	Recorded Up-Looking Uranium Count
R_TOT	counts/s	10	*	Recorded Total Count, de-lagged
R_POT	counts/s	10	*	Recorded Potassium Count, de-lagged
R_URA	counts/s	10	*	Recorded Uranium Count, de-lagged
R_THO	counts/s	10	*	Recorded Thorium Count, de-lagged
C_TOT_D	counts/s	10	*	Corrected Total Count, de-lagged, DPF
C_POT_D	%	10	*	Corrected Potassium Concentration, de-lagged, DPF
C_URA_D	ppm	10	*	Corrected Uranium Concentration, de-lagged, DPF
C_THO_D	ppm	10	*	Corrected Thorium Concentration, de-lagged, DPF

Name	Units	Field Length	Null	Description
C_TOT_DL	counts/s	10	*	Corrected Total Count, de-lagged, DPF and minimum limited to 0
C_POT_DL	%	10	*	Corrected Potassium Concentration, de-lagged, DPF and minimum limited to 0
C_URA_DL	ppm	10	*	Corrected Uranium Concentration, de-lagged, DPF and minimum limited to 0
C_THO_DL	ppm	10	*	Corrected Thorium Concentration, de-lagged, DPF and minimum limited to 0
C_TOT_DLU	counts/s	10	*	Unlimited Corrected Total Count, de-lagged, DPF and minimum limited to 0
C_POT_DLU	%	10	*	Unlimited Corrected Potassium Concentration, de-lagged, DPF and minimum limited to 0
C_URA_DLU	ppm	10	*	Unlimited Corrected Uranium Concentration, de-lagged, DPF and minimum limited to 0
C_THO_DLU	ppm	10	*	Unlimited Corrected Thorium Concentration, de-lagged, DPF and minimum limited to 0
E_DOSE	nGy/hr	10	*	Air absorbed dose rate
E_DOSEU	nGy/hr	10	*	Unlimited Air absorbed dose rate
RUT	ppm/ppm	10	*	Uranium / Thorium Ratio
RUK	ppm/%	10	*	Uranium / Potassium Ratio
RTK	ppm/%	10	*	Thorium / Potassium Ratio
RUTU	ppm/ppm	10	*	Unlimited Uranium / Thorium Ratio
RUKU	ppm/%	10	*	Unlimited Uranium / Potassium Ratio
RTKU	ppm/%	10	*	Unlimited Thorium / Potassium Ratio

Frequency-Domain Electromagnetic Line Data Format

A listing of the data channels delivered in ASCII format with a sampling rate of 10 Hz can be found in *Table 27*.

Table 27: F.E.M line data channels and format

Name	Units	Field Length	Null	Description
LINE	-	8	-	Line number - LLLL.SR (L=line, S=segment, R=reflight)
FLT	-	5	-	Flight number
DATE	-	10	-	Date YYYYMMDD
DAY	-	5	-	Day of year
TIME	sec	10	-	Fiducial seconds
LAT	degree	13	*	Latitude, WGS-84
LONG	degree	13	*	Longitude, WGS-84
ITM-X	m	11	*	X coordinate, IRENET95 ITM
ITM-Y	m	11	*	Y coordinate, IRENET95 ITM
UTM-X	m	11	*	X coordinate, WGS-84 UTM 29N
UTM-Y	m	12	*	Y coordinate, WGS-84 UTM 29N
UTM-Z	m	10	*	GPS Elevation above WGS-84 Ellipsoid
MSLHGT	m	10	*	GPS Elevation above Mean Sea Level
CLEARANCE	m	13	*	Clearance above Terrain from Laser
DEM	m	7	*	DEM for Laser with respect to Mean Sea Level
TEMP	degree C	8	*	Temperature
P09ppm	ppm	9	*	In-phase 912 Hz
Q09ppm	ppm	9	*	Quadrature 912 Hz
P3ppm	ppm	9	*	In-phase 3005 Hz
Q3ppm	ppm	9	*	Quadrature 3005 Hz
P12ppm	ppm	9	*	In-phase 11962 Hz
Q12ppm	ppm	9	*	Quadrature 11962 Hz
P25ppm	ppm	9	*	In-phase 24510 Hz
Q25ppm	ppm	9	*	Quadrature 24510 Hz
P09filt	ppm	9	*	Filtered in-phase 912 Hz
Q09filt	ppm	9	*	Filtered quadrature 912 Hz
P3filt	ppm	9	*	Filtered in-phase 3005 Hz
Q3filt	ppm	9	*	Filtered quadrature 3005 Hz
P12filt	ppm	9	*	Filtered in-phase 11962 Hz
Q12filt	ppm	9	*	Filtered quadrature 11962 Hz
P25filt	ppm	9	*	Filtered in-phase 24510 Hz
Q25filt	ppm	9	*	Filtered quadrature 24510 Hz
P09lev	ppm	9	*	Levelled and filtered in-phase 912 Hz
Q09lev	ppm	9	*	Levelled and filtered quadrature 912 Hz

Name	Units	Field Length	Null	Description
P3lev	ppm	9	*	Levelled and filtered in-phase 3005 Hz
Q3lev	ppm	9	*	Levelled and filtered quadrature 3005 Hz
P12lev	ppm	9	*	Levelled and filtered in-phase 11962 Hz
Q12lev	ppm	9	*	Levelled and filtered quadrature 11962 Hz
P25lev	ppm	9	*	Levelled and filtered in-phase 24510 Hz
Q25lev	ppm	9	*	Levelled and filtered quadrature 24510 Hz
Radio_Flag	-	11	*	Radio call flag
PLM_nT	nT	11	*	Power line monitor
ExtendedRes09	ohm-m	18	*	Extended range resistivity, half-space model, 912 Hz
ExtendedRes3	ohm-m	18	*	Extended range resistivity, half-space model, 3005 Hz
ExtendedRes12	ohm-m	18	*	Extended range resistivity, half-space model, 11962 Hz
ExtendedRes25	ohm-m	18	*	Extended range resistivity, half-space model, 24510 Hz
ExtendedRes09_GRID	ohm-m	20	*	Microlevelled extended range resistivity, half-space model, 912 Hz, for gridding, nulled >120 m
ExtendedRes3_GRID	ohm-m	20	*	Microlevelled extended range resistivity, half-space model, 3005 Hz, for gridding, nulled >120 m
ExtendedRes12_GRID	ohm-m	20	*	Microlevelled extended range resistivity, half-space model, 11962 Hz, for gridding, nulled >120 m
ExtendedRes25_GRID	ohm-m	20	*	Microlevelled extended range resistivity, half-space model, 24510 Hz, for gridding, nulled >120 m
ExtendedDepth09	m	17	*	Extended range centroid depth 912 Hz
ExtendedDepth3	m	17	*	Extended range centroid depth 3005 Hz
ExtendedDepth12	m	17	*	Extended range centroid depth 11962 Hz
ExtendedDepth25	m	17	*	Extended range centroid depth 24510 Hz
ExtendedResSlice10	ohm-m	21	*	Extended range resistivity depth slice at 10 m
ExtendedResSlice30	ohm-m	21	*	Extended range resistivity depth slice at 30 m
ExtendedResSlice60	ohm-m	21	*	Extended range resistivity depth slice at 60 m
ExtendedResSlice100	ohm-m	21	*	Extended range resistivity depth slice at 100 m
ExtendedResSlice10_GRID	ohm-m	25	*	Microlevelled extended range resistivity depth slice at 10 m, for gridding, nulled >120 m
ExtendedResSlice30_GRID	ohm-m	25	*	Microlevelled extended range resistivity depth slice at 30 m, for gridding, nulled >120 m
ExtendedResSlice60_GRID	ohm-m	25	*	Microlevelled extended range resistivity depth slice at 60 m, for gridding, nulled >120 m
ExtendedResSlice100_GRID	ohm-m	25	*	Microlevelled extended range resistivity depth slice at 100 m, for gridding, nulled >120 m

Full Spectrum Spectrometer Line Data Format

A listing of the data channels delivered in ASCII format with a sampling rate of 1 Hz can be found in *Table 28*. Full spectrum data was delivered for 512 and 1024 channels.

File Names: DOWN1024-A9.xyz, UP1024-A9.xyz, DOWN512-A9.xyz, UP512-A9.xyz

Table 28:Full spectrum spectrometer line data channels and format

Column	Name	Units	Field Length	Null	Description
01	TIME	s	9	-	Fiducial Seconds
02	LIVE	msec	6	-	Live time
03	S:1	counts	6	-	Spectrometer channel 1
04	S:2	counts	6	-	Spectrometer channel 2
.	.		.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
1026	S:1024	counts	6	-	Spectrometer channel 1024

Digital Grids

The following are provided as digital grids

Formats	ASCII (.XYZ), Geosoft Binary (.GRD), Grid Exchange (.GXF)
Grid Cell Size	50 m
Datum:	IRENET95
Projection	Irish Transverse Mercator (ITM)

Table 29:Delivered digital grids

Grid File Name	Units	Description
AMF	nT	Magnetic Anomaly
FVM	nT/m	First Vertical Derivative of Magnetic Anomaly
TER	m	Digital Elevation Model from Clearance
TOT	counts/sec	Total counts
POT	%	Potassium
THO	ppm	Equivalent Thorium
URA	ppm	Equivalent Uranium
TOTU	counts/sec	Unlimited Total Counts
POTU	%	Unlimited Potassium
THOU	ppm	Unlimited Equivalent Thorium
URAU	ppm	Unlimited Equivalent Uranium
P09	ppm	In-phase, 912 Hz, levelled
Q09	ppm	Quadrature, 912 Hz, levelled
P3	ppm	In-phase, 3005 Hz, levelled
Q3	ppm	Quadrature, 3005 Hz, levelled
P12	ppm	In-phase, 11962 Hz, levelled
Q12	ppm	Quadrature, 11962 Hz, levelled
P25	ppm	In-phase, 24510 Hz, levelled
Q25	ppm	Quadrature, 24510 Hz, levelled
ExtendedRes09	ohm-m	Microlevelled extended range resistivity, half-space model, 912 Hz, nulled >120 m
ExtendedRes3	ohm-m	Microlevelled extended range resistivity, half-space model, 3005 Hz, nulled >120 m
ExtendedRes12	ohm-m	Microlevelled extended range resistivity, half-space model, 11962 Hz, nulled >120 m
ExtendedRes25	ohm-m	Microlevelled extended range resistivity, half-space model, 24510 Hz, nulled >120 m
ExtendedResSlice10	ohm-m	Microlevelled extended range resistivity depth slice at 10m, nulled >120 m
ExtendedResSlice30	ohm-m	Microlevelled extended range resistivity depth slice at 30m, nulled >120 m
ExtendedResSlice60	ohm-m	Microlevelled extended range resistivity depth slice at 60m, nulled >120 m
ExtendedResSlice100	ohm-m	Microlevelled extended range resistivity depth slice at 100m, nulled >120 m

Digital Video Inventory

Please see Appendix XIII for a complete list of the Digital Video Inventory.

SGL

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.

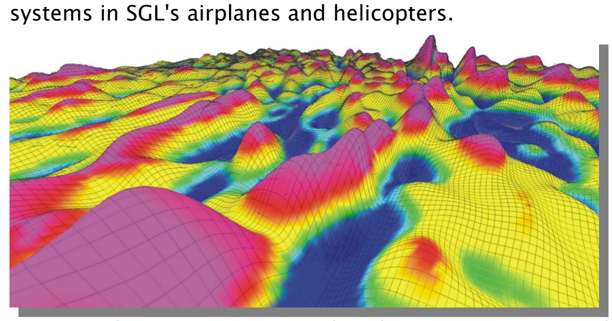
Facilities at the head office include a state of the art data processing department with an integrated digital cartographic department and a fully equipped electronics workshop for research, development and production of geophysical instruments. A Transport Canada Approved Maintenance Organization (AMO) 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.

v6.0

Appendix II

Planned Survey Lines

Datum: IRENET95

Traverse Lines
A9 Block

SEGMENT NO	START LAT	START LONG	END LAT	END LONG	LENGTH NM	LENGTH KM
T9001.0	N51:38.43	W008:32.24	N52:18.08	W008:50.11	41.20	76.30
T9002.0	N51:38.46	W008:32.07	N52:18.11	W008:49.94	41.20	76.30
T9003.0	N51:38.49	W008:31.91	N52:18.14	W008:49.77	41.20	76.30
T9004.0	N51:38.51	W008:31.74	N52:18.17	W008:49.60	41.20	76.30
T9005.0	N51:38.54	W008:31.57	N52:18.20	W008:49.43	41.20	76.30
T9006.0	N51:38.57	W008:31.41	N52:18.23	W008:49.26	41.20	76.30
T9007.0	N51:38.60	W008:31.24	N52:18.26	W008:49.09	41.20	76.30
T9008.0	N51:38.63	W008:31.07	N52:18.29	W008:48.92	41.20	76.30
T9009.0	N51:38.65	W008:30.90	N52:18.31	W008:48.75	41.20	76.31
T9010.0	N51:38.68	W008:30.73	N52:18.34	W008:48.58	41.21	76.31
T9011.0	N51:39.62	W008:30.97	N52:18.37	W008:48.42	40.26	74.57
T9012.0	N51:39.70	W008:30.83	N52:18.40	W008:48.25	40.20	74.46
T9013.0	N51:39.73	W008:30.66	N52:18.43	W008:48.08	40.20	74.46
T9014.0	N51:39.76	W008:30.49	N52:18.46	W008:47.91	40.20	74.45
T9015.0	N51:39.79	W008:30.33	N52:18.49	W008:47.74	40.20	74.45
T9016.0	N51:39.82	W008:30.16	N52:18.52	W008:47.57	40.20	74.44
T9017.0	N51:39.86	W008:30.00	N52:18.55	W008:47.40	40.19	74.44
T9018.0	N51:39.89	W008:29.83	N52:18.58	W008:47.23	40.19	74.43
T9019.0	N51:39.92	W008:29.66	N52:18.60	W008:47.06	40.19	74.43
T9020.0	N51:39.95	W008:29.50	N52:18.63	W008:46.89	40.19	74.42
T9021.0	N51:39.98	W008:29.33	N52:18.66	W008:46.72	40.18	74.42
T9022.0	N51:40.01	W008:29.16	N52:18.69	W008:46.55	40.18	74.42
T9023.0	N51:40.04	W008:29.00	N52:18.72	W008:46.38	40.18	74.41
T9024.0	N51:40.07	W008:28.83	N52:18.75	W008:46.21	40.18	74.41
T9025.0	N51:40.10	W008:28.67	N52:18.78	W008:46.04	40.17	74.40
T9026.0	N51:40.13	W008:28.50	N52:18.81	W008:45.87	40.17	74.40
T9027.0	N51:40.16	W008:28.33	N52:18.84	W008:45.70	40.17	74.39
T9028.0	N51:40.20	W008:28.17	N52:18.87	W008:45.53	40.17	74.39
T9029.0	N51:40.23	W008:28.00	N52:18.90	W008:45.36	40.16	74.38
T9030.0	N51:40.26	W008:27.83	N52:18.92	W008:45.19	40.16	74.38
T9031.0	N51:40.29	W008:27.67	N52:18.95	W008:45.03	40.16	74.38
T9032.0	N51:40.32	W008:27.50	N52:18.98	W008:44.86	40.16	74.37
T9033.0	N51:40.35	W008:27.34	N52:19.01	W008:44.69	40.15	74.37
T9034.0	N51:40.38	W008:27.17	N52:19.04	W008:44.52	40.15	74.36
T9035.0	N51:40.41	W008:27.00	N52:19.07	W008:44.35	40.15	74.36
T9036.0	N51:40.44	W008:26.84	N52:19.10	W008:44.18	40.15	74.35
T9037.0	N51:40.47	W008:26.67	N52:19.13	W008:44.01	40.15	74.35
T9038.0	N51:40.50	W008:26.50	N52:19.16	W008:43.84	40.14	74.34
T9039.0	N51:40.54	W008:26.34	N52:19.19	W008:43.67	40.14	74.34
T9040.0	N51:40.57	W008:26.17	N52:19.21	W008:43.50	40.14	74.34
T9041.0	N51:40.60	W008:26.00	N52:19.24	W008:43.33	40.14	74.33
T9042.0	N51:40.63	W008:25.84	N52:19.27	W008:43.16	40.13	74.33
T9043.0	N51:40.66	W008:25.67	N52:19.30	W008:42.99	40.13	74.32
T9044.0	N51:40.69	W008:25.51	N52:19.33	W008:42.82	40.13	74.32
T9045.0	N51:40.72	W008:25.34	N52:19.36	W008:42.65	40.13	74.31
T9046.0	N51:40.75	W008:25.17	N52:19.39	W008:42.48	40.12	74.31
T9047.0	N51:40.78	W008:25.01	N52:19.42	W008:42.31	40.12	74.30
T9048.0	N51:40.81	W008:24.84	N52:19.45	W008:42.14	40.12	74.30
T9049.0	N51:40.84	W008:24.67	N52:19.48	W008:41.97	40.12	74.30

Traverse Lines
A9 Block

SEGMENT	START		END		LENGTH	
NO	LAT	LONG	LAT	LONG	NM	KM
T9050.0	N51:40.87	W008:24.51	N52:19.50	W008:41.80	40.12	74.30
T9051.0	N51:40.90	W008:24.34	N52:19.53	W008:41.63	40.12	74.30
T9052.0	N51:40.93	W008:24.17	N52:19.56	W008:41.46	40.12	74.30
T9053.0	N51:40.96	W008:24.00	N52:19.59	W008:41.29	40.12	74.30
T9054.0	N51:40.98	W008:23.84	N52:19.62	W008:41.12	40.12	74.30
T9055.0	N51:41.01	W008:23.67	N52:19.65	W008:40.95	40.12	74.30
T9056.0	N51:41.04	W008:23.50	N52:19.68	W008:40.79	40.12	74.30
T9057.0	N51:41.07	W008:23.33	N52:19.71	W008:40.62	40.12	74.30
T9058.0	N51:41.10	W008:23.17	N52:19.74	W008:40.45	40.12	74.30
T9059.0	N51:41.13	W008:23.00	N52:19.76	W008:40.28	40.12	74.30
T9060.0	N51:41.16	W008:22.83	N52:19.79	W008:40.11	40.12	74.30
T9061.0	N51:41.18	W008:22.66	N52:19.82	W008:39.94	40.12	74.30
T9062.0	N51:41.21	W008:22.50	N52:19.85	W008:39.77	40.12	74.30
T9063.0	N51:41.24	W008:22.33	N52:19.88	W008:39.60	40.12	74.30
T9064.0	N51:41.27	W008:22.16	N52:19.91	W008:39.43	40.12	74.30
T9065.0	N51:41.30	W008:21.99	N52:19.94	W008:39.26	40.12	74.30
T9066.0	N51:42.27	W008:22.24	N52:19.97	W008:39.09	39.14	72.49
T9067.0	N51:42.34	W008:22.10	N52:20.00	W008:38.92	39.09	72.40
T9068.0	N51:42.38	W008:21.93	N52:20.02	W008:38.75	39.09	72.39
T9069.0	N51:42.41	W008:21.76	N52:20.05	W008:38.58	39.09	72.39
T9070.0	N51:42.44	W008:21.60	N52:20.08	W008:38.41	39.09	72.39
T9071.0	N51:42.47	W008:21.43	N52:20.11	W008:38.24	39.08	72.38
T9072.0	N51:42.50	W008:21.26	N52:20.14	W008:38.07	39.08	72.38
T9073.0	N51:42.53	W008:21.10	N52:20.17	W008:37.90	39.08	72.37
T9074.0	N51:42.56	W008:20.93	N52:20.20	W008:37.73	39.08	72.37
T9075.0	N51:42.59	W008:20.76	N52:20.23	W008:37.56	39.07	72.37
T9076.0	N51:42.62	W008:20.60	N52:20.26	W008:37.39	39.07	72.36
T9077.0	N51:42.65	W008:20.43	N52:20.28	W008:37.22	39.07	72.36
T9078.0	N51:42.68	W008:20.26	N52:20.31	W008:37.05	39.07	72.35
T9079.0	N51:42.71	W008:20.10	N52:20.34	W008:36.88	39.07	72.35
T9080.0	N51:42.74	W008:19.93	N52:20.37	W008:36.71	39.06	72.35
T9081.0	N51:42.77	W008:19.76	N52:20.40	W008:36.54	39.06	72.34
T9082.0	N51:42.80	W008:19.60	N52:20.43	W008:36.37	39.06	72.34
T9083.0	N51:42.83	W008:19.43	N52:20.46	W008:36.20	39.06	72.33
T9084.0	N51:42.86	W008:19.26	N52:20.49	W008:36.03	39.06	72.33
T9085.0	N51:42.89	W008:19.10	N52:20.51	W008:35.86	39.05	72.33
T9086.0	N51:42.92	W008:18.93	N52:20.54	W008:35.69	39.05	72.32
T9087.0	N51:42.95	W008:18.76	N52:20.57	W008:35.52	39.05	72.32
T9088.0	N51:42.99	W008:18.60	N52:20.60	W008:35.35	39.05	72.31
T9089.0	N51:43.02	W008:18.43	N52:20.63	W008:35.18	39.04	72.31
T9090.0	N51:43.05	W008:18.26	N52:20.66	W008:35.02	39.04	72.31
T9091.0	N51:43.08	W008:18.10	N52:20.69	W008:34.85	39.04	72.30
T9092.0	N51:43.11	W008:17.93	N52:20.72	W008:34.68	39.04	72.30
T9093.0	N51:43.13	W008:17.76	N52:20.74	W008:34.51	39.04	72.30
T9094.0	N51:43.16	W008:17.59	N52:20.77	W008:34.34	39.04	72.30
T9095.0	N51:43.19	W008:17.43	N52:20.80	W008:34.17	39.04	72.30
T9096.0	N51:43.22	W008:17.26	N52:20.83	W008:34.00	39.04	72.30
T9097.0	N51:43.25	W008:17.09	N52:20.86	W008:33.83	39.04	72.30
T9098.0	N51:43.28	W008:16.92	N52:20.89	W008:33.66	39.04	72.30
T9099.0	N51:43.31	W008:16.76	N52:20.92	W008:33.49	39.04	72.30
T9100.0	N51:43.33	W008:16.59	N52:20.95	W008:33.32	39.04	72.30
T9101.0	N51:43.36	W008:16.42	N52:20.97	W008:33.15	39.04	72.30
T9102.0	N51:43.39	W008:16.25	N52:21.00	W008:32.98	39.04	72.30
T9103.0	N51:43.42	W008:16.09	N52:21.03	W008:32.81	39.04	72.30
T9104.0	N51:43.45	W008:15.92	N52:21.06	W008:32.64	39.04	72.30

Traverse Lines
A9 Block

SEGMENT NO	START LAT	START LONG	END LAT	END LONG	LENGTH NM	LENGTH KM
T9105.0	N51:43.48	W008:15.75	N52:21.09	W008:32.47	39.04	72.30
T9106.0	N51:43.50	W008:15.58	N52:21.12	W008:32.30	39.04	72.30
T9107.0	N51:43.53	W008:15.41	N52:21.15	W008:32.13	39.04	72.30
T9108.0	N51:45.49	W008:16.09	N52:21.18	W008:31.96	37.04	68.59
T9109.0	N51:45.55	W008:15.94	N52:21.20	W008:31.79	37.00	68.53
T9110.0	N51:45.58	W008:15.77	N52:21.23	W008:31.62	37.00	68.53
T9111.0	N51:45.61	W008:15.60	N52:21.26	W008:31.45	37.00	68.53
T9112.0	N51:45.64	W008:15.44	N52:21.29	W008:31.28	37.00	68.53
T9113.0	N51:45.67	W008:15.27	N52:21.32	W008:31.11	37.00	68.53
T9114.0	N51:45.69	W008:15.10	N52:21.35	W008:30.94	37.00	68.53
T9115.0	N51:45.72	W008:14.93	N52:21.38	W008:30.77	37.00	68.53
T9116.0	N51:45.75	W008:14.77	N52:21.41	W008:30.60	37.00	68.52
T9117.0	N51:45.78	W008:14.60	N52:21.43	W008:30.43	37.00	68.52
T9118.0	N51:45.81	W008:14.43	N52:21.46	W008:30.26	37.00	68.52
T9119.0	N51:45.84	W008:14.26	N52:21.49	W008:30.09	37.00	68.52
T9120.0	N51:45.87	W008:14.10	N52:21.52	W008:29.92	37.00	68.52
T9121.0	N51:45.90	W008:13.93	N52:21.55	W008:29.75	37.00	68.52
T9122.0	N51:45.92	W008:13.76	N52:21.58	W008:29.58	37.00	68.52
T9123.0	N51:45.95	W008:13.59	N52:21.61	W008:29.41	37.00	68.52
T9124.0	N51:45.98	W008:13.43	N52:21.63	W008:29.24	37.00	68.52
T9125.0	N51:46.01	W008:13.26	N52:21.66	W008:29.07	37.00	68.52
T9126.0	N51:46.04	W008:13.09	N52:21.69	W008:28.90	37.00	68.52
T9127.0	N51:46.07	W008:12.92	N52:21.72	W008:28.73	37.00	68.52
T9128.0	N51:46.10	W008:12.75	N52:21.75	W008:28.56	37.00	68.52
T9129.0	N51:46.12	W008:12.59	N52:21.78	W008:28.39	37.00	68.52
T9130.0	N51:46.15	W008:12.42	N52:21.81	W008:28.22	36.99	68.51
T9131.0	N51:46.18	W008:12.25	N52:21.83	W008:28.05	36.99	68.51
T9132.0	N51:46.21	W008:12.08	N52:21.86	W008:27.88	36.99	68.51
T9133.0	N51:46.24	W008:11.92	N52:21.89	W008:27.71	36.99	68.51
T9134.0	N51:46.27	W008:11.75	N52:21.92	W008:27.54	36.99	68.51
T9135.0	N51:46.30	W008:11.58	N52:21.95	W008:27.37	36.99	68.51
T9136.0	N51:46.32	W008:11.41	N52:21.98	W008:27.20	36.99	68.51
T9137.0	N51:46.35	W008:11.25	N52:22.01	W008:27.03	36.99	68.51
T9138.0	N51:46.38	W008:11.08	N52:22.03	W008:26.86	36.99	68.51
T9139.0	N51:46.41	W008:10.91	N52:22.06	W008:26.69	36.99	68.51
T9140.0	N51:46.44	W008:10.74	N52:22.09	W008:26.52	36.99	68.51
T9141.0	N51:46.47	W008:10.57	N52:22.12	W008:26.35	36.99	68.51
T9142.0	N51:46.50	W008:10.41	N52:22.15	W008:26.18	36.99	68.51
T9143.0	N51:46.52	W008:10.24	N52:22.18	W008:26.01	36.99	68.51
T9144.0	N51:46.55	W008:10.07	N52:22.21	W008:25.84	36.99	68.50
T9145.0	N51:46.58	W008:09.90	N52:22.23	W008:25.67	36.99	68.50
T9146.0	N51:46.61	W008:09.74	N52:22.26	W008:25.50	36.99	68.50
T9147.0	N51:46.64	W008:09.57	N52:22.29	W008:25.33	36.99	68.50
T9148.0	N51:46.67	W008:09.40	N52:22.32	W008:25.16	36.99	68.50
T9149.0	N51:46.70	W008:09.23	N52:22.35	W008:24.99	36.99	68.50
T9150.0	N51:46.72	W008:09.07	N52:22.38	W008:24.82	36.99	68.50
T9151.0	N51:46.75	W008:08.90	N52:22.41	W008:24.65	36.99	68.50
T9152.0	N51:46.78	W008:08.73	N52:22.43	W008:24.48	36.99	68.50
T9153.0	N51:46.81	W008:08.56	N52:22.46	W008:24.31	36.99	68.50
T9154.0	N51:46.84	W008:08.39	N52:22.49	W008:24.14	36.99	68.50
T9155.0	N51:46.87	W008:08.23	N52:22.52	W008:23.97	36.99	68.50
T9156.0	N51:46.90	W008:08.06	N52:22.55	W008:23.80	36.99	68.50
T9157.0	N51:46.92	W008:07.89	N52:22.58	W008:23.63	36.98	68.50
T9158.0	N51:46.95	W008:07.72	N52:22.61	W008:23.46	36.98	68.50
T9159.0	N51:46.98	W008:07.56	N52:22.63	W008:23.29	36.98	68.49

Traverse Lines
A9 Block

SEGMENT NO	START LAT	START LONG	END LAT	END LONG	LENGTH NM	LENGTH KM
T9160.0	N51:47.01	W008:07.39	N52:22.66	W008:23.12	36.98	68.49
T9161.0	N51:47.04	W008:07.22	N52:22.69	W008:22.95	36.98	68.49
T9162.0	N51:47.07	W008:07.05	N52:22.72	W008:22.78	36.98	68.49
T9163.0	N51:47.09	W008:06.88	N52:22.75	W008:22.61	36.98	68.49
T9164.0	N51:47.12	W008:06.72	N52:22.78	W008:22.44	36.98	68.49
T9165.0	N51:47.15	W008:06.55	N52:22.81	W008:22.27	36.98	68.49
T9166.0	N51:47.18	W008:06.38	N52:22.83	W008:22.10	36.98	68.49
T9167.0	N51:47.21	W008:06.21	N52:22.86	W008:21.93	36.98	68.49
T9168.0	N51:47.24	W008:06.05	N52:22.89	W008:21.76	36.98	68.49
T9169.0	N51:47.27	W008:05.88	N52:22.92	W008:21.59	36.98	68.49
T9170.0	N51:47.29	W008:05.71	N52:22.95	W008:21.42	36.98	68.49
T9171.0	N51:47.32	W008:05.54	N52:22.98	W008:21.25	36.98	68.49
T9172.0	N51:47.35	W008:05.37	N52:23.00	W008:21.08	36.98	68.49
T9173.0	N51:47.38	W008:05.21	N52:23.03	W008:20.91	36.98	68.48
T9174.0	N51:47.41	W008:05.04	N52:23.06	W008:20.74	36.98	68.48
T9175.0	N51:47.44	W008:04.87	N52:23.09	W008:20.57	36.98	68.48
T9176.0	N51:47.46	W008:04.70	N52:23.12	W008:20.40	36.98	68.48
T9177.0	N51:47.49	W008:04.53	N52:23.15	W008:20.23	36.98	68.48
T9178.0	N51:47.52	W008:04.37	N52:23.17	W008:20.06	36.98	68.48
T9179.0	N51:47.55	W008:04.20	N52:23.20	W008:19.89	36.98	68.48
T9180.0	N51:47.58	W008:04.03	N52:23.23	W008:19.72	36.98	68.48
T9181.0	N51:47.61	W008:03.86	N52:23.26	W008:19.55	36.98	68.48
T9182.0	N51:47.64	W008:03.70	N52:23.29	W008:19.38	36.98	68.48
T9183.0	N51:47.66	W008:03.53	N52:23.32	W008:19.21	36.98	68.48
T9184.0	N51:47.69	W008:03.36	N52:23.35	W008:19.04	36.97	68.48
T9185.0	N51:47.72	W008:03.19	N52:23.37	W008:18.87	36.97	68.48
T9186.0	N51:47.75	W008:03.02	N52:23.40	W008:18.70	36.97	68.48
T9187.0	N51:47.78	W008:02.86	N52:23.43	W008:18.53	36.97	68.48
T9188.0	N51:47.81	W008:02.69	N52:23.46	W008:18.36	36.97	68.47
T9189.0	N51:47.83	W008:02.52	N52:23.49	W008:18.19	36.97	68.47
T9190.0	N51:47.86	W008:02.35	N52:23.52	W008:18.02	36.97	68.47
T9191.0	N51:47.89	W008:02.18	N52:23.54	W008:17.85	36.97	68.47
T9192.0	N51:47.92	W008:02.02	N52:23.57	W008:17.68	36.97	68.47
T9193.0	N51:47.95	W008:01.85	N52:23.60	W008:17.51	36.97	68.47
T9194.0	N51:47.98	W008:01.68	N52:23.63	W008:17.34	36.97	68.47
T9195.0	N51:48.00	W008:01.51	N52:23.66	W008:17.17	36.97	68.47
T9196.0	N51:48.03	W008:01.35	N52:23.69	W008:17.00	36.97	68.47
T9197.0	N51:48.06	W008:01.18	N52:23.71	W008:16.83	36.97	68.47
T9198.0	N51:48.09	W008:01.01	N52:23.74	W008:16.66	36.97	68.47
T9199.0	N51:48.12	W008:00.84	N52:23.77	W008:16.49	36.97	68.47
T9200.0	N51:48.15	W008:00.67	N52:23.80	W008:16.32	36.97	68.47
T9201.0	N51:48.17	W008:00.51	N52:23.83	W008:16.15	36.97	68.47
T9202.0	N51:48.20	W008:00.34	N52:23.86	W008:15.98	36.97	68.46
T9203.0	N51:48.23	W008:00.17	N52:23.88	W008:15.81	36.97	68.46
T9204.0	N51:48.26	W008:00.00	N52:23.91	W008:15.64	36.97	68.46
T9205.0	N51:48.29	W007:59.83	N52:23.94	W008:15.47	36.97	68.46
T9206.0	N51:48.32	W007:59.67	N52:23.97	W008:15.30	36.97	68.46
T9207.0	N51:48.34	W007:59.50	N52:24.00	W008:15.13	36.97	68.46
T9208.0	N51:48.37	W007:59.33	N52:24.03	W008:14.96	36.97	68.46
T9209.0	N51:48.40	W007:59.16	N52:24.05	W008:14.79	36.97	68.46
T9210.0	N51:48.43	W007:58.99	N52:24.08	W008:14.62	36.96	68.46
T9211.0	N51:48.46	W007:58.83	N52:24.11	W008:14.45	36.96	68.46
T9212.0	N51:48.49	W007:58.66	N52:24.14	W008:14.28	36.96	68.46
T9213.0	N51:50.68	W007:59.43	N52:24.17	W008:14.11	34.72	64.30
T9214.0	N51:50.71	W007:59.26	N52:24.20	W008:13.94	34.72	64.30

Traverse Lines
A9 Block

SEGMENT NO	START LAT	START LONG	END LAT	END LONG	LENGTH NM	LENGTH KM
T9215.0	N51:50.74	W007:59.09	N52:24.22	W008:13.77	34.72	64.30
T9216.0	N51:50.76	W007:58.92	N52:24.25	W008:13.60	34.72	64.30
T9217.0	N51:50.79	W007:58.75	N52:24.28	W008:13.43	34.72	64.30
T9218.0	N51:50.82	W007:58.59	N52:24.31	W008:13.25	34.72	64.30
T9219.0	N51:50.85	W007:58.42	N52:24.34	W008:13.08	34.72	64.30
T9220.0	N51:50.88	W007:58.25	N52:24.36	W008:12.91	34.72	64.30
T9221.0	N51:50.90	W007:58.08	N52:24.39	W008:12.74	34.72	64.30
T9222.0	N51:50.93	W007:57.91	N52:24.42	W008:12.57	34.72	64.30
T9223.0	N51:50.96	W007:57.74	N52:24.45	W008:12.40	34.72	64.30
T9224.0	N51:50.99	W007:57.58	N52:24.48	W008:12.23	34.72	64.30
T9225.0	N51:51.01	W007:57.41	N52:24.51	W008:12.06	34.72	64.30
T9226.0	N51:51.04	W007:57.24	N52:24.53	W008:11.89	34.72	64.30
T9227.0	N51:51.07	W007:57.07	N52:24.56	W008:11.72	34.72	64.30
T9228.0	N51:51.10	W007:56.90	N52:24.59	W008:11.55	34.72	64.30
T9229.0	N51:51.13	W007:56.73	N52:24.62	W008:11.38	34.72	64.30
T9230.0	N51:51.15	W007:56.57	N52:24.65	W008:11.21	34.72	64.30
T9231.0	N51:51.18	W007:56.40	N52:24.68	W008:11.04	34.72	64.30
T9232.0	N51:51.21	W007:56.23	N52:24.70	W008:10.87	34.72	64.30

Total traverse line length = 8838.40 nautical miles
= 16368.71 kilometers.

Control Lines
A9 Block

SEGMENT NO	START LAT	START LONG	END LAT	END LONG	LENGTH NM	LENGTH KM
C0901.0	N51:38.48	W008:32.40	N51:38.79	W008:30.65	1.13	2.10
C0902.0	N51:39.52	W008:32.86	N51:41.40	W008:21.90	7.07	13.10
C0903.0	N51:40.56	W008:33.33	N51:43.63	W008:15.32	11.61	21.50
C0904.0	N51:41.60	W008:33.79	N51:44.67	W008:15.78	11.61	21.50
C0905.0	N51:42.64	W008:34.25	N51:48.67	W007:58.60	22.95	42.50
C0906.0	N51:43.68	W008:34.71	N51:49.71	W007:59.05	22.95	42.50
C0907.0	N51:44.72	W008:35.18	N51:51.31	W007:56.14	25.11	46.50
C0908.0	N51:45.76	W008:35.64	N51:52.35	W007:56.59	25.11	46.50
C0909.0	N51:46.80	W008:36.11	N51:53.39	W007:57.04	25.11	46.50
C0910.0	N51:47.84	W008:36.57	N51:54.44	W007:57.49	25.11	46.50
C0911.0	N51:48.88	W008:37.04	N51:55.48	W007:57.94	25.11	46.50
C0912.0	N51:49.92	W008:37.50	N51:56.52	W007:58.39	25.11	46.50
C0913.0	N51:50.96	W008:37.97	N51:57.56	W007:58.84	25.11	46.50
C0914.0	N51:52.00	W008:38.43	N51:58.60	W007:59.29	25.11	46.50
C0915.0	N51:53.04	W008:38.90	N51:59.65	W007:59.75	25.11	46.50
C0916.0	N51:54.08	W008:39.37	N52:00.69	W008:00.20	25.11	46.50
C0917.0	N51:55.12	W008:39.83	N52:01.73	W008:00.65	25.11	46.50
C0918.0	N51:56.16	W008:40.30	N52:02.77	W008:01.11	25.11	46.50
C0919.0	N51:57.20	W008:40.77	N52:03.81	W008:01.56	25.11	46.50
C0920.0	N51:58.24	W008:41.24	N52:04.86	W008:02.01	25.11	46.50
C0921.0	N51:59.28	W008:41.71	N52:05.90	W008:02.47	25.11	46.50
C0922.0	N52:00.32	W008:42.17	N52:06.94	W008:02.92	25.11	46.50
C0923.0	N52:01.36	W008:42.64	N52:07.98	W008:03.38	25.11	46.50
C0924.0	N52:02.40	W008:43.11	N52:09.02	W008:03.83	25.11	46.50
C0925.0	N52:03.44	W008:43.58	N52:10.07	W008:04.29	25.11	46.50
C0926.0	N52:04.47	W008:44.05	N52:11.11	W008:04.75	25.11	46.50
C0927.0	N52:05.51	W008:44.52	N52:12.15	W008:05.20	25.11	46.50
C0928.0	N52:06.55	W008:45.00	N52:13.19	W008:05.66	25.11	46.50
C0929.0	N52:07.59	W008:45.47	N52:14.23	W008:06.12	25.11	46.50
C0930.0	N52:08.63	W008:45.94	N52:15.27	W008:06.57	25.11	46.50
C0931.0	N52:09.67	W008:46.41	N52:16.31	W008:07.03	25.11	46.50
C0932.0	N52:10.71	W008:46.88	N52:17.36	W008:07.49	25.11	46.50
C0933.0	N52:11.75	W008:47.36	N52:18.40	W008:07.95	25.11	46.50
C0934.0	N52:12.79	W008:47.83	N52:19.44	W008:08.41	25.11	46.50
C0935.0	N52:13.83	W008:48.30	N52:20.48	W008:08.87	25.11	46.50
C0936.0	N52:14.86	W008:48.78	N52:21.52	W008:09.33	25.11	46.50
C0937.0	N52:15.90	W008:49.25	N52:22.56	W008:09.79	25.11	46.50
C0938.0	N52:16.94	W008:49.73	N52:23.61	W008:10.25	25.11	46.50
C0939.0	N52:17.98	W008:50.20	N52:24.65	W008:10.71	25.11	46.50

Total control line length = 905.89 nautical miles
= 1677.70 kilometers.

Total length of all lines = 9744.28 nautical miles
= 18046.41 kilometers.

SGL

Appendix III

Survey Boundary Points – A9 Block

Survey Boundary Defined from Line Ends of Adjacent Blocks

Datum ITM: parameters W008:00:00 N53:30:00 750000 600000 0.99982

Easting (m)	Northing (m)
587590.67	629279.35
587397.59	629227.20
587204.48	629175.16
587011.40	629123.01
586818.29	629070.96
586625.20	629018.82
586432.10	628966.75
586239.01	628914.62
586045.91	628862.56
585852.82	628810.43
585659.72	628758.37
585466.63	628706.24
585273.53	628654.16
585080.44	628602.03
584887.34	628549.97
584694.25	628497.84
584501.16	628445.71
584308.06	628393.64
584114.97	628341.52
583921.87	628289.44
583728.78	628237.31
583535.68	628185.24
583342.59	628133.11
583149.48	628081.05
582956.40	628028.92
582763.29	627976.86
582570.20	627924.73
582377.10	627872.66
582184.02	627820.52
581990.91	627768.47
581797.82	627716.33
581604.72	627664.26
581411.63	627612.13
581218.53	627560.07

Easting (m)	Northing (m)
581025.44	627507.93
580832.34	627455.88
580639.25	627403.73
580446.17	627351.60
580253.06	627299.54
580059.97	627247.41
579866.87	627195.35
579673.76	627143.28
579480.68	627091.15
579287.59	627039.01
579094.49	626986.95
578901.40	626934.82
578708.30	626882.75
578515.21	626830.62
578322.10	626778.56
578129.02	626726.41
577935.91	626674.37
577742.83	626622.22
577549.72	626570.17
577356.64	626518.03
577163.53	626465.98
576970.45	626413.84
576777.34	626361.77
576584.25	626309.64
576391.15	626257.58
576198.06	626205.45
576004.96	626153.39
575811.87	626101.24
575618.79	626049.11
575425.68	625997.05
575232.58	625944.98
575039.49	625892.86
574846.41	625840.71
574653.30	625788.66
574460.21	625736.52
574267.11	625684.47
574074.02	625632.33
573880.92	625580.26
573687.83	625528.12
573494.73	625476.07

Easting (m)	Northing (m)
573301.64	625423.92
573108.53	625371.88
572915.45	625319.75
572722.35	625267.67
572529.26	625215.54
572336.15	625163.47
572143.07	625111.34
571949.96	625059.28
571756.87	625007.15
571563.77	624955.09
571370.68	624902.96
571177.58	624850.89
570984.49	624798.75
570791.41	624746.62
570598.30	624694.56
570405.21	624642.43
570212.11	624590.36
570019.02	624538.24
569825.92	624486.17
569632.83	624434.03
569439.73	624381.96
569246.64	624329.83
569053.54	624277.77
568860.45	624225.64
568667.35	624173.58
568474.26	624121.43
568281.15	624069.38
568088.07	624017.24
567894.96	623965.19
567701.88	623913.05
567508.77	623861.00
567315.69	623808.85
567122.58	623756.79
566929.50	623704.65
566736.39	623652.60
566543.31	623600.45
566350.20	623548.40
566157.11	623496.26
565964.03	623444.13
565770.92	623392.07

Easting (m)	Northing (m)
565577.82	623340.00
565384.73	623287.87
565191.65	623235.73
564998.54	623183.68
564805.46	623131.54
564612.35	623079.49
564419.26	623027.34
564226.16	622975.28
564033.07	622923.15
563839.97	622871.09
563646.88	622818.94
563453.77	622766.89
563260.69	622714.76
563067.58	622662.70
562874.50	622610.56
562681.39	622558.49
562488.31	622506.36
562295.20	622454.30
562102.11	622402.17
561909.01	622350.11
561715.92	622297.98
561522.82	622245.90
561329.73	622193.77
561136.63	622141.70
560943.54	622089.58
560750.46	622037.45
560557.35	621985.38
560364.26	621933.25
560171.16	621881.19
559978.08	621829.05
559784.97	621776.98
559591.88	621724.85
559398.78	621672.79
559205.69	621620.66
559012.59	621568.60
558819.50	621516.47
558626.40	621464.39
558433.31	621412.26
558240.20	621360.21
558047.12	621308.06

Easting (m)	Northing (m)
557854.01	621256.00
557660.93	621203.87
557467.82	621151.81
557274.74	621099.66
557081.63	621047.61
556888.55	620995.47
556695.46	620943.34
556502.36	620891.28
556309.27	620839.15
556116.16	620787.08
555923.06	620735.02
555729.97	620682.89
555536.89	620630.75
555343.78	620578.70
555150.70	620526.55
554957.59	620474.51
554764.50	620422.36
554571.40	620370.30
554378.32	620318.15
554185.21	620266.10
553992.12	620213.96
553799.02	620161.91
553605.93	620109.77
553412.82	620057.72
553219.74	620005.57
553026.64	619953.51
552833.55	619901.38
552640.44	619849.32
552447.36	619797.19
552254.25	619745.12
552061.17	619692.98
551868.08	619640.85
551674.98	619588.79
551481.87	619536.72
551288.78	619484.59
551095.70	619432.45
550902.59	619380.40
550709.51	619328.26
550516.40	619276.21
550323.32	619224.06

Easting (m)	Northing (m)
550130.21	619172.00
549937.12	619119.87
549744.02	619067.81
549550.93	619015.68
549357.83	618963.61
549164.74	618911.48
548971.64	618859.40
548778.55	618807.28
548585.45	618755.21
548392.36	618703.08
548199.25	618651.03
548006.17	618598.89
547813.06	618546.83
547619.98	618494.70
547426.87	618442.63
547233.79	618390.49
547040.68	618338.44
546847.60	618286.30
546654.51	618234.17
546461.40	618182.10
546268.32	618129.97
546075.22	618077.89
545882.13	618025.77
545689.02	617973.70
545495.94	617921.57
545302.83	617869.51
545109.75	617817.38
544916.64	617765.32
544723.56	617713.17
544530.45	617661.12
544337.37	617608.98
544144.26	617556.93
543951.17	617504.79
543758.06	617452.74
543564.98	617400.59
543371.88	617348.53
543178.79	617296.40
542985.68	617244.34
542963.55	616769.24
543481.32	614837.43

Easting (m)	Northing (m)
543999.15	612905.63
544516.92	610973.81
545034.75	609042.01
545552.58	607110.21
546070.33	605178.39
546588.18	603246.59
547105.93	601314.77
547623.76	599382.97
548141.67	597451.19
548660.82	595519.75
549180.02	593588.31
549699.14	591656.86
550218.32	589725.42
550737.50	587793.98
551256.62	585862.53
551775.79	583931.09
552294.97	581999.65
552814.11	580068.20
553333.27	578136.75
553852.45	576205.31
554371.59	574273.87
554890.77	572342.43
555409.94	570410.99
555929.06	568479.53
556445.29	566547.30
556960.96	564614.92
557476.58	562682.53
557992.24	560750.15
558507.94	558817.78
559023.55	556885.38
559539.22	554953.00
560054.83	553020.61
560570.50	551088.23
561086.11	549155.84
561601.78	547223.46
562117.42	545291.07
562633.09	543358.69
562801.42	543290.99
562996.19	543336.85
563190.96	543382.72

Easting (m)	Northing (m)
563385.72	543428.57
563580.49	543474.44
563775.26	543520.29
563970.03	543566.15
564164.79	543612.01
564359.58	543657.79
564554.35	543703.64
564613.48	543889.33
564268.95	545541.50
564460.98	545597.58
564653.00	545653.69
564845.03	545709.79
565037.05	545765.87
565229.08	545821.97
565421.10	545878.09
565613.12	545934.17
565805.14	545990.28
565997.19	546046.30
566189.22	546102.39
566381.24	546158.50
566573.26	546214.58
566765.29	546270.68
566957.31	546326.79
567149.34	546382.88
567341.36	546438.98
567533.38	546495.09
567725.41	546551.17
567917.45	546607.19
568109.47	546663.31
568301.50	546719.39
568493.52	546775.50
568685.55	546831.59
568877.57	546887.68
569069.59	546943.78
569261.62	546999.88
569453.64	547055.98
569645.69	547112.00
569837.71	547168.10
570029.73	547224.19
570221.76	547280.29

Easting (m)	Northing (m)
570413.78	547336.39
570605.80	547392.49
570797.83	547448.59
570989.85	547504.69
571181.88	547560.79
571373.90	547616.88
571565.94	547672.90
571757.97	547729.00
571949.99	547785.10
572142.02	547841.20
572334.04	547897.30
572526.06	547953.39
572718.09	548009.49
572910.11	548065.59
573102.13	548121.69
573294.16	548177.79
573486.18	548233.89
573678.23	548289.91
573870.25	548346.00
574062.27	548402.10
574254.30	548458.20
574446.32	548514.30
574638.35	548570.40
574736.45	548672.33
574359.75	550382.86
574551.90	550438.52
574744.03	550494.20
574936.17	550549.86
575128.31	550605.53
575320.45	550661.20
575512.59	550716.86
575704.73	550772.53
575896.87	550828.20
576089.01	550883.86
576281.16	550939.46
576473.30	550995.13
576665.44	551050.80
576857.58	551106.46
577049.72	551162.13
577241.86	551217.79

Easting (m)	Northing (m)
577434.00	551273.46
577626.14	551329.13
577818.28	551384.81
578010.42	551440.48
578202.55	551496.14
578394.69	551551.81
578586.85	551607.39
578778.99	551663.06
578971.13	551718.73
579163.27	551774.41
579355.41	551830.06
579547.55	551885.74
579739.69	551941.39
579931.83	551997.07
580123.97	552052.74
580316.11	552108.41
580508.25	552164.07
580700.40	552219.67
580892.52	552275.41
581084.68	552331.01
581276.82	552386.67
581468.96	552442.32
581661.10	552498.01
581853.24	552553.67
582045.38	552609.34
582237.52	552665.01
582337.97	552779.70
581811.28	554709.13
581470.47	556300.42
581663.46	556352.91
581856.45	556405.40
582049.44	556457.88
582242.43	556510.37
582435.42	556562.85
582628.42	556615.33
582821.41	556667.82
583014.40	556720.30
583207.39	556772.79
583400.39	556825.27
583593.38	556877.75

Easting (m)	Northing (m)
583786.37	556930.25
583979.36	556982.73
584172.35	557035.21
584365.35	557087.69
584558.34	557140.19
584751.33	557192.67
584944.34	557245.07
585137.34	557297.55
585330.33	557350.05
585523.32	557402.53
585716.31	557455.01
585909.30	557507.49
586102.29	557559.99
586295.29	557612.47
586488.28	557664.95
586681.27	557717.43
586874.26	557769.92
587067.25	557822.40
587260.25	557874.89
587453.24	557927.37
587646.23	557979.86
587839.22	558032.34
588032.22	558084.82
588225.20	558137.32
588418.20	558189.80
588611.21	558242.20
588804.21	558294.68
588997.20	558347.16
589190.19	558399.66
589383.18	558452.14
589576.17	558504.62
589769.16	558557.12
589962.16	558609.60
590155.15	558662.08
590348.14	558714.58
590541.13	558767.04
590734.12	558819.54
590927.12	558872.02
591120.11	558924.50
591313.10	558976.99

Easting (m)	Northing (m)
591506.09	559029.48
591699.08	559081.96
591892.07	559134.45
592085.07	559186.93
592278.08	559239.33
592471.07	559291.83
592664.07	559344.30
592857.06	559396.79
593050.05	559449.27
593243.04	559501.75
593436.03	559554.25
593629.02	559606.73
593822.02	559659.21
594015.01	559711.71
594208.00	559764.17
594400.99	559816.67
594593.99	559869.15
594786.98	559921.63
594979.97	559974.13
595172.96	560026.61
595365.95	560079.09
595558.94	560131.58
595751.94	560184.05
595944.93	560236.55
596137.94	560288.95
596330.94	560341.43
596523.92	560393.92
596716.92	560446.40
596909.91	560498.89
597102.90	560551.38
597295.90	560603.85
597488.89	560656.34
597681.87	560708.84
597874.87	560761.30
598067.86	560813.80
598260.85	560866.28
598453.85	560918.76
598646.84	560971.26
598839.83	561023.72
599032.82	561076.22

Easting (m)	Northing (m)
599225.81	561128.72
599418.81	561181.18
599611.80	561233.68
599804.81	561286.08
599997.80	561338.56
600190.79	561391.06
600383.79	561443.54
600576.78	561496.02
600769.77	561548.51
600962.77	561600.98
601155.75	561653.47
601348.75	561705.96
601541.74	561758.44
601521.04	562060.89
601017.80	563996.60
600645.42	565876.29
600838.99	565926.62
601032.56	565976.96
601226.15	566027.21
601419.71	566077.55
601613.29	566127.87
601806.85	566178.20
602000.43	566228.52
602194.01	566278.80
602387.58	566329.13
602581.15	566379.45
602774.74	566429.71
602968.31	566480.04
603161.88	566530.38
603355.44	566580.71
603549.02	566631.03
603742.61	566681.29
603936.17	566731.62
604129.74	566781.96
604323.31	566832.29
604339.79	566957.28
603821.23	568888.89
603302.73	570820.51
602784.15	572752.11
602265.59	574683.71

Easting (m)	Northing (m)
601747.03	576615.31
601228.44	578546.91
600709.88	580478.52
600191.32	582410.12
599672.82	584341.74
599154.26	586273.35
598635.70	588204.95
598117.12	590136.55
597598.56	592068.15
597080.00	593999.76
596561.41	595931.36
596045.26	597863.61
595529.96	599796.08
595014.63	601728.56
594499.35	603661.04
593984.08	605593.52
593468.78	607526.00
592953.48	609458.48
592438.23	611390.97
591922.92	613323.45
591407.62	615255.93
590892.32	617188.40
590377.07	619120.90
589861.77	621053.37
589346.46	622985.85
588831.22	624918.34
588315.91	626850.82
587800.61	628783.30

Appendix IV

Equipment List

	PART	Serial number	Description	Manufacturer
Aircraft	Aircraft C-GSGF	DHC-6-642	Twin Otter Series 300, DE HAVILLAND	DE HAVILLAND
	Laser Profilometer	9994938	LD90-3300VHS-FLP 11-28VDC laser rangefinder. 1-400m capability	Riegl
	RadarTranceiver	4403206	TRA-3000	FreeFlight Systems
	Collins Radar Altimeter	7497	860F-1 Radio Altimeter 0-2500ft	Collins
	Barometric Sensor	1347373	HONEYWELL MODEL TJE Absolute Pressure Sensor	HONEYWELL
	Data Acquisition Computer	CDAC-13	CPCI Data Acquisition computer	SGL
	GPS Receiver	DAB06340038	OEMV-3, 72-ch, L1/L2	Novatel
	Electromagnetics System	SG-FEM	SGL 4 frequency vertically mounted EM system (912 3005 11962 24510)	SGL
	Spectrometer detector 5-Pack	5444	RSX-5	Radiation Solutions Inc
	Spectrometer detector 5-Pack	5557	RSX-5	Radiation Solutions Inc
	Spectrometer detector 5-Pack	5558	RSX-5	Radiation Solutions Inc
	Spectrometer detector 4-Pack	5632	RSX-4	Radiation Solutions Inc
	Magnetometer Sensor	75368-C1576	model G-822A, Sensor S/N C1576	Geometrics
	Fluxgate Magnetometer	487	TFM100G2-1E	Billingsley Aerospace and Deence
SGRef Station One	SGRef Station	M-SGREF-62	CPCI ground station - 28Vdc input	SGL
	GPS Receiver	DAB13020013	OEMV-3, 72-ch, L1/L2	Novatel
	GPS Antenna	NZT07260011	Model 702L,L1/L2 Kinematic GPS Ant.	Novatel
	Magnetometer Sensor	75215-C377	model G-822A, Sensor S/N C377	Geometrics
SGRef Station Two	SGRef Station	M-SGREF-59	CPCI ground station - 28Vdc input	SGL
	GPS Receiver	DAB14070001	OEMV-3, 72-ch, L1/L2	Novatel
	GPS Antenna	NZT07260023	Model 702,L1/L2 Kinematic GPS Ant.	Novatel
	Magnetometer Sensor	75409-C3235	model G-822A, Sensor S/N C3235	Geometrics

Appendix V

GEOPHYSICAL SURVEY AIRCRAFT

de Havilland DHC-6 Twin Otter

Registration	C-GSGF
Serial #	642

The de Havilland DHC-6 Twin Otter is an all metal, high wing, twin-engine, short takeoff and landing (STOL) aircraft. The Twin Otter is powered by two Pratt & Whitney Canada PT6A-27 engines. These engines drive a constant speed, fully feathering, reversible propeller. The PT6 turbine engines provide ample power for climbing over steep terrain, working at altitudes up to 7,000 m and can withstand frequent rapid power changes. The aircraft is highly maneuverable, rugged in design and can be flown at speeds from 80 to 160 knots. The low stall speeds and abundant available power make the Twin Otter a safe and effective aircraft for surveys requiring drape flying over rough topography, low air speeds or flights at high altitude. The aircraft has fixed gear, extendable flaps and manually adjustable trim tabs on the primary controls for the roll and pitch axes and full rudder trim for the yaw axis. The aircraft is equipped with full de-icing equipment and sufficient avionics for instrument flying including a flight control system. Supplementary fuel can be added for transoceanic flight. The Twin Otter is certified for IFR flights in known icing conditions.

GEOPHYSICAL SURVEYING

The SGL Twin Otter is fully equipped for airborne magnetic, gravity, radiometric and frequency-domain EM surveys. EM fields are measured with the SGL frequency-domain EM system (**SGFEM**). The four-frequency EM transmitter is located in the right wingtip EM pod, and the receiver is located in the left wingtip EM pod. The magnetic field is measured by one sensor mounted in a stinger that is rigidly attached to the tail of the aircraft, and a second sensor can be mounted in the left wingtip EM pod. Gravity surveys are performed using SGL's state-of-the-art **AIRGrav** system. The Twin Otter can carry up to 63 litres of detector crystals for gamma-ray spectrometer surveys.

DE HAVILLAND DHC-6 TWIN OTTER SPECIFICATIONS

Crew Capacity:
- 2 pilots, 1 operator (optional)

Fuselage:
- semi-monocoque

Wings:
- strut braced, high wing
- outboard ailerons and trim tab, full span flaps

Tail:
- conventional stabilizers
- elevator and rudder with trim tabs

Power Plant:
- Pratt & Whitney Canada PT6A-27, 680 shp, free-turbine gas engine, overhaul 3,600 hours
- three-blade, fully-feathering, constant-speed, reversible propeller, overhaul 3,000 hours or 5 years

Systems:
- dual flight controls with IFR instruments and avionics
- 2-axis autopilot
- full airframe and propeller de-icing

Dimensions:

Wing span	65 ft	19.8 m
Exterior length	51 ft 9 in	15.8 m
Exterior height	19 ft 6 in	5.94 m
Interior usable length	18 ft 5 in	5.61 m
Interior usable width	4 ft 4 in	1.32 m
Interior height	4 ft 11 in	1.5 m
Usable fuel capacity	385 US gal	1,455 l

Weights:

Empty	8,100 lb	3,674 kg
Maximum take-off	12,500 lb	5,670 kg

Performance (2,000 ft ASL, standard day, maximum take-off weight, 1,900 rpm, 1,375 ft-lb tq):

Range, maximum range power (plus reserve)	920 nm	1,704 km
Cruise speed at maximum range power	170 kt	315 km/h
Fuel flow at maximum range power	50 US gal/h	189 l/h
Stall airspeed, landing configuration	58 kt	107 km/h
Service ceiling	25,000 ft	7,620 m
Minimum required runway length	2,500 ft	762 m
Rate of climb	1,600 ft/min	488 m/min
Maximum sustained climb gradient	650 ft/nm	107 m/km

Type of Aviation Fuel: Jet A, A-1, B, JP-1, 4, 5, 8
Maximum Endurance: 8 hours plus 1 hour reserve at maximum range power

GEOPHYSICAL CAPABILITIES

SGFEM, frequency-domain EM
AIRGrav, SGL airborne gravimeter
Magnetic total field
Horizontal magnetic gradient
Gamma-ray spectrometer, up to 63 litres (3,840 in^3) of detector crystals
SGMethane, methane gas sensing

Additional Features:
- Tail stinger 6.8 m long and 22 cm in diameter, capable of housing a 1 kg sensor
- HF radio
- Video camera mount with 23 cm diameter glass covered opening in the belly of the aircraft
- Two instrument racks, standard 48 cm (19 in) width
- Radar altimeter, 0-750 m
- Electrical power capacity, 28 VDC at 200 amp
- Static inverters, 115 VAC - 400 Hz, 110 VAC - 60 Hz
- GPS receiver and antenna

Appendix VI

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	Tellus	**Client Name**	Geological Survey of Ireland
Survey Location	Waterford, Ireland	**Contact Name**	Jim Hodgson
Project Code	GSI___21.IRL	**Contact Phone**	+353 1678 2742
Total km	18047	**Client Address**	Beggar's Bush, Haddington Road, Dublin 4, Ireland
Line Spacing	200 m by 2000 m		
Survey Type	MAG/SPEC/FEM	**Email**	jim.hodgson@gsi.ie / tellus@gsi.ie

SURVEY PRODUCTION SUMMARY			
Production This Week (km)	578.7	**Total km Flown to Date**	578.7
Total Remaining (km)	17468.3	**km Reflown This Week**	0.0
Percent Complete (%)	3.2	**Flight Time This Week (h)**	4.0
Prod km/Day This Week	82.7	**Prod km/Flt Hour This Week**	144.7

WEEKLY PRODUCTION

Week 1		**Flight No.**	**Flight Time**	**No. of Lines Flown**	**No. Reflight Lines Flown**	**Production (km)**	**Reflown (km)**
TOTALS			**4.0**	**9.0**	**0.0**	**578.7**	**0.0**
19-Jul	**Monday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	sunny and hot		**Remarks**	Mobilization commences for A9 block.			
Geomag	quiet						
20-Jul	**Tuesday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	sunny and hot		**Remarks**	Mobilization continues. Dwayne departs for Canada.			
Geomag	quiet						
21-Jul	**Wednesday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	sunny and hot		**Remarks**	First flight attempted to commence production in A9 block. Mechanical issue with aircraft. Waiting for an AME.			
Geomag	quiet						
22-Jul	**Thursday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	sunny and hot		**Remarks**	Aircraft AOG, waiting for an AME.			
Geomag	quiet						
23-Jul	**Friday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	sunny and hot		**Remarks**	Aircraft AOG, waiting for an AME.			
Geomag	quiet						
24-Jul	**Saturday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	sunny and hot		**Remarks**	Aircraft AOG. AME, Darren, arrives in Dunmore East.			
Geomag	quiet						
25-Jul	**Sunday**		**4.0**	**9.0**	**0.0**	**578.7**	**0.0**
	C-GSGF Flt 1	1	4.0	9.0	0.0	578.7	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	sunny and hot		**Remarks**	Aircraft maintenance completed. First production flight completed in A9 block.			
Geomag	quiet						

Comments Production in A9 block, East Cork, commences. Aircraft maintenance issue delayed start.

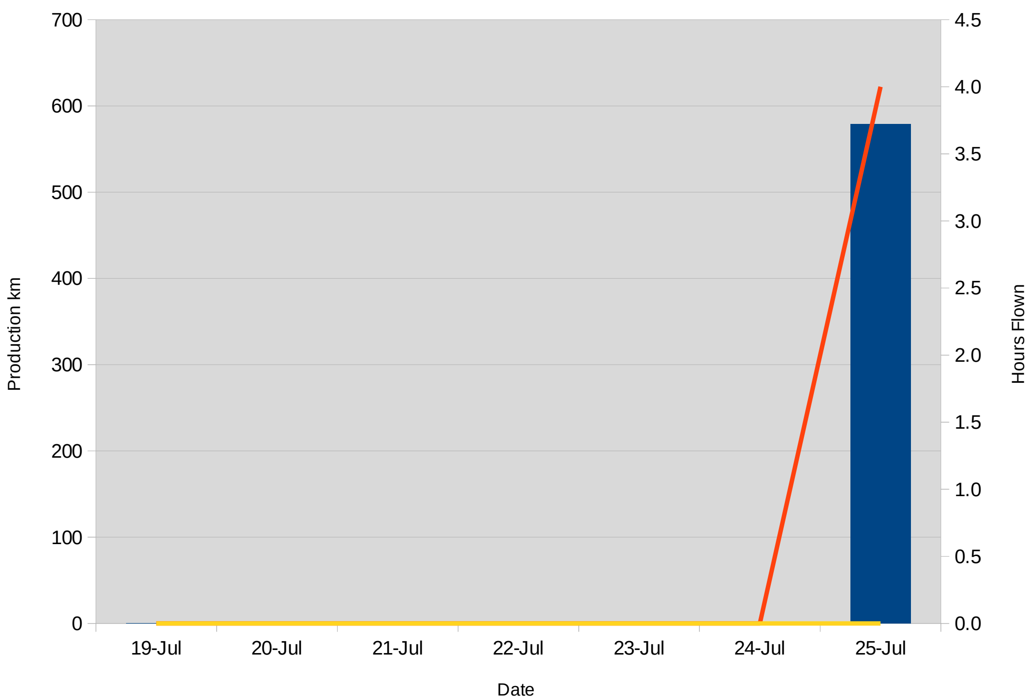
Signed Alison McCleary

PERSONNEL ON SITE THIS WEEK

Name	Position	Arrival This Week	Departure This Week	On Site?	No. of Days On Site This Week	No. of Days on Site To Date
Alison McCleary	Crew Chief			ON SITE	7	339
Steve Gebhardt	Lead Pilot			ON SITE	7	339
Charles Dicks	Pilot			ON SITE	7	103
Dwayne Bailey	AME		20-Jul-21	ON SITE	2	95
Steven Hyde	Pilot			ON SITE	7	29
Jeff Tucker	Pilot			ON SITE	7	14
Craig McMahon	Technician			ON SITE	7	8
Darren McBeth	AME	24-Jul-21		ON SITE	2	2

HSE Statistics	This Week	Project Totals
SGL Person Hours	345	345
Inductions	2	2
Near Miss		0
First Aid Case (FAC)		0
Medical Treatment Case (MTC)		0
Restricted Work Case (RWC)		0
Lost Time Injuries (LTI)		0
Safety Meetings		0
GSI PR Complaints		0
Fuel Consumption (L)	1140	1140

WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN



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	Tellus	**Client Name**	Geological Survey of Ireland
Survey Location	Waterford, Ireland	**Contact Name**	Jim Hodgson
Project Code	GSI___21.IRL	**Contact Phone**	+353 1678 2742
Total km	18047	**Client Address**	Beggar's Bush, Haddington Road, Dublin 4, Ireland
Line Spacing	200 m by 2000 m		
Survey Type	MAG/SPEC/FEM	**Email**	jim.hodgson@gsi.ie / tellus@gsi.ie

SURVEY PRODUCTION SUMMARY

Production This Week (km)	1670.2	**Total km Flown to Date**	2248.9
Total Remaining (km)	15798.1	**km Reflown This Week**	0.0
Percent Complete (%)	12.5	**Flight Time This Week (h)**	12.4
Prod km/Day This Week	238.6	**Prod km/Flt Hour This Week**	134.7

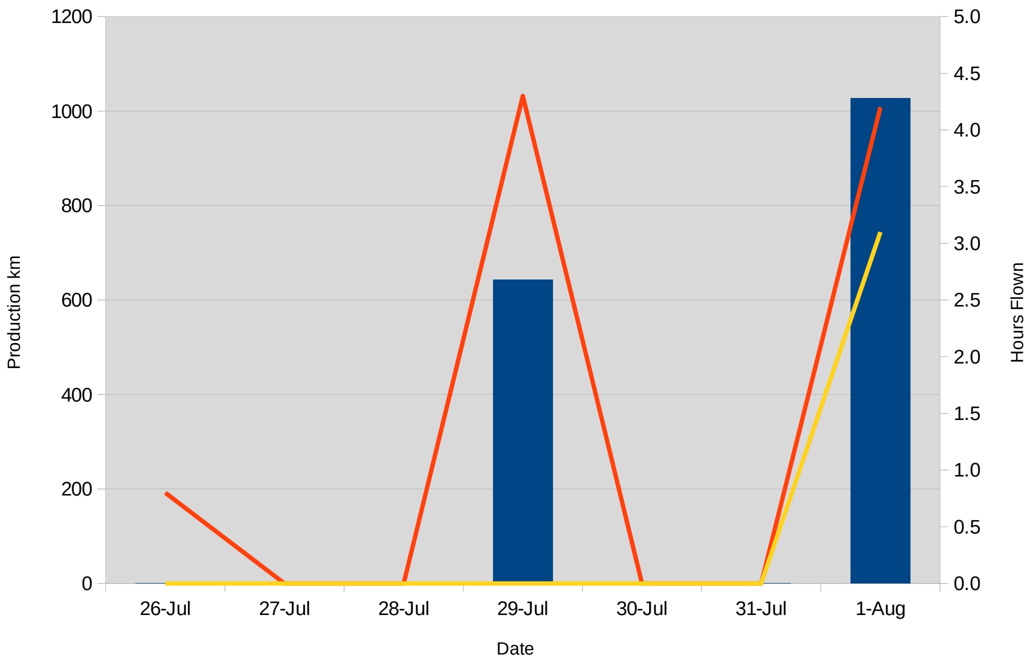
WEEKLY PRODUCTION

Week 2		**Flight No.**	**Flight Time**	**No. of Lines Flown**	**No. Reflight Lines Flown**	**Production (km)**	**Reflown (km)**
TOTALS			**12.4**	**25.0**	**0.0**	**1670.2**	**0.0**
26-Jul	**Monday**		**0.8**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1	2	0.8	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	windy and fog, partly sunny		**Remarks**	Flight aborted due to weather.			
Geomag	quiet						
27-Jul	**Tuesday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	overcast, windy, rain		**Remarks**	No flight due to weather. Charles departs for Canada.			
Geomag	unsettled						
28-Jul	**Wednesday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	partly sunny, windy, thunderstorm		**Remarks**	No flight due to weather.			
Geomag	unsettled						
29-Jul	**Thursday**		**4.3**	**10.0**	**0.0**	**643.0**	**0.0**
	C-GSGF Flt 1	3	4.3	10.0	0.0	643.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	partly sunny, thunderstorms		**Remarks**	Full production flight. Heavy rain in afternoon.			
Geomag	active with micropulsations						
30-Jul	**Friday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	overcast, windy, rain		**Remarks**	No flight due to weather. Storm Evert hits southern coast of Ireland overnight with torrential rain this morning.			
Geomag	unsettled						
31-Jul	**Saturday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	fog, overcast, windy, rain showers		**Remarks**	No flight due to weather. Pilot, Todd, arrives in Dunmore East.			
Geomag	unsettled						
1-Aug	**Sunday**		**7.3**	**15.0**	**0.0**	**1027.2**	**0.0**
	C-GSGF Flt 1	4	4.2	9.0	0.0	616.3	0.0
	C-GSGF Flt 2	5	3.1	6.0	0.0	410.9	0.0
Weather	sunny, overcast, rain showers		**Remarks**	Two full flights of production. Second flight short due to airport hours.			
Geomag	unsettled with micropulsations						
Comments	Week hampered by weather but still managed an average production rate.						

Signed Alison McCleary

PERSONNEL ON SITE THIS WEEK						
Name	Position	Arrival This Week	Departure This Week	On Site?	No. of Days On Site This Week	No. of Days on Site To Date
Alison McCleary	Crew Chief			ON SITE	7	346
Steve Gebhardt	Lead Pilot			ON SITE	7	346
Charles Dicks	Pilot		27-Jul-21	ON SITE	2	105
Dwayne Bailey	AME				0	95
Steven Hyde	Pilot			ON SITE	7	36
Jeff Tucker	Pilot			ON SITE	7	21
Craig McMahon	Technician			ON SITE	7	15
Darren McBeth	AME			ON SITE	7	9
Todd Svarckopf	Pilot	31-Jul-21		ON SITE	2	2

HSE Statistics	This Week	Project Totals
SGL Person Hours	345	690
Inductions	1	3
Near Miss		0
First Aid Case (FAC)		0
Medical Treatment Case (MTC)		0
Restricted Work Case (RWC)		0
Lost Time Injuries (LTI)		0
Safety Meetings		0
GSI PR Complaints		0
Fuel Consumption (L)	3440	4580



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SURVEY DETAILS

Survey Name	Tellus	**Client Name**	Geological Survey of Ireland
Survey Location	Waterford, Ireland	**Contact Name**	Jim Hodgson
Project Code	GSI___21.IRL	**Contact Phone**	+353 1678 2742
Total km	18047	**Client Address**	Beggar's Bush, Haddington Road, Dublin 4, Ireland
Line Spacing	200 m by 2000 m		
Survey Type	MAG/SPEC/FEM	**Email**	jim.hodgson@gsi.ie / tellus@gsi.ie

SURVEY PRODUCTION SUMMARY

Production This Week (km)	1660.4	**Total km Flown to Date**	3909.3
Total Remaining (km)	14137.7	**km Reflown This Week**	0.0
Percent Complete (%)	21.7	**Flight Time This Week (h)**	15.4
Prod km/Day This Week	237.2	**Prod km/Flt Hour This Week**	107.8

WEEKLY PRODUCTION

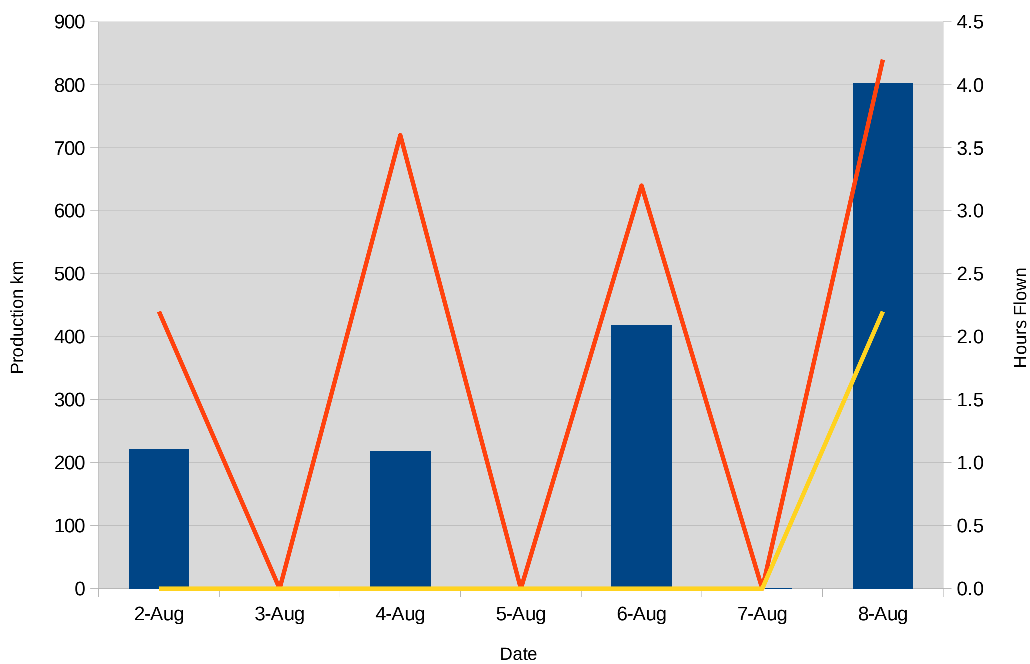
Week 3		**Flight No.**	**Flight Time**	**No. of Lines Flown**	**No. Reflight Lines Flown**	**Production (km)**	**Reflown (km)**
TOTALS			**15.4**	**25.0**	**0.0**	**1660.4**	**0.0**
2-Aug	**Monday**		**2.2**	**3.3**	**0.0**	**221.6**	**0.0**
	C-GSGF Flt 1	6	2.2	3.3	0.0	221.6	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	overcast, rain showers		**Remarks**	Flight aborted due to rain.			
Geomag	unsettled						
3-Aug	**Tuesday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	fog, overcast, rain showers		**Remarks**	No flight due to weather.			
Geomag	unsettled						
4-Aug	**Wednesday**		**3.6**	**3.2**	**0.0**	**217.6**	**0.0**
	C-GSGF Flt 1	7	3.6	3.2	0.0	217.6	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	partly sunny, rain showers		**Remarks**	Training flight which included some production.			
Geomag	quiet						
5-Aug	**Thursday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	heavy rain, thunderstorms, windy		**Remarks**	No flight due to weather. Safety meeting held.			
Geomag	quiet						
6-Aug	**Friday**		**3.2**	**6.1**	**0.0**	**419.2**	**0.0**
	C-GSGF Flt 1	8	3.2	6.1	0.0	419.2	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	rain, strong winds		**Remarks**	Flight delayed due to weather. Flight aborted due to rain.			
Geomag	quiet						
7-Aug	**Saturday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	overcast, rain, strong winds		**Remarks**	No flight due to weather.			
Geomag	unsettled						
8-Aug	**Sunday**		**6.4**	**12.4**	**0.0**	**802.0**	**0.0**
	C-GSGF Flt 1	9	4.2	8.9	0.0	564.3	0.0
	C-GSGF Flt 2	10	2.2	3.5	0.0	237.7	0.0
Weather	partly sunny, rain showers, windy		**Remarks**	Full flight in morning. Afternoon flight aborted due to rain.			
Geomag	unsettled with micropulsations						
Comments	Another average production week hampered by weather. Pilots persevered and found weather windows.						

Signed Alison McCleary

PERSONNEL ON SITE THIS WEEK						
Name	Position	Arrival This Week	Departure This Week	On Site?	No. of Days On Site This Week	No. of Days on Site To Date
Alison McCleary	Crew Chief			ON SITE	7	353
Steve Gebhardt	Lead Pilot			ON SITE	7	353
Charles Dicks	Pilot				0	105
Dwayne Bailey	AME				0	95
Steven Hyde	Pilot			ON SITE	7	43
Jeff Tucker	Pilot			ON SITE	7	28
Craig McMahon	Technician			ON SITE	7	22
Darren McBeth	AME			ON SITE	7	16
Todd Svarckopf	Pilot			ON SITE	7	9

HSE Statistics	This Week	Project Totals
SGL Person Hours	367.5	1057.5
Inductions		3
Near Miss		0
First Aid Case (FAC)		0
Medical Treatment Case (MTC)		0
Restricted Work Case (RWC)		0
Lost Time Injuries (LTI)		0
Safety Meetings	1	1
GSI PR Complaints		0
Fuel Consumption (L)	4280	8860

WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN



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SURVEY DETAILS

Survey Name	Tellus	**Client Name**	Geological Survey of Ireland
Survey Location	Waterford, Ireland	**Contact Name**	Jim Hodgson
Project Code	GSI___21.IRL	**Contact Phone**	+353 1678 2742
Total km	18047	**Client Address**	Beggar's Bush, Haddington Road, Dublin 4, Ireland
Line Spacing	200 m by 2000 m		
Survey Type	MAG/SPEC/FEM	**Email**	jim.hodgson@gsi.ie / tellus@gsi.ie

SURVEY PRODUCTION SUMMARY

Production This Week (km)	2154.3	**Total km Flown to Date**	6063.6
Total Remaining (km)	11983.4	**km Reflown This Week**	0.0
Percent Complete (%)	33.6	**Flight Time This Week (h)**	16.5
Prod km/Day This Week	307.8	**Prod km/Flt Hour This Week**	130.6

WEEKLY PRODUCTION

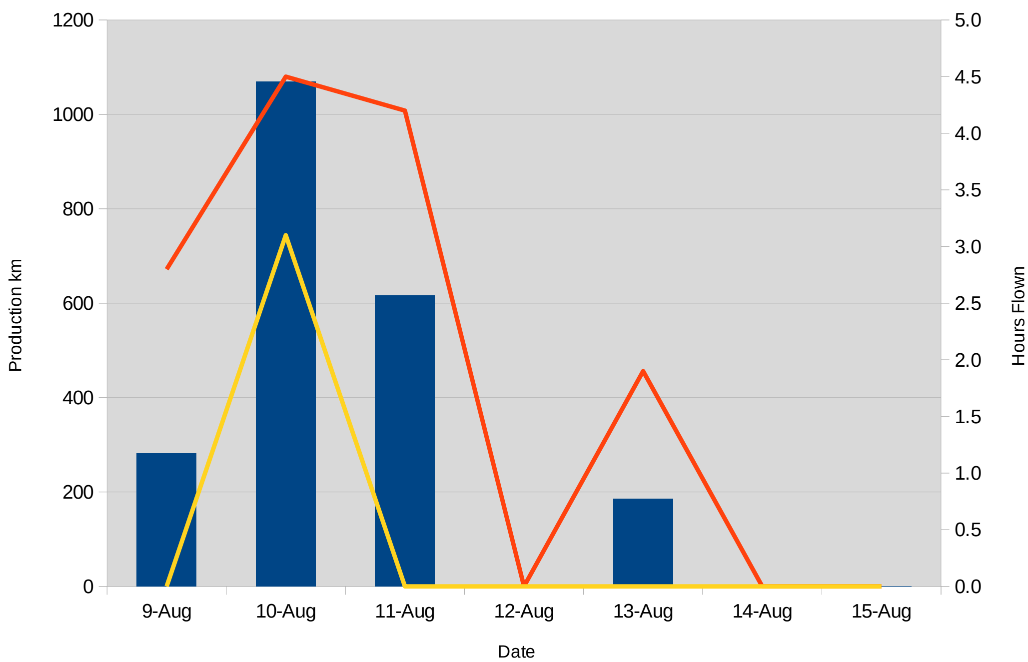
Week 4		**Flight No.**	**Flight Time**	**No. of Lines Flown**	**No. Reflight Lines Flown**	**Production (km)**	**Reflown (km)**
TOTALS			**16.5**	**32.7**	**0.0**	**2154.3**	**0.0**
9-Aug	**Monday**		**2.8**	**4.1**	**0.0**	**282.2**	**0.0**
	C-GSGF Flt 1	11	2.8	4.1	0.0	282.2	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	overcast, rain showers		**Remarks**	Flight aborted due to rain.			
Geomag	micropulsations						
10-Aug	**Tuesday**		**7.6**	**15.6**	**0.0**	**1069.6**	**0.0**
	C-GSGF Flt 1	12	4.5	9.6	0.0	658.6	0.0
	C-GSGF Flt 2	13	3.1	6.0	0.0	411.0	0.0
Weather	partly sunny, rain showers		**Remarks**	Full flight in morning. Afternoon flight aborted due to rain.			
Geomag	unsettled with micropulsations						
11-Aug	**Wednesday**		**4.2**	**9.0**	**0.0**	**616.5**	**0.0**
	C-GSGF Flt 1	14	4.2	9.0	0.0	616.5	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	rain and fog, late afternoon sun		**Remarks**	Flight delayed due to rain. Full flight in late afternoon, early evening.			
Geomag	quiet						
12-Aug	**Thursday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	gale bringing strong winds		**Remarks**	No flight due to weather.			
Geomag	quiet						
13-Aug	**Friday**		**1.9**	**4.0**	**0.0**	**186.0**	**0.0**
	C-GSGF Flt 1	15	1.9	4.0	0.0	186.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	overcast, strong winds all day		**Remarks**	Flight aborted due to logistics.			
Geomag	unsettled						
14-Aug	**Saturday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	overcast, rain, fog		**Remarks**	No flight due to weather.			
Geomag	quiet						
15-Aug	**Sunday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	overcast, rain showers, fog		**Remarks**	No flight due to weather.			
Geomag	quiet						
Comments	Best week so far for A9 block. Well done all.						

Signed Alison McCleary

PERSONNEL ON SITE THIS WEEK						
Name	**Position**	**Arrival This Week**	**Departure This Week**	**On Site?**	**No. of Days On Site This Week**	**No. of Days on Site To Date**
Alison McCleary	Crew Chief			ON SITE	7	360
Steve Gebhardt	Lead Pilot			ON SITE	7	360
Charles Dicks	Pilot				0	105
Dwayne Bailey	AME				0	95
Steven Hyde	Pilot			ON SITE	7	50
Jeff Tucker	Pilot			ON SITE	7	35
Craig McMahon	Technician			ON SITE	7	29
Darren McBeth	AME			ON SITE	7	23
Todd Svarckopf	Pilot			ON SITE	7	16

HSE Statistics	This Week	Project Totals
SGL Person Hours	367.5	1425
Inductions		3
Near Miss		0
First Aid Case (FAC)		0
Medical Treatment Case (MTC)		0
Restricted Work Case (RWC)		0
Lost Time Injuries (LTI)		0
Safety Meetings		1
GSI PR Complaints		0
Fuel Consumption (L)	4670	13530

WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN



SANDER GEOPHYSICS AIRBORNE GEOPHYSICAL SURVEY

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SURVEY DETAILS

Survey Name	Tellus	**Client Name**	Geological Survey of Ireland
Survey Location	Waterford, Ireland	**Contact Name**	Jim Hodgson
Project Code	GSI___21.IRL	**Contact Phone**	+353 1678 2742
Total km	18047	**Client Address**	Beggar's Bush, Haddington Road, Dublin 4, Ireland
Line Spacing	200 m by 2000 m		
Survey Type	MAG/SPEC/FEM	**Email**	jim.hodgson@gsi.ie / tellus@gsi.ie

SURVEY PRODUCTION SUMMARY

Production This Week (km)	1106.1	**Total km Flown to Date**	7169.7
Total Remaining (km)	10877.3	**km Reflown This Week**	70.8
Percent Complete (%)	39.7	**Flight Time This Week (h)**	10.1
Prod km/Day This Week	158.0	**Prod km/Flt Hour This Week**	109.5

WEEKLY PRODUCTION

Week 5		**Flight No.**	**Flight Time**	**No. of Lines Flown**	**No. Reflight Lines Flown**	**Production (km)**	**Reflown (km)**
TOTALS			**10.1**	**16.1**	**1.1**	**1106.1**	**70.8**
16-Aug	**Monday**		**1.6**	**1.7**	**0.0**	**118.8**	**0.0**
	C-GSGF Flt 1	16	1.6	1.7	0.0	118.8	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	overcast, strong winds		**Remarks**	Flight aborted due to strong winds.			
Geomag	micropulsations						
17-Aug	**Tuesday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	overcast, strong winds		**Remarks**	No flight due to weather.			
Geomag	unsettled						
18-Aug	**Wednesday**		**4.4**	**6.4**	**1.1**	**439.2**	**70.8**
	C-GSGF Flt 1	17	4.4	6.4	1.1	439.2	70.8
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	overcast, partly sunny		**Remarks**	Full production flight in afternoon.			
Geomag	unsettled						
19-Aug	**Thursday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	overcast, fog, poor visibility, windy		**Remarks**	No flight due to weather.			
Geomag	unsettled						
20-Aug	**Friday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	overcast, heavy rain showers		**Remarks**	No flight due to weather.			
Geomag	unsettled						
21-Aug	**Saturday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	overcast, fog, rain, thunderstorms		**Remarks**	No flight due to weather.			
Geomag	unsettled						
22-Aug	**Sunday**		**4.1**	**8.0**	**0.0**	**548.1**	**0.0**
	C-GSGF Flt 1	18	4.1	8.0	0.0	548.1	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	partly sunny		**Remarks**	Flight delayed due to aircraft maintenance issue. Resolved and full flight completed in late afternoon.			
Geomag	unsettled with micropulsations						
Comments	Below average week given poor weather conditions. Expecting a better week coming up.						

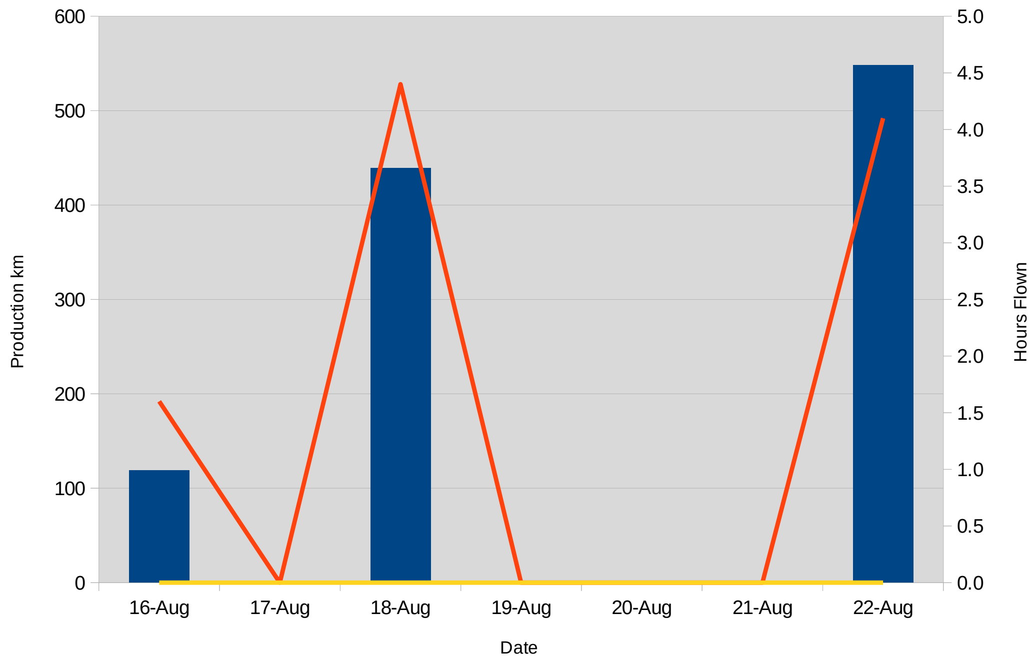
Signed Alison McCleary

PERSONNEL ON SITE THIS WEEK

Name	Position	Arrival This Week	Departure This Week	On Site?	No. of Days On Site This Week	No. of Days on Site To Date
Alison McCleary	Crew Chief			ON SITE	7	367
Steve Gebhardt	Lead Pilot			ON SITE	7	367
Charles Dicks	Pilot				0	105
Dwayne Bailey	AME				0	95
Steven Hyde	Pilot			ON SITE	7	57
Jeff Tucker	Pilot			ON SITE	7	42
Craig McMahon	Technician			ON SITE	7	36
Darren McBeth	AME			ON SITE	7	30
Todd Svarckopf	Pilot			ON SITE	7	23

HSE Statistics	This Week	Project Totals
SGL Person Hours	367.5	1792.5
Inductions		3
Near Miss		0
First Aid Case (FAC)		0
Medical Treatment Case (MTC)		0
Restricted Work Case (RWC)		0
Lost Time Injuries (LTI)		0
Safety Meetings		1
GSI PR Complaints		0
Fuel Consumption (L)	2770	16300

WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN



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SURVEY DETAILS

Survey Name	Tellus	**Client Name**	Geological Survey of Ireland
Survey Location	Waterford, Ireland	**Contact Name**	Jim Hodgson
Project Code	GSI___21.IRL	**Contact Phone**	+353 1678 2742
Total km	18047	**Client Address**	Beggar's Bush, Haddington Road, Dublin 4, Ireland
Line Spacing	200 m by 2000 m		
Survey Type	MAG/SPEC/FEM	**Email**	jim.hodgson@gsi.ie / tellus@gsi.ie

SURVEY PRODUCTION SUMMARY

Production This Week (km)	3442.7	**Total km Flown to Date**	10612.4
Total Remaining (km)	7434.6	**km Reflown This Week**	366.8
Percent Complete (%)	58.8	**Flight Time This Week (h)**	32.8
Prod km/Day This Week	491.8	**Prod km/Flt Hour This Week**	105.0

WEEKLY PRODUCTION

Week 6		**Flight No.**	**Flight Time**	**No. of Lines Flown**	**No. Reflight Lines Flown**	**Production (km)**	**Reflown (km)**
TOTALS			**32.8**	**50.5**	**6.7**	**3442.7**	**366.8**
23-Aug	**Monday**		**7.1**	**14.0**	**0.0**	**959.3**	**0.0**
	C-GSGF Flt 1	19	3.9	8.0	0.0	548.2	0.0
	C-GSGF Flt 2	20	3.2	6.0	0.0	411.1	0.0
Weather	partly sunny		**Remarks**	Two production flights. Second flight shortened by ocean fog.			
Geomag	unsettled						
24-Aug	**Tuesday**		**6.6**	**13.0**	**0.0**	**865.7**	**0.0**
	C-GSGF Flt 1	21	4.2	9.0	0.0	602.3	0.0
	C-GSGF Flt 2	22	2.4	4.0	0.0	263.4	0.0
Weather	fog, partly sunny		**Remarks**	Flight delayed by fog. Two production flights. Second flight shortened by airport hours.			
Geomag	unsettled with micropulsations						
25-Aug	**Wednesday**		**6.5**	**4.1**	**2.0**	**263.9**	**147.4**
	C-GSGF Flt 1	23	3.3	1.9	1.6	130.8	106.8
	C-GSGF Flt 2	24	3.2	2.2	0.4	133.1	40.6
Weather	fog, partly sunny		**Remarks**	Flight delayed by fog. Two production flights. First flight shortened due to pilot meeting with Cork ATC, second by airport hours.			
Geomag	micropulsations						
26-Aug	**Thursday**		**4.5**	**9.4**	**0.0**	**656.6**	**0.0**
	C-GSGF Flt 1	25	4.5	9.4	0.0	656.6	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	fog, sunny, hazy on coast/sea		**Remarks**	Flight delayed by fog. Full production flight. Second flight not possible due to aircraft maintenance.			
Geomag	unsettled with micropulsations						
27-Aug	**Friday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	sunny, hazy		**Remarks**	Aircraft maintenance continues. Pilot training.			
Geomag	quiet						
28-Aug	**Saturday**		**3.7**	**2.0**	**4.7**	**118.8**	**219.4**
	C-GSGF Flt 1	26	3.7	2.0	4.7	118.8	219.4
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	partly sunny		**Remarks**	Aircraft maintenance completed early afternoon. Partial flight completed.			
Geomag	quiet						
29-Aug	**Sunday**		**4.4**	**8.0**	**0.0**	**578.4**	**0.0**
	C-GSGF Flt 1	27	4.4	8.0	0.0	578.4	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	fog, sunny, hazy		**Remarks**	Full production flight between morning fog and afternoon fog.			
Geomag	micropulsations						
Comments	Best production week for A9 block. Well done all.						

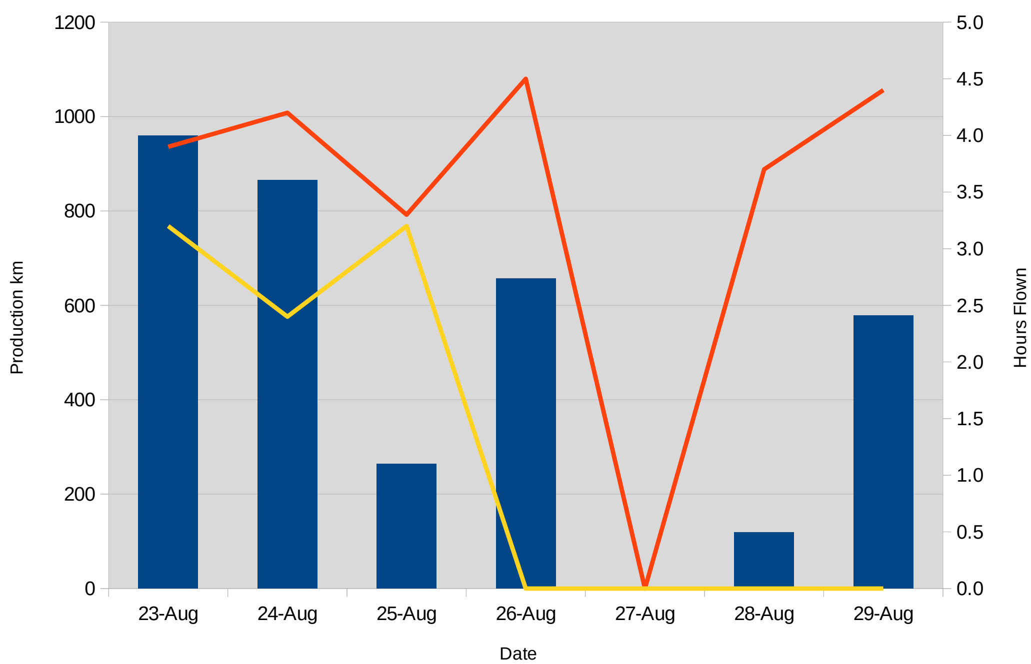
Signed Alison McCleary

PERSONNEL ON SITE THIS WEEK

Name	Position	Arrival This Week	Departure This Week	On Site?	No. of Days On Site This Week	No. of Days on Site To Date
Alison McCleary	Crew Chief			ON SITE	7	374
Steve Gebhardt	Lead Pilot			ON SITE	7	374
Charles Dicks	Pilot				0	105
Dwayne Bailey	AME				0	95
Steven Hyde	Pilot			ON SITE	7	64
Jeff Tucker	Pilot			ON SITE	7	49
Craig McMahon	Technician			ON SITE	7	43
Darren McBeth	AME			ON SITE	7	37
Todd Svarckopf	Pilot			ON SITE	7	30

HSE Statistics	This Week	Project Totals
SGL Person Hours	367.5	2160
Inductions		3
Near Miss		0
First Aid Case (FAC)		0
Medical Treatment Case (MTC)		0
Restricted Work Case (RWC)		0
Lost Time Injuries (LTI)		0
Safety Meetings		1
GSI PR Complaints		0
Fuel Consumption (L)	9500	25800

WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN



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SURVEY DETAILS

Survey Name	Tellus	**Client Name**	Geological Survey of Ireland
Survey Location	Waterford, Ireland	**Contact Name**	Jim Hodgson
Project Code	GSI___21.IRL	**Contact Phone**	+353 1678 2742
Total km	18047	**Client Address**	Beggar's Bush, Haddington Road, Dublin 4, Ireland
Line Spacing	200 m by 2000 m		
Survey Type	MAG/SPEC/FEM	**Email**	jim.hodgson@gsi.ie / tellus@gsi.ie

SURVEY PRODUCTION SUMMARY

Production This Week (km)	2629.8	**Total km Flown to Date**	13242.2
Total Remaining (km)	4804.8	**km Reflown This Week**	0.0
Percent Complete (%)	73.4	**Flight Time This Week (h)**	21.9
Prod km/Day This Week	375.7	**Prod km/Flt Hour This Week**	120.1

WEEKLY PRODUCTION

Week 7		**Flight No.**	**Flight Time**	**No. of Lines Flown**	**No. Reflight Lines Flown**	**Production (km)**	**Reflown (km)**
TOTALS			**21.9**	**39.6**	**0.0**	**2629.8**	**0.0**
30-Aug	**Monday**		**4.4**	**9.0**	**0.0**	**650.7**	**0.0**
	C-GSGF Flt 1	28	4.4	9.0	0.0	650.7	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	fog, partly sunny		**Remarks**	Flight delayed due to fog. Full production flight. Technician, Sean, arrives in Dunmore East. Craig and Steven depart for Canada.			
Geomag	unsettled with micropulsations						
31-Aug	**Tuesday**		**8.0**	**16.0**	**0.0**	**1157.7**	**0.0**
	C-GSGF Flt 1	29	4.0	8.0	0.0	578.7	0.0
	C-GSGF Flt 2	30	4.0	8.0	0.0	579.0	0.0
Weather	overcast, windy		**Remarks**	Two full production flights.			
Geomag	active with micropulsations						
1-Sep	**Wednesday**		**1.5**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1	31	1.5	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	overcast, windy, rain showers		**Remarks**	Flight aborted due to technical issue with geophysical equipment. No second flight due to weather.			
Geomag	unsettled						
2-Sep	**Thursday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	overcast		**Remarks**	No flight due to Cork ATC – permission to fly within airspace denied.			
Geomag	unsettled						
3-Sep	**Friday**		**8.0**	**14.6**	**0.0**	**821.4**	**0.0**
	C-GSGF Flt 1	32/33	5.3	10.6	0.0	523.6	0.0
	C-GSGF Flt 2	34	2.7	4.0	0.0	297.8	0.0
Weather	overcast, hazy, rain showers		**Remarks**	First flight aborted due to technical issue with geophysical equipment. Full flight followed. Last flight aborted due to rain.			
Geomag	unsettled						
4-Sep	**Saturday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	overcast, hazy, foggy		**Remarks**	Flight delayed due to technical issue with geophysical equipment which was resolved. No flight due to weather – poor visibility.			
Geomag	quiet						
5-Sep	**Sunday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	foggy		**Remarks**	No flight due to weather – poor visibility.			
Geomag	quiet						
Comments	Another great week in Ireland.						

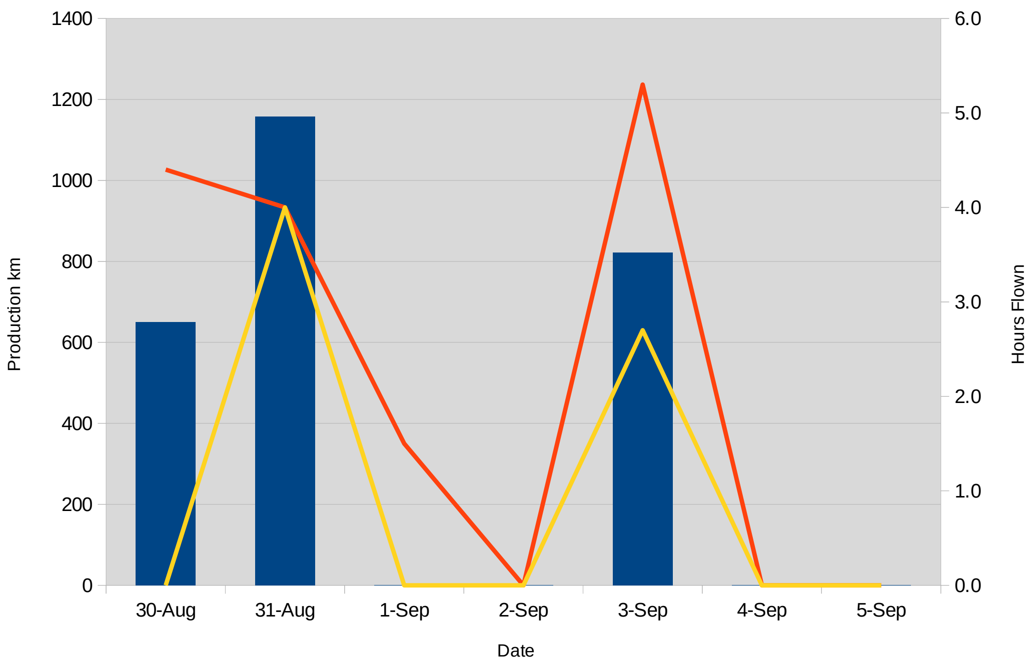
Signed Alison McCleary

PERSONNEL ON SITE THIS WEEK

Name	Position	Arrival This Week	Departure This Week	On Site?	No. of Days On Site This Week	No. of Days on Site To Date
Alison McCleary	Crew Chief			ON SITE	7	381
Steve Gebhardt	Lead Pilot			ON SITE	7	381
Charles Dicks	Pilot				0	105
Dwayne Bailey	AME				0	95
Steven Hyde	Pilot		30-Aug-21	ON SITE	1	65
Jeff Tucker	Pilot			ON SITE	7	56
Craig McMahon	Technician		30-Aug-21	ON SITE	1	44
Darren McBeth	AME			ON SITE	7	44
Todd Svarckopf	Pilot			ON SITE	7	37
Sean O'Rourke	Technician	30-Aug-21		ON SITE	7	7

HSE Statistics	This Week	Project Totals
SGL Person Hours	330	2490
Inductions	1	4
Near Miss		0
First Aid Case (FAC)		0
Medical Treatment Case (MTC)		0
Restricted Work Case (RWC)		0
Lost Time Injuries (LTI)		0
Safety Meetings		1
GSI PR Complaints		0
Fuel Consumption (L)	6330	32130

WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN



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SURVEY DETAILS

Survey Name	Tellus	**Client Name**	Geological Survey of Ireland
Survey Location	Waterford, Ireland	**Contact Name**	Jim Hodgson
Project Code	GSI___21.IRL	**Contact Phone**	+353 1678 2742
Total km	18047	**Client Address**	Beggar's Bush, Haddington Road, Dublin 4, Ireland
Line Spacing	200 m by 2000 m		
Survey Type	MAG/SPEC/FEM	**Email**	jim.hodgson@gsi.ie / tellus@gsi.ie

SURVEY PRODUCTION SUMMARY

Production This Week (km)	1119.4	**Total km Flown to Date**	14361.6
Total Remaining (km)	3685.4	**km Reflown This Week**	0.0
Percent Complete (%)	79.6	**Flight Time This Week (h)**	10.5
Prod km/Day This Week	159.9	**Prod km/Flt Hour This Week**	106.6

WEEKLY PRODUCTION

Week 8		**Flight No.**	**Flight Time**	**No. of Lines Flown**	**No. Reflight Lines Flown**	**Production (km)**	**Reflown (km)**
TOTALS			**10.5**	**17.0**	**0.0**	**1119.4**	**0.0**
6-Sep	**Monday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	foggy		**Remarks**	No flight due to weather.			
Geomag	quiet						
7-Sep	**Tuesday**		**8.1**	**15.0**	**0.0**	**1026.4**	**0.0**
	C-GSGF Flt 1	35	4.5	8.0	0.0	595.3	0.0
	C-GSGF Flt 2	36	3.6	7.0	0.0	431.1	0.0
Weather	foggy, sunny, hot		**Remarks**	Flight delayed due to fog. Two production flights. Second flight shortened due to daylight hours.			
Geomag	unsettled with micropulsations						
8-Sep	**Wednesday**		**1.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1	37	1.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	thunderstorms, thick fog		**Remarks**	No production flight due to weather. Short training flight at airport.			
Geomag	quiet						
9-Sep	**Thursday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	thick fog, mist, rain		**Remarks**	No flight due to weather.			
Geomag	quiet						
10-Sep	**Friday**		**1.4**	**2.0**	**0.0**	**93.0**	**0.0**
	C-GSGF Flt 1	38	1.4	2.0	0.0	93.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	fog, partly sunny		**Remarks**	Flight delayed due to fog. Flight aborted due to Cork ATC – permission to fly within airspace denied.			
Geomag	quiet						
11-Sep	**Saturday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	partly sunny		**Remarks**	No flight due to Cork ATC – permission to fly within airspace denied.			
Geomag	quiet						
12-Sep	**Sunday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	light rain all day		**Remarks**	No flight due to Cork ATC – permission to fly within airspace denied.			
Geomag	quiet						
Comments	A below average week. Fog created poor visibility for most of it. Cork ATC had a very busy weekend as they got ready to close from September 13 to November 22.						

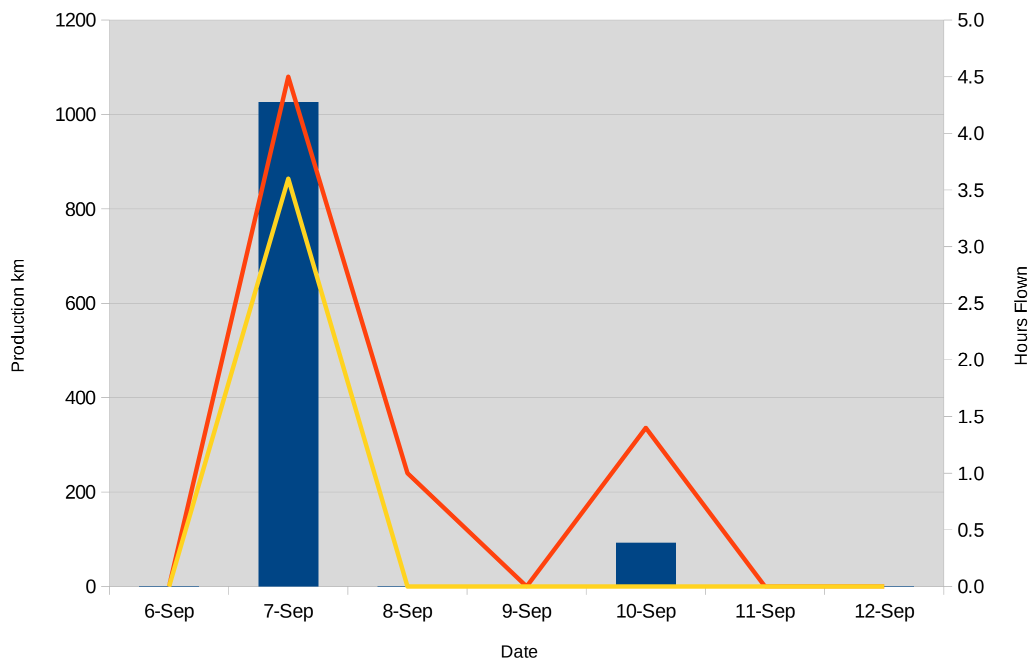
Signed Alison McCleary

PERSONNEL ON SITE THIS WEEK

Name	Position	Arrival This Week	Departure This Week	On Site?	No. of Days On Site This Week	No. of Days on Site To Date
Alison McCleary	Crew Chief			ON SITE	7	388
Steve Gebhardt	Lead Pilot			ON SITE	7	388
Charles Dicks	Pilot				0	105
Dwayne Bailey	AME				0	95
Steven Hyde	Pilot				0	65
Jeff Tucker	Pilot			ON SITE	7	63
Craig McMahon	Technician				0	44
Darren McBeth	AME			ON SITE	7	51
Todd Svarckopf	Pilot			ON SITE	7	44
Sean O'Rourke	Technician			ON SITE	7	14

HSE Statistics	This Week	Project Totals
SGL Person Hours	315	2805
Inductions		4
Near Miss		0
First Aid Case (FAC)		0
Medical Treatment Case (MTC)		0
Restricted Work Case (RWC)		0
Lost Time Injuries (LTI)		0
Safety Meetings		1
GSI PR Complaints		0
Fuel Consumption (L)	2970	35100

WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN



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	Tellus	**Client Name**	Geological Survey of Ireland
Survey Location	Waterford, Ireland	**Contact Name**	Jim Hodgson
Project Code	GSI___21.IRL	**Contact Phone**	+353 1678 2742
Total km	18047	**Client Address**	Beggar's Bush, Haddington Road, Dublin 4, Ireland
Line Spacing	200 m by 2000 m		
Survey Type	MAG/SPEC/FEM	**Email**	jim.hodgson@gsi.ie / tellus@gsi.ie

SURVEY PRODUCTION SUMMARY

Production This Week (km)	3153.3	**Total km Flown to Date**	17514.9
Total Remaining (km)	532.1	**km Reflown This Week**	0.0
Percent Complete (%)	97.1	**Flight Time This Week (h)**	22.4
Prod km/Day This Week	450.5	**Prod km/Flt Hour This Week**	140.8

WEEKLY PRODUCTION

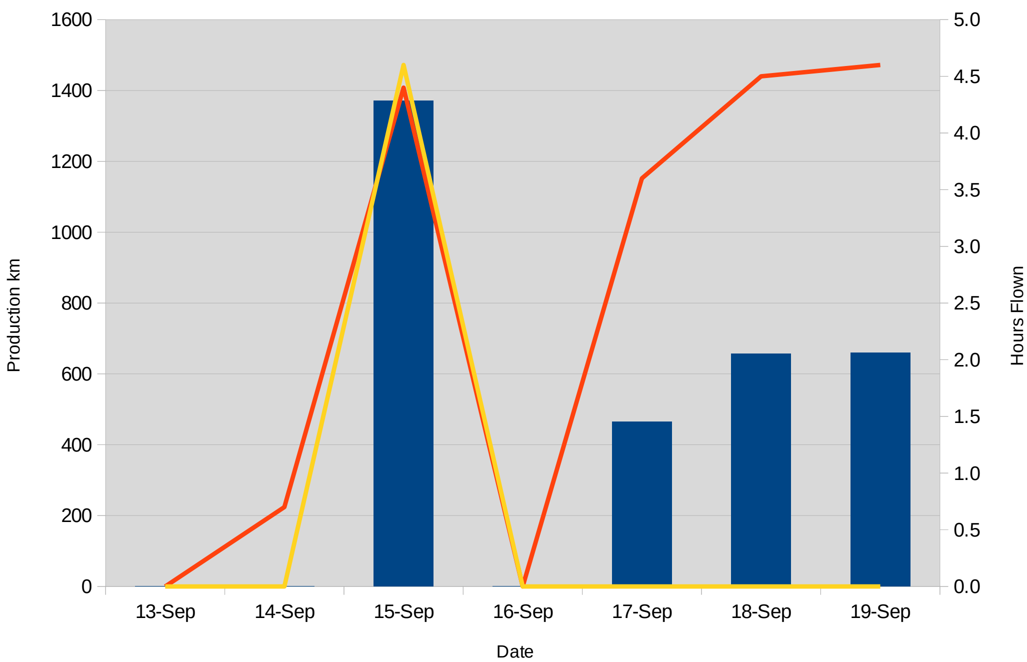
Week 9		**Flight No.**	**Flight Time**	**No. of Lines Flown**	**No. Reflight Lines Flown**	**Production (km)**	**Reflown (km)**
TOTALS			**22.4**	**46.6**	**0.0**	**3153.3**	**0.0**
13-Sep	**Monday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	overcast, heavy rain showers		**Remarks**	No flight due to weather.			
Geomag	quiet						
14-Sep	**Tuesday**		**0.7**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1	39	0.7	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	fog, overcast, heavy rain showers		**Remarks**	No flight due to weather. Short training flight at airport.			
Geomag	quiet						
15-Sep	**Wednesday**		**9.0**	**20.0**	**0.0**	**1371.5**	**0.0**
	C-GSGF Flt 1	40	4.4	10.0	0.0	684.1	0.0
	C-GSGF Flt 2	41	4.6	10.0	0.0	687.4	0.0
Weather	overcast		**Remarks**	Two full production flights.			
Geomag	unsettled with micropulsations						
16-Sep	**Thursday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	overcast, fog, mist, rain showers		**Remarks**	No flight due to weather.			
Geomag	quiet						
17-Sep	**Friday**		**3.6**	**7.0**	**0.0**	**464.8**	**0.0**
	C-GSGF Flt 1	42	3.6	7.0	0.0	464.8	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	heavy rain showers, partly sunny		**Remarks**	Production flight delayed due to heavy rain. Production flight aborted due to rain.			
Geomag	quiet						
18-Sep	**Saturday**		**4.5**	**9.6**	**0.0**	**657.4**	**0.0**
	C-GSGF Flt 1	43	4.5	9.6	0.0	657.4	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	fog, partly sunny, warm, rain		**Remarks**	Flight delayed due to fog. Full production flight.			
Geomag	unsettled with micropulsations						
19-Sep	**Sunday**		**4.6**	**10.0**	**0.0**	**659.6**	**0.0**
	C-GSGF Flt 1	44	4.6	10.0	0.0	659.6	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	sunny, rain showers		**Remarks**	Full production flight. Second flight cancelled due to rain.			
Geomag	unsettled with micropulsations						
Comments	Second best week of production in the A9 block. One full production flight remains. Well done all.						

Signed Alison McCleary

PERSONNEL ON SITE THIS WEEK						
Name	**Position**	**Arrival This Week**	**Departure This Week**	**On Site?**	**No. of Days On Site This Week**	**No. of Days on Site To Date**
Alison McCleary	Crew Chief			ON SITE	7	395
Steve Gebhardt	Lead Pilot			ON SITE	7	395
Charles Dicks	Pilot				0	105
Dwayne Bailey	AME				0	95
Steven Hyde	Pilot				0	65
Jeff Tucker	Pilot			ON SITE	7	70
Craig McMahon	Technician				0	44
Darren McBeth	AME		16-Sep-21	ON SITE	4	55
Todd Svarckopf	Pilot		19-Sep-21	ON SITE	7	51
Sean O'Rourke	Technician			ON SITE	7	21
John Burnham	AME	15-Sep-21		ON SITE	5	5

HSE Statistics	This Week	Project Totals
SGL Person Hours	330	3135
Inductions	1	5
Near Miss		0
First Aid Case (FAC)		0
Medical Treatment Case (MTC)		0
Restricted Work Case (RWC)		0
Lost Time Injuries (LTI)		0
Safety Meetings		1
GSI PR Complaints		0
Fuel Consumption (L)	6230	41330

WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN



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	Tellus	**Client Name**	Geological Survey of Ireland
Survey Location	Waterford, Ireland	**Contact Name**	Jim Hodgson
Project Code	GSI___21.IRL	**Contact Phone**	+353 1678 2742
Total km	18047	**Client Address**	Beggar's Bush, Haddington Road, Dublin 4, Ireland
Line Spacing	200 m by 2000 m		
Survey Type	MAG/SPEC/FEM	**Email**	jim.hodgson@gsi.ie / tellus@gsi.ie

SURVEY PRODUCTION SUMMARY			
Production This Week (km)	532.1	**Total km Flown to Date**	18047.0
Total Remaining (km)	0.0	**km Reflown This Week**	66.7
Percent Complete (%)	100.0	**Flight Time This Week (h)**	7.1
Prod km/Day This Week	76.0	**Prod km/Flt Hour This Week**	74.9

WEEKLY PRODUCTION

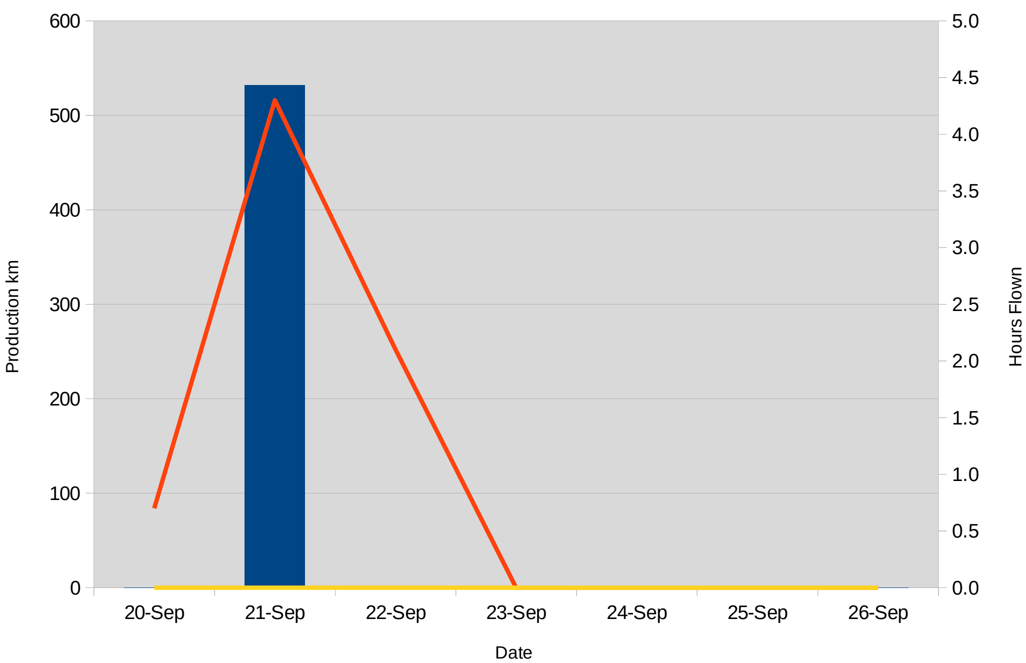
Week 10		**Flight No.**	**Flight Time**	**No. of Lines Flown**	**No. Reflight Lines Flown**	**Production (km)**	**Reflown (km)**
TOTALS			**7.1**	**9.4**	**0.8**	**532.1**	**66.7**
20-Sep	**Monday**		**0.7**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1	45	0.7	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	fog, heavy rain showers		**Remarks**	Flight delayed due to fog. Flight aborted due to poor visibility.			
Geomag	unsettled with micropulsations						
21-Sep	**Tuesday**		**4.3**	**9.4**	**0.8**	**532.1**	**66.7**
	C-GSGF Flt 1	46	4.3	9.4	0.8	532.1	66.7
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	partly sunny, misty, overcast		**Remarks**	Last production flight of A9 block.			
Geomag	unsettled with micropulsations						
22-Sep	**Wednesday**		**2.1**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1	47	2.1	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	partly sunny, windy		**Remarks**	Waterford client test line completed.			
Geomag	quiet						
23-Sep	**Thursday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	sunny, calm		**Remarks**	Data verification and aircraft maintenance.			
Geomag	quiet						
24-Sep	**Friday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	partly sunny		**Remarks**	Data verification complete. Aircraft maintenance continues.			
Geomag	quiet						
25-Sep	**Saturday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	fog, mist		**Remarks**	Aircraft maintenance continues.			
Geomag	quiet						
26-Sep	**Sunday**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	C-GSGF Flt 1		0.0	0.0	0.0	0.0	0.0
	C-GSGF Flt 2		0.0	0.0	0.0	0.0	0.0
Weather	partly sunny, rain, windy		**Remarks**	Aircraft maintenance continues.			
Geomag	quiet						
Comments	A9 production completed. Flying in Ireland during 2021 is finished. Thank you to all who contributed to another efficient and safe Tellus project. A9 block is the second highest rate of production next to the A7 block.						

Signed Alison McCleary

PERSONNEL ON SITE THIS WEEK						
Name	**Position**	**Arrival This Week**	**Departure This Week**	**On Site?**	**No. of Days On Site This Week**	**No. of Days on Site To Date**
Alison McCleary	Crew Chief			ON SITE	7	402
Steve Gebhardt	Lead Pilot			ON SITE	7	402
Charles Dicks	Pilot				0	105
Dwayne Bailey	AME				0	95
Steven Hyde	Pilot				0	65
Jeff Tucker	Pilot			ON SITE	7	77
Craig McMahon	Technician				0	44
Darren McBeth	AME				0	55
Todd Svarckopf	Pilot				0	51
Sean O'Rourke	Technician			ON SITE	7	28
John Burnham	AME			ON SITE	7	12

HSE Statistics	This Week	Project Totals
SGL Person Hours	262.5	3397.5
Inductions		5
Near Miss		0
First Aid Case (FAC)		0
Medical Treatment Case (MTC)		0
Restricted Work Case (RWC)		0
Lost Time Injuries (LTI)		0
Safety Meetings		1
GSI PR Complaints		0
Fuel Consumption (L)	1150	42480

WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN



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Appendix VII

FEM FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9001.00	37062.30	38165.00	543039.66	561224.99	616949.32	549134.87	2025	238	2021
9001.01	42506.80	42607.90	562797.93	561192.32	543260.80	549243.53	2033	246	2021
9002.00	38325.10	39468.30	560897.55	543227.17	551133.19	617018.77	2025	238	2021
9002.01	42804.50	42942.10	560918.67	563002.82	551214.80	543296.17	2033	246	2021
9003.00	39625.70	40785.70	543424.63	562133.76	617056.93	547306.27	2025	238	2021
9003.01	43117.60	43189.10	563184.95	562101.05	543364.96	547416.97	2033	246	2021
9004.00	41626.50	42767.70	561804.11	543615.14	549305.76	617120.60	2025	238	2021
9004.01	43435.30	43542.70	561780.58	563389.15	549387.27	543399.37	2033	246	2021
9005.00	42916.60	44017.60	543812.19	561484.72	617159.28	551274.67	2025	238	2021
9005.01	43729.80	43862.70	563573.76	561453.28	543463.99	551381.92	2033	246	2021
9006.00	44212.90	45412.80	562701.35	543998.31	547477.21	617226.03	2025	238	2021
9006.01	44127.80	44194.20	562687.41	563780.08	547556.65	543505.56	2033	246	2021
9007.00	45557.60	46672.20	544200.82	562391.38	617264.94	549449.30	2025	238	2021
9007.01	44328.50	44431.50	563964.83	562351.89	543568.73	549554.40	2033	246	2021
9008.00	46897.80	48063.70	563097.13	544388.45	547583.51	617330.77	2025	238	2021
9008.01	44716.10	44782.90	563070.72	564156.84	547656.47	543606.46	2033	246	2021
9009.00	44981.70	46199.70	564346.88	544581.65	543666.12	617378.38	2033	246	2021
9010.00	46349.50	47587.30	544776.57	564548.18	617416.03	543697.28	2033	246	2021
9011.00	47797.10	48987.90	564288.92	544957.98	545452.96	617483.09	2033	246	2021
9012.00	49158.10	49532.90	545164.23	551429.98	617520.10	594147.96	2033	246	2021
9012.01	49785.00	50613.00	551407.71	564452.18	594237.98	545590.25	2033	246	2021
9013.00	50783.30	51973.80	564642.32	545361.18	545659.50	617586.77	2033	246	2021
9014.00	58382.10	59572.50	564836.28	545545.23	545718.33	617642.40	2033	246	2021
9015.00	59706.50	60944.10	545730.81	565031.84	617678.43	545760.45	2033	246	2021
9016.00	61113.70	62306.00	565219.85	545932.71	545831.08	617743.69	2033	246	2021
9017.00	62435.20	63662.60	546130.98	565417.78	617778.58	545869.18	2033	246	2021
9018.00	39125.20	40335.60	565597.58	546319.09	545943.46	617849.52	2035	250	2021
9019.00	40492.90	40937.30	546511.41	553298.67	617883.00	592578.36	2035	250	2021
9019.01	41391.10	42221.00	553277.36	565806.21	592670.87	545983.39	2035	250	2021
9020.00	42403.50	43555.80	565990.42	546705.91	546051.80	617949.06	2035	250	2021
9021.00	43729.50	44979.40	546901.25	566185.99	617989.69	546094.15	2035	250	2021
9022.00	45109.70	46267.90	566369.84	547088.83	546168.06	618051.94	2035	250	2021
9023.00	46420.50	47676.10	547286.65	566571.89	618093.32	546206.18	2035	250	2021
9024.00	47803.40	48980.40	566755.42	547485.13	546279.26	618159.13	2035	250	2021
9025.00	49150.20	49514.40	547674.99	553426.98	618196.19	596752.83	2035	250	2021
9025.01	49831.80	50683.90	553400.62	566945.85	596842.67	546318.78	2035	250	2021
9026.00	34782.20	36018.70	567140.02	547867.79	546392.74	618262.28	2040	258	2021

FEM FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9027.00	36215.50	37395.40	548061.11	567336.48	618300.66	546435.43	2040	258	2021
9028.00	37564.10	38803.40	567526.69	548253.80	546500.37	618363.15	2040	258	2021
9029.00	39002.40	40218.70	548446.36	567725.36	618401.99	546548.00	2040	258	2021
9030.00	40411.60	41667.00	567904.98	548641.62	546615.95	618469.34	2040	258	2021
9031.00	41836.50	43043.70	548836.88	568100.81	618505.99	546659.24	2040	258	2021
9032.00	43175.20	44390.40	568290.37	549028.37	546730.06	618570.07	2040	258	2021
9033.00	44578.20	45793.50	549220.81	568486.84	618609.43	546770.58	2040	258	2021
9034.00	49815.50	51002.80	549420.13	568676.24	618659.20	546823.59	2042	260	2021
9035.00	51176.50	52425.60	568879.48	549606.40	546896.85	618729.41	2042	260	2021
9036.00	52601.60	53759.80	549797.12	569062.62	618765.92	546935.26	2042	260	2021
9037.00	53926.00	55165.90	569248.03	549990.68	547010.38	618834.13	2042	260	2021
9038.00	55351.20	56451.40	551248.99	569449.46	614910.44	547050.27	2042	260	2021
9038.01	42100.50	42169.20	550191.23	551276.50	618868.30	614813.14	2046	264	2021
9039.00	38900.40	40057.30	569640.48	550374.67	547117.85	618934.96	2043	261	2021
9040.00	40226.20	41510.40	550572.70	569837.25	618973.70	547159.58	2043	261	2021
9041.00	41690.90	42837.90	570019.70	550765.10	547233.21	619036.29	2043	261	2021
9042.00	43018.70	44305.90	550961.03	570221.84	619078.35	547274.35	2043	261	2021
9043.00	44479.80	45641.30	570407.64	551153.94	547342.69	619143.59	2043	261	2021
9044.00	45775.50	47012.80	551338.54	570581.99	619178.36	547389.39	2043	261	2021
9045.00	47196.00	48102.70	570785.11	555710.45	547454.11	603691.83	2043	261	2021
9045.01	41700.30	41954.80	555734.95	551538.19	603600.59	619246.77	2046	264	2021
9046.00	48346.10	49297.70	555388.97	570978.67	605661.86	547498.34	2043	261	2021
9046.01	41175.80	41408.20	551706.74	555410.33	619284.04	605570.26	2046	264	2021
9047.00	37103.80	38306.30	571168.31	551924.14	547572.39	619352.14	2044	262	2021
9048.00	38559.70	39772.10	552118.40	571374.38	619388.99	547610.09	2044	262	2021
9049.00	39934.70	41170.10	571562.19	552305.77	547680.02	619454.45	2044	262	2021
9050.00	41425.70	42551.60	554085.10	571761.07	613596.26	547713.85	2044	262	2021
9050.01	42462.80	42559.00	554108.70	552498.51	613522.02	619506.67	2046	264	2021
9051.00	42693.60	43905.20	571944.66	552715.89	547778.75	619554.53	2044	262	2021
9052.00	44034.40	45231.90	552896.05	572140.72	619591.00	547819.44	2044	262	2021
9053.00	45383.70	45953.40	572342.03	563469.15	547882.66	580916.84	2044	262	2021
9053.01	43623.60	43690.80	562436.55	563497.95	584767.25	580814.28	2046	264	2021
9053.05	46015.30	46601.70	562459.41	553089.78	584690.68	619662.52	2044	262	2021
9054.00	37227.10	38455.80	572519.02	553281.08	547938.22	619713.13	2046	264	2021
9055.00	38603.50	39770.00	553473.15	572726.46	619752.68	547971.04	2046	264	2021
9056.00	39908.00	41099.50	572910.16	553664.07	548038.54	619816.17	2046	264	2021
9057.00	62278.10	63403.80	553854.30	573102.45	619853.29	548079.09	2040	258	2021

FEM FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9058.00	60806.90	62061.50	573297.29	554035.20	548142.29	619917.40	2040	258	2021
9059.00	59539.40	60636.10	554738.88	573493.19	617929.97	548182.66	2040	258	2021
9060.00	58066.70	59304.20	573681.47	554972.08	548246.82	617995.95	2040	258	2021
9061.00	56826.80	57924.10	555167.50	573877.43	618032.50	548289.12	2040	258	2021
9062.00	55407.90	56633.90	574057.01	555359.47	548353.46	618099.80	2040	258	2021
9063.00	54193.70	55279.40	555560.15	574265.35	618138.20	548391.84	2040	258	2021
9064.00	52761.10	54009.40	574453.88	555218.65	548456.50	620229.63	2040	258	2021
9065.00	65040.70	66234.70	574653.90	555406.38	548504.86	620280.81	2036	250	2021
9066.00	63082.10	64286.50	555600.09	574377.51	620318.95	550294.07	2036	250	2021
9067.00	61742.70	62941.40	574541.14	555788.68	550445.36	620386.53	2036	250	2021
9068.00	60297.20	61529.50	555936.79	574734.05	620428.26	550491.05	2036	250	2021
9069.00	60483.80	61643.70	556178.61	574931.68	620475.73	550547.30	2029	243	2021
9070.00	59191.80	60328.50	575124.99	556368.72	550617.94	620543.40	2029	243	2021
9071.00	57799.10	58980.70	556562.12	575312.08	620580.11	550653.73	2029	243	2021
9072.00	56462.70	57621.80	575508.46	556751.91	550725.76	620647.19	2029	243	2021
9073.00	55101.70	56271.80	556958.92	575700.44	620681.31	550764.49	2029	243	2021
9074.00	53799.40	54951.30	575893.03	557144.57	550835.36	620749.06	2029	243	2021
9075.00	52414.10	53594.70	557335.52	576080.42	620784.98	550879.11	2029	243	2021
9076.00	51100.50	52264.20	576279.58	557528.89	550946.39	620854.08	2029	243	2021
9077.00	43673.90	44835.30	557720.03	576469.18	620892.25	550989.17	2029	243	2021
9078.00	42375.80	43533.70	576662.14	557914.84	551057.38	620959.31	2029	243	2021
9079.00	41038.20	42216.10	558109.56	576850.85	620991.81	551099.02	2029	243	2021
9080.00	39714.80	40855.80	577046.30	558293.84	551169.25	621061.88	2029	243	2021
9081.00	38355.90	39538.80	558493.49	577234.75	621099.55	551213.65	2029	243	2021
9082.00	37066.30	38206.60	577429.12	558685.26	551278.63	621160.15	2029	243	2021
9083.00	35672.60	36846.90	558882.84	577619.78	621200.58	551321.79	2029	243	2021
9084.00	34349.20	35498.00	577818.50	559072.07	551390.28	621264.35	2029	243	2021
9085.00	50287.30	51442.10	578002.82	559269.27	551450.35	621317.22	2028	242	2021
9086.00	48981.20	50111.60	559461.99	578198.13	621357.51	551491.49	2028	242	2021
9087.00	47673.50	48816.60	578382.80	559655.05	551559.20	621423.41	2028	242	2021
9088.00	46334.20	47502.30	559849.25	578582.09	621462.03	551602.04	2028	242	2021
9089.00	44986.20	46143.70	578774.55	560038.13	551668.62	621526.17	2028	242	2021
9090.00	43678.50	44818.60	560237.24	578968.09	621564.93	551711.64	2028	242	2021
9091.00	42311.60	43515.10	579158.59	560427.11	551782.63	621631.24	2028	242	2021
9092.00	41025.40	42152.80	560622.19	579349.45	621667.58	551826.02	2028	242	2021
9093.00	51337.60	52470.30	560813.81	579540.19	621718.18	551878.58	2027	241	2021
9094.00	39682.80	40860.60	579729.34	561008.67	551943.66	621785.95	2028	242	2021

FEM FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9095.00	49961.90	51190.80	579873.35	561193.73	551994.91	621837.10	2027	241	2021
9096.00	53823.00	54950.20	561389.92	580123.43	621873.45	552033.81	2026	240	2021
9097.00	48634.10	49790.30	561588.29	580320.26	621927.13	552080.33	2027	241	2021
9098.00	47213.20	48442.00	580507.95	561771.54	552146.08	621991.34	2027	241	2021
9099.00	45925.80	47075.50	561979.56	580699.57	622025.72	552186.43	2027	241	2021
9100.00	44581.70	45776.20	580895.73	562165.89	552254.98	622095.73	2027	241	2021
9101.00	43283.00	44440.70	562361.99	581094.42	622135.93	552288.10	2027	241	2021
9102.00	41942.20	43128.70	581282.35	562553.35	552357.64	622197.60	2027	241	2021
9103.00	57804.40	58964.80	562741.82	581477.58	622237.44	552391.63	2021	236	2021
9104.00	56493.60	57665.10	581667.52	562939.46	552462.26	622305.78	2021	236	2021
9105.00	55024.90	56203.00	563130.95	581864.97	622340.38	552495.29	2021	236	2021
9106.00	47230.60	48408.40	582055.51	563324.89	552565.12	622404.09	2021	236	2021
9107.00	45945.80	47088.20	563522.61	582247.93	622447.09	552600.49	2021	236	2021
9108.00	44644.70	45773.50	581476.59	563710.30	556250.03	622513.77	2021	236	2021
9109.00	43368.50	44477.70	563909.03	581658.99	622548.38	556349.53	2021	236	2021
9110.00	42071.40	43186.40	581845.87	564096.01	556414.65	622616.90	2021	236	2021
9111.00	40820.10	41935.30	564289.64	582043.34	622650.56	556454.09	2021	236	2021
9112.00	39509.80	40623.40	582233.54	564484.42	556519.89	622719.54	2021	236	2021
9113.00	38230.60	39318.30	564678.23	582432.45	622753.12	556560.67	2021	236	2021
9114.00	57541.80	58704.30	564872.41	582625.51	622804.59	556607.26	2019	235	2021
9115.00	56290.50	57356.20	582814.04	565059.18	556675.36	622871.06	2019	235	2021
9116.00	54989.50	56125.50	565258.02	583010.54	622906.74	556715.00	2019	235	2021
9117.00	53740.10	54820.40	583199.48	565448.16	556779.54	622973.10	2019	235	2021
9118.00	52396.80	53565.60	565647.06	583389.27	623010.90	556822.04	2019	235	2021
9119.00	51113.50	52218.50	583585.08	565830.61	556887.21	623081.34	2019	235	2021
9120.00	43321.80	44437.80	566031.35	583775.92	623118.41	556928.00	2019	235	2021
9121.00	42061.80	43139.90	583970.12	566223.52	556996.83	623181.74	2019	235	2021
9122.00	40789.70	41888.20	566408.75	584167.12	623222.88	557033.33	2019	235	2021
9123.00	39544.30	40634.20	584359.34	566608.82	557095.29	623290.00	2019	235	2021
9124.00	38267.40	39388.60	566804.35	584552.53	623322.05	557137.24	2019	235	2021
9125.00	37019.30	38119.50	584743.05	566993.61	557198.32	623389.30	2019	235	2021
9126.00	35741.50	36843.50	567181.12	584938.80	623429.92	557238.39	2019	235	2021
9127.00	34510.40	35614.50	585130.35	567376.61	557307.83	623495.70	2019	235	2021
9128.00	60930.80	62108.80	585324.19	567576.07	557356.67	623544.27	2018	234	2021
9129.00	62266.00	63350.60	567768.81	585523.27	623586.22	557399.05	2018	234	2021
9130.00	53881.20	55050.00	567968.15	585710.43	623634.21	557450.76	2017	230	2021
9131.00	53238.90	54392.40	585906.04	568152.25	557516.85	623702.31	2018	234	2021

FEM FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9132.00	54604.40	55670.40	568349.81	586099.53	623738.99	557555.54	2018	234	2021
9133.00	55823.20	56959.70	586287.31	568538.54	557623.34	623802.37	2018	234	2021
9134.00	57152.30	58241.00	568736.24	586480.39	623844.58	557662.19	2018	234	2021
9135.00	58390.30	59524.50	586674.98	568925.33	557727.77	623907.78	2018	234	2021
9136.00	59732.80	60819.10	569119.49	586867.11	623948.23	557764.83	2018	234	2021
9137.00	48075.00	49213.10	569314.16	587062.81	624000.17	557815.03	2017	230	2021
9138.00	46810.70	47926.20	587254.58	569509.37	557889.49	624062.49	2017	230	2021
9139.00	45525.50	46634.00	569702.28	587443.40	624099.19	557926.81	2017	230	2021
9140.00	44101.80	45264.80	587641.26	569892.86	557991.31	624165.34	2017	230	2021
9141.00	35449.40	36282.90	573224.18	587835.79	612516.59	558028.77	2016	228	2021
9141.01	57148.90	57339.20	570086.79	573245.16	624204.09	612425.24	2023	237	2021
9142.00	34181.20	35260.20	588026.62	572380.89	558093.08	616445.25	2016	228	2021
9142.01	56443.60	56564.20	570279.00	572398.64	624259.63	616341.77	2023	237	2021
9143.00	62449.90	63531.60	588219.06	570466.81	558148.35	624324.25	2014	223	2021
9144.00	61233.80	62327.50	570670.70	588413.94	624357.26	558183.55	2014	223	2021
9145.00	59973.90	61078.60	588605.54	570858.02	558254.13	624426.45	2014	223	2021
9146.00	58703.30	59819.00	571057.06	588800.86	624465.68	558288.21	2014	223	2021
9147.00	57380.40	58525.40	588994.22	571239.69	558356.44	624528.56	2014	223	2021
9148.00	56140.20	57217.70	571444.25	589185.22	624565.71	558393.31	2014	223	2021
9149.00	54812.60	55962.40	589375.96	571632.42	558458.64	624633.12	2014	223	2021
9150.00	53575.00	54662.80	571823.88	589570.64	624673.56	558498.35	2014	223	2021
9151.00	52239.70	53397.80	589763.32	572021.53	558568.86	624736.24	2014	223	2021
9152.00	57827.50	59030.80	572208.96	589957.06	624773.12	558606.25	2012	222	2021
9153.00	56617.50	57620.90	590153.00	572401.04	558671.40	624841.65	2012	222	2021
9154.00	55256.80	56447.60	572599.83	590345.29	624879.58	558707.48	2012	222	2021
9155.00	54038.30	55080.80	590539.65	572795.02	558775.49	624943.24	2012	222	2021
9156.00	52683.70	53885.00	572986.41	590727.30	624981.09	558815.31	2012	222	2021
9157.00	51503.10	52510.90	590927.50	573182.50	558878.40	625044.26	2012	222	2021
9158.00	45221.00	46376.30	573382.44	591120.54	625084.66	558917.92	2012	222	2021
9159.00	43959.20	45025.80	591302.53	573564.28	558988.61	625150.55	2012	222	2021
9160.00	42657.70	43810.00	573767.20	591504.04	625189.86	559026.66	2012	222	2021
9161.00	41364.90	42466.10	591699.24	573947.23	559091.12	625251.85	2012	222	2021
9162.00	40112.70	41240.60	574156.79	591884.01	625291.63	559127.66	2012	222	2021
9163.00	38870.70	39959.00	592075.60	574336.55	559197.42	625356.59	2012	222	2021
9164.00	39644.50	40671.50	592275.90	576630.35	559245.96	617582.46	2011	221	2021
9164.01	53548.90	53686.30	576651.51	574532.70	617494.42	625411.40	2017	230	2021
9165.00	38746.00	39488.50	580957.01	592467.32	602165.08	559286.78	2011	221	2021

FEM FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9165.01	50881.50	51282.60	574726.44	580991.76	625448.53	602072.83	2017	230	2021
9166.00	37890.10	38580.30	592662.01	581675.97	559351.60	600298.74	2011	221	2021
9166.01	50281.50	50714.30	581704.82	574924.16	600204.45	625511.94	2017	230	2021
9167.00	36574.60	37460.20	578765.22	592854.60	611931.27	559389.42	2011	221	2021
9167.01	55668.50	55890.70	575121.35	578790.03	625550.37	611838.18	2023	237	2021
9168.00	34983.60	36152.70	593044.31	575299.62	559457.36	625615.11	2011	221	2021
9169.01	52389.30	52742.20	593235.77	587436.24	559512.33	581134.69	2017	230	2021
9169.05	54867.80	55618.70	575486.61	587465.69	625653.30	581028.55	2009	220	2021
9170.00	54119.90	54715.40	585060.68	575688.61	590756.47	625719.08	2009	220	2021
9170.01	56435.10	56664.80	588692.15	585041.26	577230.80	590845.11	2009	220	2021
9170.02	51891.90	52210.30	588671.32	593436.59	577304.34	559546.56	2017	230	2021
9171.00	53374.30	53864.20	575880.80	584221.75	625758.05	594653.18	2009	220	2021
9171.01	49384.40	49971.00	593624.65	584194.60	559616.88	594761.80	2017	230	2021
9172.00	52114.40	53199.50	593810.65	576081.72	559669.23	625825.19	2009	220	2021
9173.00	56757.90	57968.20	594008.66	576266.74	559720.55	625876.86	2004	213	2021
9174.00	58143.70	59174.00	576469.00	594211.00	625915.05	559758.57	2004	213	2021
9175.00	34250.80	35340.30	594423.58	577719.60	559825.42	622019.62	2006	214	2021
9175.01	55177.90	55247.00	576659.95	577744.43	625965.50	621913.12	2023	237	2021
9176.00	35545.50	36584.50	576848.32	594592.13	626019.34	559863.52	2006	214	2021
9177.00	36736.70	37531.40	594781.66	582765.39	559931.53	604734.65	2006	214	2021
9177.01	45765.80	46105.40	577050.07	582793.73	626071.77	604629.63	2009	220	2021
9178.00	44436.90	45589.20	594976.10	577236.04	559986.41	626134.35	2009	220	2021
9179.00	43149.70	44213.40	577434.38	595167.38	626176.20	560020.27	2009	220	2021
9180.00	41817.30	42964.40	595357.92	577622.76	560091.30	626238.51	2009	220	2021
9181.00	40633.70	41685.10	577819.87	595553.27	626279.37	560126.65	2009	220	2021
9182.00	55553.60	56581.40	578010.05	595749.23	626330.86	560177.23	2004	213	2021
9183.00	54190.90	55408.20	595938.16	578204.25	560244.22	626393.21	2004	213	2021
9184.00	52977.10	53988.20	578402.89	596138.17	626428.05	560281.49	2004	213	2021
9185.00	51578.60	52812.30	596326.10	578589.51	560350.46	626499.85	2004	213	2021
9186.00	45141.70	46083.00	596518.79	582432.26	560405.29	612927.84	2004	213	2021
9186.01	58080.80	58307.00	578790.38	582461.60	626532.62	612821.99	2023	237	2021
9187.00	43964.10	44969.40	578871.39	596715.91	626586.37	560443.24	2004	213	2021
9188.00	42673.40	43865.00	596904.61	579168.78	560510.25	626655.78	2004	213	2021
9189.00	41459.50	42459.30	579367.06	597102.02	626687.50	560547.15	2004	213	2021
9190.00	40094.90	41297.80	597290.53	579552.53	560612.40	626755.18	2004	213	2021
9191.00	38885.10	39906.10	579745.26	597480.80	626796.06	560649.93	2004	213	2021
9192.00	37479.50	38736.40	597687.04	579940.33	560715.85	626861.52	2004	213	2021

FEM FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9193.00	36250.70	37294.70	580131.30	597866.81	626894.97	560755.00	2004	213	2021
9194.00	34870.10	36115.10	598062.91	580325.92	560824.84	626963.42	2004	213	2021
9195.00	36956.00	37362.10	580522.09	587305.82	626999.96	601695.31	2009	220	2021
9195.01	33710.30	34376.50	598251.45	587278.21	560879.54	601804.34	2012	222	2021
9196.00	37527.10	38066.90	588009.36	580709.38	599829.27	627065.17	2009	220	2021
9196.01	34630.20	35282.00	587993.78	598450.44	599907.41	560914.66	2012	222	2021
9197.00	38227.50	38635.40	580907.10	587693.25	627105.59	601795.67	2009	220	2021
9197.01	35443.80	36111.50	598642.31	587668.21	560980.22	601903.09	2012	222	2021
9198.00	38795.20	39294.20	588415.56	581098.31	599930.56	627168.58	2009	220	2021
9198.01	36345.90	36987.80	588378.00	598833.88	600012.39	561016.87	2012	222	2021
9199.00	39455.30	39877.10	581296.09	588082.09	627205.57	601901.36	2009	220	2021
9199.01	37147.20	37819.80	599024.31	588057.16	561082.86	602006.90	2012	222	2021
9200.00	39997.70	40507.80	588780.78	581490.42	600033.02	627273.57	2009	220	2021
9200.01	38051.60	38693.20	588766.87	599213.59	600110.81	561122.40	2012	222	2021
9201.00	49319.30	50006.70	587928.47	599413.95	604030.90	561178.59	2008	218	2021
9201.01	36416.10	36624.20	587943.00	584811.91	603955.37	615637.84	2009	220	2021
9201.02	40278.90	40465.40	581676.66	584839.55	627313.62	615532.74	2023	237	2021
9202.00	48368.70	49108.10	599610.61	587603.07	561244.07	606026.75	2008	218	2021
9202.01	41320.80	41660.40	581877.40	587631.08	627365.42	605921.36	2023	237	2021
9203.00	47305.70	48186.80	585716.85	599807.41	613797.49	561280.00	2008	218	2021
9203.01	42329.40	42528.30	582072.74	585744.87	627414.67	613704.22	2023	237	2021
9204.00	46217.50	47121.00	600002.26	585391.29	561348.33	615790.22	2008	218	2021
9204.01	43065.50	43234.70	582267.26	585421.60	627467.15	615690.33	2023	237	2021
9205.00	45194.10	46077.80	586109.50	600183.77	613898.46	561389.01	2008	218	2021
9205.01	43797.20	44012.70	582457.84	586129.93	627518.97	613808.96	2023	237	2021
9206.00	44117.50	45018.50	600379.65	585778.70	561455.28	615893.85	2008	218	2021
9206.01	44552.50	44730.60	582645.80	585804.78	627572.85	615794.01	2023	237	2021
9207.01	37810.50	38917.40	582841.89	600575.65	627624.66	561493.56	2023	237	2021
9208.00	42092.00	42942.60	600764.75	586685.05	561557.59	614070.29	2008	218	2021
9208.01	45324.80	45524.30	583021.01	586711.57	627678.04	613963.98	2023	237	2021
9209.00	44072.20	45134.00	586356.76	600960.75	616037.29	561597.92	2007	216	2021
9209.01	51689.90	51877.70	583224.98	586385.49	627726.71	615945.58	2023	237	2021
9210.00	43116.40	43953.70	601152.63	587070.27	561660.46	614168.56	2007	216	2021
9210.01	52442.80	52659.80	583428.89	587098.44	627776.69	614067.14	2023	237	2021
9211.00	41997.40	42926.80	587791.48	601348.50	612274.17	561701.53	2007	216	2021
9211.01	53257.90	53493.60	583613.96	587814.58	627834.24	612183.42	2023	237	2021
9212.01	39100.50	40148.20	601538.49	583804.97	561772.49	627897.35	2023	237	2021

FEM FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9213.00	37767.40	38348.60	590762.88	600652.23	602717.56	565825.15	2006	214	2021
9213.01	54006.40	54392.10	584001.12	590785.49	627937.21	602629.56	2023	237	2021
9214.00	44696.40	45713.90	584194.33	600841.44	627988.26	565871.28	2003	210	2021
9215.00	43427.30	44538.70	601043.75	584390.08	565937.25	628053.59	2003	210	2021
9216.00	42249.70	43275.60	584586.09	601235.92	628086.50	565979.39	2003	210	2021
9217.00	40981.70	42076.10	601424.79	584772.25	566041.74	628152.47	2003	210	2021
9218.00	39830.70	40828.30	584966.67	601619.37	628189.88	566077.78	2003	210	2021
9219.00	38546.80	39650.70	601807.27	585158.41	566146.43	628256.82	2003	210	2021
9220.00	37394.40	38396.00	585356.50	602003.71	628298.43	566184.27	2003	210	2021
9221.00	48339.20	49426.80	602197.18	585543.83	566250.36	628360.71	2001	206	2021
9222.00	49568.90	50558.30	585739.90	602400.57	628401.51	566288.01	2001	206	2021
9223.00	50734.30	51850.90	602582.41	585928.89	566354.80	628467.84	2001	206	2021
9224.00	51995.00	52978.90	586129.37	602783.55	628506.00	566393.97	2001	206	2021
9225.00	53129.50	54233.00	602969.37	586320.28	566457.45	628567.18	2001	206	2021
9226.00	54392.70	55405.70	586510.90	603167.45	628611.22	566498.77	2001	206	2021
9227.00	55577.40	56687.80	603351.97	586702.04	566561.67	628674.52	2001	206	2021
9228.00	56845.10	57851.80	586894.74	603549.20	628710.99	566597.19	2001	206	2021
9229.00	58023.20	59116.10	603745.78	587089.90	566662.65	628778.88	2001	206	2021
9230.00	33763.00	34840.40	603927.74	587281.11	566720.49	628825.97	2003	210	2021
9231.00	34991.00	35997.80	587476.63	604129.16	628867.07	566753.97	2003	210	2021
9232.00	36156.80	37285.50	604322.12	587665.16	566821.46	628932.00	2003	210	2021
901.00	42249.90	42283.70	564643.52	562619.08	543898.40	543354.47	2033	246	2021
902.00	41420.40	41662.20	562111.43	574763.13	545287.26	548678.65	2033	246	2021
903.00	40847.80	41200.50	582346.14	561578.01	552788.32	547218.23	2033	246	2021
904.00	40381.60	40764.80	561074.09	581842.11	549151.30	554723.11	2033	246	2021
905.00	39549.70	40231.20	601593.13	560543.67	562092.00	551077.07	2033	246	2021
906.00	33834.60	34488.20	601076.30	562632.11	564021.08	553711.81	2040	258	2021
906.01	52370.70	52411.30	560038.33	562741.11	553017.21	553740.34	2040	258	2021
907.00	46116.90	46853.30	559522.56	604438.01	554948.11	566991.34	2040	258	2021
908.00	51454.00	52244.50	603902.61	558989.88	568927.31	556881.55	2040	258	2021
909.00	63827.90	64573.80	558486.79	603403.02	558807.91	570867.55	2040	258	2021
910.00	36072.30	36843.80	602869.20	557950.09	572787.11	560729.28	2046	264	2021
911.00	47721.10	48471.70	557447.06	602363.28	562680.00	574725.35	2046	264	2021
912.00	37609.10	38399.70	601833.90	556917.50	576654.55	564608.30	2043	261	2021
913.00	49810.80	50498.80	556413.84	601326.96	566551.02	578592.71	2043	261	2021
914.00	35731.90	36566.90	600795.52	555880.89	580514.20	568475.76	2044	262	2021
915.00	46717.90	47512.50	600277.27	555360.79	582447.00	570397.03	2046	264	2021

FEM FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
916.00	45900.50	46599.10	554857.01	599775.90	572337.00	584390.16	2046	264	2021
917.00	45038.80	45787.10	599243.30	554324.22	586310.67	574268.25	2046	264	2021
918.00	44176.60	44932.10	553820.28	598735.10	576202.00	588247.70	2046	264	2021
919.00	47228.00	48001.60	598202.17	553288.34	590179.27	578127.04	2042	260	2021
920.00	48117.80	48828.40	552784.33	597701.53	580072.51	592110.41	2042	260	2021
921.00	34688.40	35400.90	552267.25	597180.21	582007.07	594041.91	2044	262	2021
922.00	33783.40	34599.80	596649.77	551733.28	595972.37	583930.87	2044	262	2021
923.00	48804.60	49594.50	596132.40	551217.36	597900.11	585867.03	2038	253	2021
924.00	49729.50	50408.40	550712.26	595628.10	587792.36	599841.63	2038	253	2021
925.00	56996.30	57724.00	595093.40	550178.87	601767.03	589723.48	2036	250	2021
926.00	57870.70	58705.70	549675.14	594596.54	591660.53	603702.50	2036	250	2021
927.00	59006.70	59688.90	549159.49	594075.59	593594.55	605638.71	2023	237	2021
928.00	52453.30	53197.20	593542.54	548621.65	607563.61	595524.52	2026	240	2021
929.00	35347.10	36043.10	548118.43	593040.05	597461.05	609502.67	2009	220	2021
930.00	34388.00	34693.40	592504.69	576283.37	611429.15	607082.61	2009	220	2021
930.01	60323.20	60799.60	547600.34	576386.59	599393.32	607109.70	2026	240	2021
931.01	56541.60	57279.30	547081.59	592002.71	601324.53	613365.64	2026	240	2021
932.00	35954.20	36716.10	591469.98	546553.91	615289.65	603249.31	2025	238	2021
933.00	48374.50	49094.50	546051.11	590969.26	605185.32	617228.02	2025	238	2021
934.01	57472.40	58182.30	590431.98	545517.79	619157.35	607117.63	2026	240	2021
935.00	53794.60	54534.90	589913.62	544993.71	621090.12	609045.91	2021	236	2021
936.01	58325.40	59097.70	544496.52	589410.31	610983.07	623028.16	2026	240	2021
937.00	36959.90	37692.80	588878.22	543964.01	624951.30	612914.91	2021	236	2021
938.01	59293.80	60015.80	588364.76	543445.40	626889.96	614847.61	2026	240	2021
939.00	59202.80	59937.60	587846.18	542924.82	628821.28	616789.90	2036	250	2021

MAGNETIC FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9001.00	37062.10	38164.90	511236.61	530350.45	170.19	424.24	2025	238	2021
9001.01	42506.50	42607.70	530321.34	532010.37	113.62	222.57	2033	246	2021
9002.00	38324.90	39468.30	511426.95	530000.76	142.13	386.84	2025	238	2021
9002.01	42804.50	42942.10	530017.36	532209.24	110.43	224.40	2033	246	2021
9003.00	39625.50	40785.50	511620.27	531282.45	138.67	380.28	2025	238	2021
9003.01	43117.30	43189.00	531253.03	532395.23	114.60	215.76	2033	246	2021
9004.00	41626.30	42767.70	511813.38	530931.97	136.57	441.77	2025	238	2021
9004.01	43435.30	43542.70	530904.01	532594.03	108.68	207.38	2033	246	2021
9005.00	42916.40	44017.50	512006.43	530580.66	154.71	423.30	2025	238	2021
9005.01	43729.60	43862.60	530551.05	532780.97	116.30	207.18	2033	246	2021
9006.00	44212.80	45412.70	512196.73	531852.17	128.45	407.85	2025	238	2021
9006.01	44127.70	44194.20	531834.03	532983.38	112.40	204.57	2033	246	2021
9007.00	45557.40	46672.20	512393.19	531513.77	149.42	403.98	2025	238	2021
9007.01	44328.30	44431.30	531476.55	533170.57	114.83	190.54	2033	246	2021
9008.00	46897.70	48063.60	512585.16	532246.41	155.21	402.33	2025	238	2021
9008.01	44715.90	44782.90	532213.99	533358.64	113.71	212.00	2033	246	2021
9009.00	44981.50	46199.70	512775.99	533551.07	114.53	378.93	2033	246	2021
9010.00	46349.30	47587.30	512967.07	533748.62	111.83	416.10	2033	246	2021
9011.00	47796.80	48987.90	513150.74	533471.01	115.62	441.25	2033	246	2021
9012.00	49157.90	49532.80	513352.91	519940.53	167.99	311.96	2033	246	2021
9012.01	49784.80	50612.90	519915.45	533625.02	154.47	443.29	2033	246	2021
9013.00	50783.10	51973.80	513552.37	533819.39	167.96	405.58	2033	246	2021
9014.00	58381.90	59572.40	513737.45	534012.26	139.53	413.76	2033	246	2021
9015.00	59706.30	60944.10	513917.23	534203.89	113.83	409.26	2033	246	2021
9016.00	61113.50	62306.00	514121.53	534394.35	119.07	375.21	2033	246	2021
9017.00	62435.00	63662.50	514315.65	534586.69	110.51	432.88	2033	246	2021
9018.00	39124.90	40335.50	514507.92	534771.19	107.71	392.96	2035	250	2021
9019.00	40492.60	40937.30	514693.32	521831.91	199.64	342.66	2035	250	2021
9019.01	41391.10	42220.90	521809.34	534973.32	121.05	384.82	2035	250	2021
9020.00	42403.30	43555.80	514891.62	535161.28	117.12	401.45	2035	250	2021
9021.00	43729.30	44979.30	515083.06	535351.44	113.46	390.19	2035	250	2021
9022.00	45109.50	46267.90	515272.99	535539.40	117.71	419.26	2035	250	2021
9023.00	46420.30	47676.00	515466.85	535735.58	115.86	394.57	2035	250	2021
9024.00	47803.20	48980.40	515667.67	535923.02	157.30	425.37	2035	250	2021
9025.00	49150.00	49514.20	515853.83	521899.24	180.73	287.82	2035	250	2021
9025.01	49831.50	50683.80	521870.36	536107.73	124.70	375.10	2035	250	2021
9026.00	34782.00	36018.70	516048.78	536306.14	141.12	421.60	2040	258	2021
9027.00	36215.30	37395.40	516237.93	536498.57	114.87	344.74	2040	258	2021

MAGNETIC FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9028.00	37563.90	38803.40	516433.26	536691.08	119.05	398.08	2040	258	2021
9029.00	39002.20	40218.70	516622.00	536885.79	114.08	440.24	2040	258	2021
9030.00	40411.40	41666.90	516821.15	537067.87	120.94	468.23	2040	258	2021
9031.00	41836.20	43043.70	517009.95	537259.61	106.24	463.89	2040	258	2021
9032.00	43175.00	44390.40	517204.71	537451.71	119.38	445.16	2040	258	2021
9033.00	44578.00	45793.50	517393.26	537643.99	112.28	421.25	2040	258	2021
9034.00	49815.20	51002.70	517591.21	537830.92	111.35	392.87	2042	260	2021
9035.00	51176.30	52425.50	517781.92	538038.13	115.63	423.42	2042	260	2021
9036.00	52601.40	53759.70	517966.90	538215.64	108.54	405.07	2042	260	2021
9037.00	53925.80	55165.80	518164.70	538405.37	119.23	427.03	2042	260	2021
9038.00	55285.80	56451.40	518356.65	538602.49	111.74	441.89	2042	260	2021
9039.00	38900.20	40057.30	518545.51	538796.04	118.76	429.03	2043	261	2021
9040.00	40226.00	41510.30	518739.57	538987.17	113.59	445.12	2043	261	2021
9041.00	41690.70	42837.90	518934.41	539173.66	118.92	433.15	2043	261	2021
9042.00	43018.50	44305.90	519126.36	539371.56	114.88	480.21	2043	261	2021
9043.00	44479.60	45641.20	519323.51	539560.24	118.64	435.79	2043	261	2021
9044.00	45775.20	47012.80	519500.84	539730.03	122.32	476.67	2043	261	2021
9045.00	47195.90	48102.60	524091.39	539934.00	123.75	459.93	2043	261	2021
9045.01	41700.20	41954.70	519706.08	524117.28	204.95	340.49	2046	264	2021
9046.00	48346.00	49297.70	523739.55	540125.09	115.02	466.21	2043	261	2021
9046.01	41175.60	41408.10	519869.64	523762.26	202.51	264.26	2046	264	2021
9047.00	37103.60	38306.20	520090.37	540317.11	120.75	440.14	2044	262	2021
9048.00	38559.50	39772.10	520278.96	540519.16	112.71	513.82	2044	262	2021
9049.00	39934.40	41170.00	520470.23	540711.16	115.94	498.94	2044	262	2021
9050.00	41327.20	42551.50	520659.39	540902.68	113.29	518.22	2044	262	2021
9051.00	42693.40	43905.20	520877.38	541090.43	116.65	472.63	2044	262	2021
9052.00	44034.20	45231.90	521053.26	541282.40	111.23	502.38	2044	262	2021
9053.00	45383.50	46601.60	521251.44	541486.14	118.66	505.14	2044	262	2021
9054.00	37226.90	38455.70	521441.83	541662.11	113.01	484.98	2046	264	2021
9055.00	38603.30	39769.90	521628.42	541864.24	112.04	488.33	2046	264	2021
9056.00	39907.80	41099.50	521821.62	542051.85	111.62	468.62	2046	264	2021
9057.00	62277.90	63403.80	522008.13	542240.28	107.64	445.33	2040	258	2021
9058.00	60806.70	62061.50	522191.23	542437.62	108.19	464.34	2040	258	2021
9059.00	59539.50	60636.10	522924.18	542629.49	111.72	424.50	2040	258	2021
9060.00	58066.50	59304.00	523157.75	542819.89	111.48	459.63	2040	258	2021
9061.00	56826.70	57924.10	523347.57	543012.15	104.72	515.12	2040	258	2021
9062.00	55407.70	56633.70	523543.62	543194.45	113.98	453.14	2040	258	2021
9063.00	54193.60	55279.40	523738.15	543398.55	109.04	459.53	2040	258	2021

MAGNETIC FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9064.00	52760.90	54009.40	523369.98	543589.70	112.65	447.12	2040	258	2021
9065.00	65040.50	66234.70	523556.94	543789.11	116.83	401.92	2036	250	2021
9066.00	63081.90	64286.50	523746.95	543484.63	159.81	396.05	2036	250	2021
9067.00	61742.50	62941.30	523939.45	543649.01	133.78	399.17	2036	250	2021
9068.00	60297.00	61529.50	524079.53	543838.36	158.54	397.97	2036	250	2021
9069.00	60483.60	61643.70	524322.78	544035.16	123.56	407.65	2029	243	2021
9070.00	59191.50	59855.70	532714.23	544232.75	128.61	397.41	2029	243	2021
9070.01	42738.30	43236.10	524517.75	532740.79	172.11	441.31	2046	264	2021
9071.00	57798.90	58980.60	524705.04	544412.22	140.12	465.54	2029	243	2021
9072.00	56462.50	57621.70	524898.75	544612.76	142.52	472.77	2029	243	2021
9073.00	55101.50	56271.70	525100.23	544798.92	146.37	466.83	2029	243	2021
9074.00	53799.20	54951.20	525289.70	544995.82	135.00	474.82	2029	243	2021
9075.00	52413.90	53594.70	525475.08	545179.02	138.91	462.36	2029	243	2021
9076.00	51100.30	52264.10	525672.43	545380.40	123.05	529.95	2029	243	2021
9077.00	43673.70	44835.30	525858.11	545566.16	166.39	508.99	2029	243	2021
9078.00	42375.60	43533.60	526056.71	545761.32	129.52	542.21	2029	243	2021
9079.00	41038.00	42216.00	526246.02	545944.59	130.27	571.96	2029	243	2021
9080.00	39714.60	40855.70	526434.56	546144.14	114.89	571.42	2029	243	2021
9081.00	38355.70	39538.80	526628.12	546328.43	115.93	607.17	2029	243	2021
9082.00	37066.10	38206.60	526822.58	546525.14	115.47	581.31	2029	243	2021
9083.00	35672.40	36846.80	527016.07	546710.21	111.82	584.81	2029	243	2021
9084.00	34349.00	35498.00	527207.83	546912.76	108.25	546.59	2029	243	2021
9085.00	50287.10	51442.10	527404.24	547096.68	116.18	622.76	2028	242	2021
9086.00	48981.00	50111.60	527592.73	547287.72	112.95	594.61	2028	242	2021
9087.00	47673.30	48816.50	527790.30	547474.96	117.92	568.69	2028	242	2021
9088.00	46334.00	47502.30	527978.65	547670.06	107.53	601.00	2028	242	2021
9089.00	44986.00	46143.60	528171.67	547864.78	113.46	610.45	2028	242	2021
9090.00	43678.30	44818.50	528365.17	548052.67	114.27	623.90	2028	242	2021
9091.00	42311.40	43515.00	528559.07	548247.29	112.71	621.75	2028	242	2021
9092.00	41025.20	42152.80	528748.20	548434.12	110.72	599.27	2028	242	2021
9093.00	51337.40	52470.30	528938.80	548624.09	117.36	624.89	2027	241	2021
9094.00	39682.60	40860.50	529138.46	548815.89	117.23	570.13	2028	242	2021
9095.00	49961.70	51190.70	529322.34	548957.34	113.06	541.10	2027	241	2021
9096.00	53822.80	54950.20	529512.82	549205.03	108.96	527.29	2026	240	2021
9097.00	48633.90	49790.20	529710.65	549399.41	115.44	528.23	2027	241	2021
9098.00	47213.00	48442.00	529896.38	549590.95	114.12	519.08	2027	241	2021
9099.00	45925.50	47075.50	530098.60	549778.92	116.52	539.14	2027	241	2021
9100.00	44581.40	45776.20	530289.17	549978.95	114.09	550.50	2027	241	2021

MAGNETIC FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9101.00	43282.80	44440.60	530481.32	550170.71	117.61	588.69	2027	241	2021
9102.00	41941.90	43128.70	530675.09	550363.48	112.96	595.50	2027	241	2021
9103.00	57804.20	58964.70	530859.31	550552.25	111.58	585.77	2021	236	2021
9104.00	56493.30	57665.00	531061.47	550747.72	114.99	600.13	2021	236	2021
9105.00	55024.70	56202.90	531247.01	550938.09	111.64	619.25	2021	236	2021
9106.00	47230.40	48408.40	531443.54	551132.38	112.14	640.34	2021	236	2021
9107.00	45945.70	47088.20	531638.87	551321.16	110.49	591.74	2021	236	2021
9108.00	44644.40	45773.40	531829.00	550505.00	113.74	618.02	2021	236	2021
9109.00	43368.30	44477.70	532022.17	550681.02	111.30	614.31	2021	236	2021
9110.00	42071.20	43186.30	532213.04	550870.30	116.35	617.71	2021	236	2021
9111.00	40819.90	41935.30	532401.44	551063.82	110.62	555.63	2021	236	2021
9112.00	39509.60	40623.30	532600.15	551256.14	112.42	495.05	2021	236	2021
9113.00	38230.40	39318.30	532788.42	551451.37	103.33	447.37	2021	236	2021
9114.00	57541.60	58704.20	532981.57	551642.14	109.59	480.32	2019	235	2021
9115.00	56290.30	57356.20	533170.82	551834.88	113.47	514.24	2019	235	2021
9116.00	54989.30	56125.50	533365.82	552027.18	114.69	540.70	2019	235	2021
9117.00	53739.90	54820.40	533558.26	552218.59	112.77	553.37	2019	235	2021
9118.00	52396.60	53565.60	533753.16	552404.33	109.08	510.60	2019	235	2021
9119.00	51113.30	52218.40	533940.81	552602.50	114.83	492.25	2019	235	2021
9120.00	43321.60	44437.80	534135.95	552789.42	115.22	462.96	2019	235	2021
9121.00	42061.50	43139.90	534330.50	552987.67	115.55	415.61	2019	235	2021
9122.00	40789.50	41888.20	534511.72	553179.06	113.59	396.59	2019	235	2021
9123.00	39544.10	40634.10	534715.94	553373.98	110.86	384.71	2019	235	2021
9124.00	38267.20	39388.60	534905.51	553562.94	111.68	486.50	2019	235	2021
9125.00	37019.20	38119.50	535097.48	553754.37	110.81	521.66	2019	235	2021
9126.00	35741.30	36843.40	535281.06	553946.09	113.24	439.26	2019	235	2021
9127.00	34510.20	35614.40	535480.59	554141.53	112.93	429.07	2019	235	2021
9128.00	60930.60	62108.80	535677.61	554334.90	115.09	462.60	2018	234	2021
9129.00	62265.90	63350.60	535867.95	554529.82	109.37	477.76	2018	234	2021
9130.00	53881.00	55050.00	536064.92	554716.22	108.38	518.43	2017	230	2021
9131.00	53238.70	54392.30	536252.79	554914.99	115.74	505.60	2018	234	2021
9132.00	54604.20	55670.40	536445.05	555103.77	110.79	491.50	2018	234	2021
9133.00	55823.00	56959.70	536636.21	555293.83	115.64	465.16	2018	234	2021
9134.00	57152.20	58241.00	536831.23	555483.07	106.01	450.42	2018	234	2021
9135.00	58390.10	59524.50	537021.43	555680.20	114.09	428.60	2018	234	2021
9136.00	59732.60	60819.10	537211.70	555868.28	104.20	402.87	2018	234	2021
9137.00	48074.80	49213.00	537405.37	556061.74	113.92	403.65	2017	230	2021
9138.00	46810.40	47926.20	537603.15	556259.05	111.79	459.65	2017	230	2021

MAGNETIC FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9139.00	45525.30	46634.10	537792.21	556443.58	113.06	489.75	2017	230	2021
9140.00	44101.60	45264.80	537985.10	556642.44	111.66	467.20	2017	230	2021
9141.00	35449.30	36282.90	541474.47	556833.07	115.84	352.88	2016	228	2021
9141.01	57148.70	57339.20	538174.71	541498.49	180.25	437.96	2023	237	2021
9142.00	34181.00	35260.10	540580.45	557027.02	111.76	407.94	2016	228	2021
9142.01	56443.50	56564.10	538367.90	540596.42	246.55	399.14	2023	237	2021
9143.00	62449.70	63531.50	538558.48	557218.28	100.60	396.95	2014	223	2021
9144.00	61233.60	62327.50	538756.50	557408.93	113.68	437.62	2014	223	2021
9145.00	59973.70	61078.60	538946.35	557603.02	106.68	435.65	2014	223	2021
9146.00	58703.10	59818.90	539141.36	557792.86	114.88	492.73	2014	223	2021
9147.00	57380.20	58525.40	539326.50	557990.02	108.61	471.30	2014	223	2021
9148.00	56140.00	57217.60	539526.79	558175.61	113.48	482.95	2014	223	2021
9149.00	54812.40	55962.40	539717.66	558370.41	116.07	475.59	2014	223	2021
9150.00	53574.80	54662.70	539905.11	558559.50	118.37	458.90	2014	223	2021
9151.00	52239.40	53397.80	540105.22	558757.56	111.71	483.10	2014	223	2021
9152.00	57827.30	59030.80	540288.71	558945.84	117.00	509.41	2012	222	2021
9153.00	56617.30	57620.80	540485.13	559144.63	121.89	543.32	2012	222	2021
9154.00	55256.60	56447.50	540678.39	559331.20	113.93	607.54	2012	222	2021
9155.00	54038.10	55080.80	540875.62	559529.47	117.89	561.73	2012	222	2021
9156.00	52683.40	53885.00	541062.02	559713.00	112.45	593.60	2012	222	2021
9157.00	51503.00	52510.90	541261.59	559914.04	116.87	593.15	2012	222	2021
9158.00	45220.70	46376.20	541456.79	560103.16	113.55	605.82	2012	222	2021
9159.00	43959.00	45025.80	541641.78	560289.52	113.63	505.67	2012	222	2021
9160.00	42657.50	43810.00	541840.44	560486.63	114.62	440.61	2012	222	2021
9161.00	41364.70	42466.10	542023.21	560684.14	115.00	449.04	2012	222	2021
9162.00	40112.50	41240.50	542228.56	560863.54	113.20	416.91	2012	222	2021
9163.00	38870.50	39959.00	542410.97	561059.34	112.25	446.09	2012	222	2021
9164.00	39644.30	40637.40	545355.76	561258.67	113.43	400.04	2011	221	2021
9164.01	53513.80	53686.20	542607.95	545382.34	257.08	333.23	2017	230	2021
9165.00	38745.90	39488.50	549347.70	561446.08	112.59	423.38	2011	221	2021
9165.01	50881.30	51282.50	542796.10	549383.98	181.38	380.59	2017	230	2021
9166.00	37889.90	38580.10	550097.15	561643.29	110.54	368.86	2011	221	2021
9166.01	50281.40	50714.30	542996.25	550125.78	158.14	383.73	2017	230	2021
9167.00	36344.90	37460.10	543183.12	561830.31	113.33	455.67	2011	221	2021
9168.00	34983.40	36152.70	543370.18	562023.55	114.96	379.59	2011	221	2021
9169.00	54867.60	55995.70	543553.24	562214.02	112.30	445.18	2009	220	2021
9170.00	54119.70	54715.40	543757.61	553612.88	154.57	376.18	2009	220	2021
9170.02	51657.30	52210.20	553586.19	562410.08	114.51	335.94	2017	230	2021

MAGNETIC FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9171.00	53374.10	53864.10	543945.74	552715.01	151.27	444.48	2009	220	2021
9171.01	49384.20	49970.80	552691.65	562602.22	112.90	353.33	2017	230	2021
9172.00	52114.20	53199.50	544149.14	562787.52	117.70	397.40	2009	220	2021
9173.00	56757.70	57968.20	544333.40	562984.08	114.05	538.96	2004	213	2021
9174.00	58143.50	59174.00	544531.26	563182.83	113.70	460.70	2004	213	2021
9175.00	34250.60	35411.40	544725.56	563398.37	111.70	467.31	2006	214	2021
9176.00	35545.30	36584.50	544909.05	563562.42	119.60	523.39	2006	214	2021
9177.00	36736.50	37531.30	551123.61	563754.22	117.29	371.39	2006	214	2021
9177.01	45765.70	46105.30	545111.91	551149.87	255.85	493.68	2009	220	2021
9178.00	44436.70	45589.20	545298.84	563948.29	112.81	513.06	2009	220	2021
9179.00	43149.60	44213.30	545494.95	564133.73	114.62	448.42	2009	220	2021
9180.00	41817.10	42964.40	545684.01	564328.11	113.06	498.69	2009	220	2021
9181.00	40633.60	41685.10	545878.62	564519.70	108.76	477.05	2009	220	2021
9182.00	55553.50	56581.30	546068.21	564713.13	115.59	465.89	2004	213	2021
9183.00	54190.70	55408.20	546263.19	564906.25	114.63	634.10	2004	213	2021
9184.00	52976.90	53988.10	546457.72	565100.46	129.17	625.90	2004	213	2021
9185.00	51578.40	52812.20	546648.50	565292.47	116.36	647.53	2004	213	2021
9186.00	45141.50	46328.60	546843.51	565484.32	112.94	644.60	2004	213	2021
9187.00	43963.90	44969.40	546922.37	565677.70	115.34	633.38	2004	213	2021
9188.00	42673.20	43864.90	547225.27	565868.72	114.61	625.30	2004	213	2021
9189.00	41459.30	42459.30	547417.75	566062.28	108.97	586.07	2004	213	2021
9190.00	40094.70	41297.80	547606.06	566253.10	115.23	595.58	2004	213	2021
9191.00	38884.90	39906.00	547794.35	566437.81	114.21	612.58	2004	213	2021
9192.00	37479.30	38736.40	547992.28	566648.07	116.10	624.82	2004	213	2021
9193.00	36250.50	37294.60	548179.06	566822.29	109.94	593.78	2004	213	2021
9194.00	34869.80	36115.10	548376.35	567023.77	119.06	635.87	2004	213	2021
9195.00	36955.80	37362.00	548568.82	555701.38	205.91	662.00	2009	220	2021
9195.01	33710.00	34376.30	555677.37	567211.90	117.89	290.28	2012	222	2021
9196.00	37526.90	38066.90	548758.30	556434.44	208.35	684.68	2009	220	2021
9196.01	34630.10	35282.00	556413.66	567405.31	114.14	290.15	2012	222	2021
9197.00	38227.30	38635.30	548951.89	556087.19	195.52	660.14	2009	220	2021
9197.01	35443.60	36111.40	556064.08	567599.66	118.66	291.81	2012	222	2021
9198.00	38795.20	39294.20	549145.68	556836.79	210.01	663.22	2009	220	2021
9198.01	36345.70	36987.70	556794.89	567785.48	115.28	280.34	2012	222	2021
9199.00	39455.00	39877.00	549337.72	556474.25	216.82	787.90	2009	220	2021
9199.01	37147.00	37819.70	556451.58	567980.03	119.82	276.64	2012	222	2021
9200.00	39997.60	40507.80	549536.23	557202.16	232.29	818.80	2009	220	2021
9200.01	38051.40	38693.10	557182.35	568163.82	111.00	278.56	2012	222	2021

MAGNETIC FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9201.00	49319.20	50006.70	556291.53	568364.95	112.71	304.30	2008	218	2021
9201.01	36416.00	36624.00	553020.53	556310.64	241.60	597.81	2009	220	2021
9201.02	40278.70	40465.40	549718.65	553046.59	217.98	903.69	2023	237	2021
9202.00	48368.50	49108.00	555942.19	568564.21	110.32	287.35	2008	218	2021
9202.01	41320.60	41660.20	549918.05	555966.33	224.96	876.89	2023	237	2021
9203.00	47305.60	48186.70	553946.01	568755.36	110.14	385.58	2008	218	2021
9203.01	42329.20	42528.20	550112.76	553975.01	258.50	806.78	2023	237	2021
9204.00	46217.30	47121.00	553594.62	568954.28	109.85	372.51	2008	218	2021
9204.01	43065.30	43234.60	550306.33	553624.45	329.89	814.33	2023	237	2021
9205.00	45194.00	46077.80	554337.14	569131.69	113.18	493.95	2008	218	2021
9205.01	43797.00	44012.60	550497.21	554358.71	217.81	799.04	2023	237	2021
9206.00	44117.30	45018.40	553982.31	569330.43	112.54	476.08	2008	218	2021
9206.01	44552.30	44730.60	550683.67	554007.95	231.97	799.99	2023	237	2021
9207.01	37810.30	38917.40	550879.46	569522.04	113.15	977.08	2023	237	2021
9208.00	42091.80	42942.50	554913.56	569713.86	111.13	505.36	2008	218	2021
9208.01	45324.70	45524.20	551058.92	554937.90	227.39	924.18	2023	237	2021
9209.00	44072.20	45134.00	554556.41	569905.61	110.23	384.96	2007	216	2021
9209.01	51689.70	51877.70	551260.90	554586.40	235.34	981.66	2023	237	2021
9210.00	43116.30	43953.60	555297.41	570098.32	111.82	392.46	2007	216	2021
9210.01	52442.60	52659.70	551463.44	555323.50	223.74	973.11	2023	237	2021
9211.00	41997.20	42926.80	556039.72	570291.84	111.99	407.93	2007	216	2021
9211.01	53257.80	53493.50	551649.34	556065.22	220.07	940.59	2023	237	2021
9212.01	39100.30	40148.20	551841.49	570484.10	106.51	929.41	2023	237	2021
9213.00	37767.10	38348.60	559140.13	569539.18	129.99	538.31	2006	214	2021
9213.01	54006.30	54391.90	552034.93	559165.10	215.53	944.90	2023	237	2021
9214.00	44696.20	45713.80	552226.27	569725.99	118.50	897.63	2003	210	2021
9215.00	43427.10	44538.60	552425.88	569933.02	115.42	897.96	2003	210	2021
9216.00	42249.40	43275.60	552614.60	570120.60	117.36	893.48	2003	210	2021
9217.00	40981.50	42076.10	552804.97	570312.43	115.92	877.36	2003	210	2021
9218.00	39830.40	40828.20	552993.80	570500.92	116.42	898.32	2003	210	2021
9219.00	38546.60	39650.70	553189.57	570693.39	115.64	901.47	2003	210	2021
9220.00	37394.20	38396.00	553384.51	570885.39	118.32	960.38	2003	210	2021
9221.00	48339.00	49426.80	553573.44	571081.39	114.75	948.99	2001	206	2021
9222.00	49568.70	50558.30	553765.32	571280.72	114.89	984.70	2001	206	2021
9223.00	50734.10	51850.80	553958.58	571465.16	114.91	1012.45	2001	206	2021
9224.00	51994.80	52978.90	554153.36	571662.15	114.01	1047.24	2001	206	2021
9225.00	53129.30	54233.00	554346.83	571850.45	113.69	1036.70	2001	206	2021
9226.00	54392.60	55405.70	554535.15	572044.52	117.33	1055.22	2001	206	2021

MAGNETIC FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9227.00	55577.20	56687.80	554726.99	572231.72	109.69	1055.82	2001	206	2021
9228.00	56844.90	57851.70	554915.72	572423.14	117.58	991.77	2001	206	2021
9229.00	58023.10	59116.00	555114.81	572622.22	116.14	930.59	2001	206	2021
9230.00	33762.70	34840.40	555303.81	572807.73	118.16	910.00	2003	210	2021
9231.00	34990.80	35997.80	555495.60	573002.48	117.63	931.37	2003	210	2021
9232.00	36156.60	37285.50	555686.28	573198.00	114.87	913.91	2003	210	2021
901.00	42249.70	42283.70	531824.82	533853.18	112.69	118.07	2033	246	2021
902.00	41420.20	41662.20	531280.50	543892.26	105.67	209.92	2033	246	2021
903.00	40847.60	41200.40	530737.13	551428.78	111.62	205.56	2033	246	2021
904.00	40381.50	40764.80	530194.93	550886.38	109.83	368.80	2033	246	2021
905.00	39549.40	40231.10	529650.47	570549.68	109.72	220.29	2033	246	2021
906.00	33834.30	34488.00	531706.88	570005.04	109.29	228.18	2040	258	2021
906.01	52370.60	52411.20	529106.04	531798.50	167.20	324.14	2040	258	2021
907.00	46116.70	46853.30	528558.78	573308.00	109.75	417.40	2040	258	2021
908.00	51453.70	52244.50	528011.55	572760.85	105.95	301.70	2040	258	2021
909.00	63827.70	64573.80	527470.15	572220.06	109.83	399.66	2040	258	2021
910.00	36072.10	36843.70	526925.29	571672.45	125.36	402.74	2046	264	2021
911.00	47721.00	48471.70	526383.69	571127.59	112.73	450.43	2046	264	2021
912.00	37608.90	38399.70	525833.90	570584.89	110.87	508.41	2043	261	2021
913.00	49810.60	50498.80	525289.28	570038.39	121.30	433.96	2043	261	2021
914.00	35731.60	36566.90	524744.56	569497.09	142.13	427.82	2044	262	2021
915.00	46717.60	47512.40	524204.15	568952.19	140.90	483.99	2046	264	2021
916.00	45900.40	46599.10	523660.88	568408.03	163.12	348.62	2046	264	2021
917.00	45038.60	45787.00	523115.28	567860.54	156.81	351.85	2046	264	2021
918.00	44176.50	44932.20	522572.06	567320.33	191.14	352.98	2046	264	2021
919.00	47227.70	48001.50	522025.94	566773.47	199.13	344.06	2042	260	2021
920.00	48117.70	48828.40	521483.21	566227.97	179.47	312.50	2042	260	2021
921.00	34688.20	35401.00	520932.92	565686.60	130.57	393.32	2044	262	2021
922.00	33783.10	34599.70	520391.22	565140.56	146.31	395.61	2044	262	2021
923.00	48804.30	49594.50	519843.65	564597.36	171.42	431.70	2038	253	2021
924.00	49729.30	50408.40	519299.46	564048.60	125.77	377.75	2038	253	2021
925.00	56996.00	57723.90	518758.62	563508.51	142.48	569.76	2036	250	2021
926.00	57870.50	58705.70	518210.35	562964.10	159.20	575.62	2036	250	2021
927.00	59006.50	59688.90	517668.16	562416.60	158.90	365.87	2023	237	2021
928.00	52453.10	53197.10	517121.71	561870.53	163.30	443.06	2026	240	2021
929.00	35347.00	36043.10	516579.19	561328.04	170.44	567.59	2009	220	2021
930.00	34387.70	35223.40	516035.92	560783.88	161.44	666.40	2009	220	2021
931.00	48352.20	49185.70	515490.22	560240.94	173.09	266.43	2015	225	2021

MAGNETIC FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
932.00	35953.90	36716.10	514942.47	559695.44	177.15	494.08	2025	238	2021
933.00	48374.30	49094.50	514401.19	559151.19	182.56	251.80	2025	238	2021
934.00	49402.70	50064.40	513853.42	558602.76	198.75	349.36	2015	225	2021
935.00	53794.30	54534.80	513309.06	558061.80	201.77	624.67	2021	236	2021
936.00	50305.10	51135.40	512766.35	557512.47	200.36	843.92	2015	225	2021
937.00	36959.60	37692.80	512220.17	556973.48	202.26	990.13	2021	236	2021
938.00	51297.30	51960.30	511677.98	556423.88	199.01	461.03	2015	225	2021
939.00	59202.60	59937.50	511133.58	555881.04	196.24	513.34	2036	250	2021

SPECTROMETER FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9001.00	37062.50	38164.50	543043.32	561217.38	616936.81	549163.86	2025	238	2021
9001.01	42506.50	42607.50	562803.11	561198.84	543242.85	549218.48	2033	246	2021
9002.00	38325.50	39467.50	560890.93	543239.89	551156.86	616969.41	2025	238	2021
9002.01	42804.50	42941.50	560918.82	562992.83	551214.84	543331.85	2033	246	2021
9003.00	39625.50	40785.50	543421.21	562130.75	617069.20	547318.16	2025	238	2021
9003.01	43117.50	43188.50	563186.53	562110.72	543359.22	547380.23	2033	246	2021
9004.00	41626.50	42767.50	561804.07	543618.40	549305.79	617108.62	2025	238	2021
9004.01	43435.50	43542.50	561783.41	563385.82	549376.88	543411.57	2033	246	2021
9005.00	42916.50	44017.50	543810.57	561483.00	617165.72	551280.75	2025	238	2021
9005.01	43729.50	43862.50	563578.46	561456.16	543446.46	551370.89	2033	246	2021
9006.00	44213.50	45412.50	562692.63	544003.35	547512.71	617207.48	2025	238	2021
9006.01	44128.50	44193.50	562697.97	563769.00	547517.63	543547.80	2033	246	2021
9007.00	45557.50	46671.50	544199.07	562380.12	617271.32	549492.40	2025	238	2021
9007.01	44328.50	44430.50	563964.80	562369.43	543568.71	549489.51	2033	246	2021
9008.00	46898.50	48063.50	563086.48	544391.63	547626.55	617318.86	2025	238	2021
9008.01	44716.50	44782.50	563077.40	564150.50	547632.39	543630.11	2033	246	2021
9009.00	44981.50	46199.50	564350.01	544584.84	543653.96	617366.17	2033	246	2021
9010.00	46349.50	47586.50	544776.57	564536.34	617416.01	543743.82	2033	246	2021
9011.00	47797.50	48987.50	564281.94	544964.62	545475.34	617458.46	2033	246	2021
9012.00	49158.50	49532.50	545170.79	551423.36	617495.27	594172.35	2033	246	2021
9012.01	49785.50	50612.50	551415.54	564444.00	594209.57	545619.57	2033	246	2021
9013.00	50783.50	51973.50	564638.99	545365.78	545671.98	617569.02	2033	246	2021
9014.00	58382.50	59572.50	564830.10	545545.27	545742.38	617642.38	2033	246	2021
9015.00	59706.50	60943.50	545730.89	565023.02	617678.43	545794.06	2033	246	2021
9016.00	61113.50	62305.50	565223.16	545941.06	545819.19	617712.58	2033	246	2021
9017.00	62435.50	63662.50	546136.10	565416.32	617760.22	545874.70	2033	246	2021
9018.00	39125.50	40335.50	565593.63	546320.61	545958.31	617843.66	2035	250	2021
9019.00	40493.50	40936.50	546520.52	553286.14	617850.31	592625.19	2035	250	2021
9019.01	41391.50	42220.50	553283.19	565798.36	592648.43	546014.32	2035	250	2021
9020.00	42403.50	43555.50	565990.42	546711.01	546051.82	617930.36	2035	250	2021
9021.00	43729.50	44978.50	546901.25	566171.72	617989.68	546146.31	2035	250	2021
9022.00	45109.50	46267.50	566373.15	547096.49	546155.98	618027.77	2035	250	2021
9023.00	46420.50	47675.50	547286.61	566561.45	618093.29	546242.09	2035	250	2021
9024.00	47803.50	48979.50	566753.91	547500.42	546285.25	618102.75	2035	250	2021
9025.00	49150.50	49513.50	547679.52	553412.01	618178.50	596802.54	2035	250	2021
9025.01	49831.50	50683.50	553396.01	566938.60	596859.30	546346.73	2035	250	2021
9026.00	34782.50	36018.50	567135.18	547870.56	546410.52	618251.96	2040	258	2021
9027.00	36215.50	37395.50	548061.13	567338.16	618300.63	546429.22	2040	258	2021

SPECTROMETER FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9028.00	37564.50	38803.50	567520.38	548252.39	546522.93	618368.18	2040	258	2021
9029.00	39002.50	40218.50	548447.93	567722.59	618396.07	546559.54	2040	258	2021
9030.00	40411.50	41666.50	567906.62	548649.52	546610.01	618441.06	2040	258	2021
9031.00	41836.50	43043.50	548836.90	568097.93	618506.00	546670.21	2040	258	2021
9032.00	43175.50	44390.50	568285.28	549026.93	546749.62	618575.58	2040	258	2021
9033.00	44578.50	45793.50	549225.49	568486.84	618592.11	546770.60	2040	258	2021
9034.00	49815.50	51002.50	549420.13	568671.43	618659.20	546840.15	2042	260	2021
9035.00	51176.50	52425.50	568879.42	549607.91	546896.79	618723.97	2042	260	2021
9036.00	52601.50	53759.50	549795.41	569057.79	618772.27	546953.23	2042	260	2021
9037.00	53926.50	55165.50	569239.24	549996.98	547043.30	618811.33	2042	260	2021
9038.00	55286.50	56451.50	550197.04	569451.00	618838.45	547044.39	2042	260	2021
9039.00	38900.50	40056.50	569638.78	550388.68	547124.00	618884.37	2043	261	2021
9040.00	40226.50	41509.50	550577.54	569824.55	618955.75	547209.68	2043	261	2021
9041.00	41691.50	42837.50	570009.37	550771.67	547271.41	619011.36	2043	261	2021
9042.00	43018.50	44305.50	550957.88	570215.68	619089.73	547296.86	2043	261	2021
9043.00	44480.50	45640.50	570394.54	551168.05	547387.68	619094.46	2043	261	2021
9044.00	45775.50	47012.50	551338.57	570578.03	619178.38	547407.34	2043	261	2021
9045.00	47196.50	48102.50	570776.63	555713.44	547486.88	603679.50	2043	261	2021
9045.01	41700.50	41954.50	555731.60	551543.19	603612.46	619228.52	2046	264	2021
9046.00	48346.50	49297.50	555395.49	570975.31	605638.79	547510.31	2043	261	2021
9046.01	41175.50	41407.50	551703.33	555399.56	619301.86	605610.93	2046	264	2021
9047.00	37103.50	38305.50	571173.27	551937.04	547554.16	619307.74	2044	262	2021
9048.00	38559.50	39771.50	552115.18	571365.20	619401.41	547646.22	2044	262	2021
9049.00	39934.50	41169.50	571565.50	552313.96	547668.03	619420.37	2044	262	2021
9050.00	41327.50	42551.50	552501.96	571759.49	619485.48	547719.42	2044	262	2021
9051.00	42693.50	43904.50	571946.33	552724.97	547772.54	619513.87	2044	262	2021
9052.00	44034.50	45231.50	552897.86	572134.02	619584.34	547840.94	2044	262	2021
9053.00	45383.50	46601.50	572345.17	553093.26	547870.08	619651.79	2044	262	2021
9054.00	37227.50	38455.50	572513.01	553285.75	547963.33	619695.36	2046	264	2021
9055.00	38603.50	39769.50	553473.11	572718.52	619752.68	548001.11	2046	264	2021
9056.00	39908.50	41099.50	572902.39	553664.11	548067.98	619816.21	2046	264	2021
9057.00	62278.50	63403.50	553860.32	573097.59	619830.60	548097.17	2040	258	2021
9058.00	60807.50	62061.50	573287.45	554035.25	548175.56	619917.41	2040	258	2021
9059.00	59539.50	60635.50	554740.91	573482.87	617924.19	548219.99	2040	258	2021
9060.00	58066.50	59303.50	573684.39	554983.55	548235.41	617954.36	2040	258	2021
9061.00	56827.50	57923.50	555178.92	573867.38	617989.02	548325.32	2040	258	2021
9062.00	55408.50	56633.50	574046.82	555366.08	548389.10	618075.29	2040	258	2021
9063.00	54193.50	55279.50	555555.95	574267.02	618150.78	548385.78	2040	258	2021

SPECTROMETER FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9064.00	52761.50	54009.50	574447.21	555217.09	548479.00	620235.39	2040	258	2021
9065.00	65040.50	66234.50	574657.41	555409.55	548492.47	620269.41	2036	250	2021
9066.00	63082.50	64286.50	555605.97	574377.55	620296.51	550294.12	2036	250	2021
9067.00	61742.50	62940.50	574543.91	555804.18	550435.43	620332.74	2036	250	2021
9068.00	60297.50	61529.50	555944.89	574734.06	620412.93	550491.06	2036	250	2021
9069.00	60483.50	61643.50	556173.72	574928.01	620493.37	550560.64	2029	243	2021
9070.00	59191.50	59855.50	575130.00	564172.35	550599.49	591440.56	2029	243	2021
9070.01	42738.50	43235.50	556374.36	564184.48	620525.75	591393.87	2046	264	2021
9071.00	57799.50	58980.50	556568.09	575308.68	620556.66	550666.45	2029	243	2021
9072.00	56462.50	57621.50	575511.74	556757.10	550713.56	620629.72	2029	243	2021
9073.00	55101.50	56271.50	556955.88	575695.28	620693.23	550783.21	2029	243	2021
9074.00	53799.50	54950.50	575891.39	557156.98	550841.61	620702.62	2029	243	2021
9075.00	52414.50	53594.50	557342.03	576077.13	620761.71	550891.09	2029	243	2021
9076.00	51100.50	52263.50	576279.58	557539.43	550946.35	620811.18	2029	243	2021
9077.00	43674.50	44834.50	557729.42	576455.17	620857.80	551041.87	2029	243	2021
9078.00	42375.50	43533.50	576666.68	557917.72	551039.87	620948.10	2029	243	2021
9079.00	41038.50	42215.50	558114.38	576841.63	620973.77	551135.96	2029	243	2021
9080.00	39714.50	40855.50	577051.29	558299.28	551151.03	621041.99	2029	243	2021
9081.00	38356.50	39538.50	558503.78	577229.82	621062.13	551231.18	2029	243	2021
9082.00	37066.50	38206.50	577425.95	558686.94	551289.72	621154.21	2029	243	2021
9083.00	35672.50	36846.50	558881.19	577613.36	621206.66	551344.61	2029	243	2021
9084.00	34349.50	35497.50	577813.93	559079.99	551406.26	621234.99	2029	243	2021
9085.00	50287.50	51441.50	577999.31	559279.37	551462.57	621279.92	2028	242	2021
9086.00	48981.50	50111.50	559467.13	578196.65	621338.36	551497.27	2028	242	2021
9087.00	47673.50	48816.50	578382.84	559656.82	551559.20	621417.21	2028	242	2021
9088.00	46334.50	47501.50	559854.03	578569.13	621444.66	551650.22	2028	242	2021
9089.00	44986.50	46143.50	578769.93	560041.38	551686.19	621513.45	2028	242	2021
9090.00	43678.50	44818.50	560237.19	578966.41	621564.91	551717.86	2028	242	2021
9091.00	42311.50	43514.50	579160.16	560436.94	551776.74	621594.65	2028	242	2021
9092.00	41025.50	42152.50	560624.00	579344.59	621661.16	551843.87	2028	242	2021
9093.00	51337.50	52469.50	560811.92	579527.33	621724.87	551927.01	2027	241	2021
9094.00	39682.50	40860.50	579734.50	561010.46	551924.34	621779.84	2028	242	2021
9095.00	49962.50	51190.50	579868.77	561197.96	552028.25	621820.77	2027	241	2021
9096.00	53823.50	54949.50	561398.84	580112.09	621841.05	552076.17	2026	240	2021
9097.00	48634.50	49789.50	561594.86	580306.72	621902.08	552129.31	2027	241	2021
9098.00	47213.50	48441.50	580503.53	561779.78	552163.25	621965.32	2027	241	2021
9099.00	45925.50	47075.50	561974.52	580699.58	622043.79	552186.43	2027	241	2021
9100.00	44581.50	45775.50	580898.79	562175.52	552243.71	622057.47	2027	241	2021

SPECTROMETER FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9101.00	43283.50	44440.50	562369.70	581091.43	622105.74	552299.84	2027	241	2021
9102.00	41942.50	43128.50	581278.20	562556.40	552372.68	622185.96	2027	241	2021
9103.00	57804.50	58964.50	562743.60	581472.87	622231.25	552409.45	2021	236	2021
9104.00	56493.50	57664.50	581669.19	562950.14	552456.64	622265.15	2021	236	2021
9105.00	55025.50	56202.50	563140.99	581856.96	622306.07	552524.22	2021	236	2021
9106.00	47230.50	48408.50	582056.98	563323.32	552559.01	622410.43	2021	236	2021
9107.00	45946.50	47087.50	563534.04	582237.01	622404.23	552641.02	2021	236	2021
9108.00	44644.50	45773.50	581479.75	563710.31	556238.78	622513.79	2021	236	2021
9109.00	43368.50	44477.50	563908.99	581655.83	622548.37	556361.27	2021	236	2021
9110.00	42071.50	43185.50	581844.34	564110.04	556420.39	622565.11	2021	236	2021
9111.00	40820.50	41934.50	564295.60	582030.71	622627.67	556500.40	2021	236	2021
9112.00	39509.50	40622.50	582237.96	564499.99	556502.66	622662.24	2021	236	2021
9113.00	38230.50	39317.50	564676.66	582419.58	622758.79	556609.34	2021	236	2021
9114.00	57541.50	58703.50	564867.48	582613.43	622822.22	556653.55	2019	235	2021
9115.00	56290.50	57355.50	582814.02	565071.70	556675.36	622824.88	2019	235	2021
9116.00	54989.50	56125.50	565258.02	583010.53	622906.73	556714.98	2019	235	2021
9117.00	53740.50	54820.50	583192.98	565446.44	556803.82	622979.55	2019	235	2021
9118.00	52396.50	53565.50	565642.21	583387.77	623029.41	556827.67	2019	235	2021
9119.00	51113.50	52218.50	583585.08	565830.63	556887.20	623081.35	2019	235	2021
9120.00	43322.50	44437.50	566042.35	583771.66	623074.20	556943.84	2019	235	2021
9121.00	42061.50	43139.50	583974.94	566229.88	556978.47	623156.07	2019	235	2021
9122.00	40789.50	41887.50	566405.57	584156.23	623234.55	557074.19	2019	235	2021
9123.00	39544.50	40633.50	584355.92	566620.49	557107.57	623244.26	2019	235	2021
9124.00	38267.50	39388.50	566806.12	584551.10	623315.77	557142.88	2019	235	2021
9125.00	37019.50	38119.50	584739.60	566993.63	557210.65	623389.32	2019	235	2021
9126.00	35741.50	36843.50	567181.14	584938.76	623429.93	557238.38	2019	235	2021
9127.00	34510.50	35614.50	585128.82	567376.63	557313.77	623495.74	2019	235	2021
9128.00	60930.50	62108.50	585329.23	567580.90	557339.44	623526.21	2018	234	2021
9129.00	62266.50	63350.50	567777.10	585521.62	623556.92	557405.22	2018	234	2021
9130.00	53881.50	55049.50	567972.98	585703.88	623616.38	557475.57	2017	230	2021
9131.00	53239.50	54391.50	585894.58	568164.02	557549.77	623654.36	2018	234	2021
9132.00	54604.50	55670.50	568351.44	586101.14	623732.96	557549.72	2018	234	2021
9133.00	55823.50	56959.50	586282.68	568541.57	557641.89	623791.30	2018	234	2021
9134.00	57152.50	58240.50	568740.14	586472.61	623830.76	557690.88	2018	234	2021
9135.00	58390.50	59524.50	586671.58	568925.34	557739.59	623907.83	2018	234	2021
9136.00	59732.50	60818.50	569114.81	586857.62	623965.25	557797.94	2018	234	2021
9137.00	48075.50	49212.50	569322.49	587054.39	623969.76	557846.14	2017	230	2021
9138.00	46810.50	47925.50	587257.83	569521.79	557877.33	624017.60	2017	230	2021

SPECTROMETER FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9139.00	45525.50	46633.50	569702.24	587436.88	624099.19	557953.22	2017	230	2021
9140.00	44101.50	45264.50	587646.03	569897.86	557973.56	624148.16	2017	230	2021
9141.00	35449.50	36282.50	573225.90	587829.05	612510.01	558055.78	2016	228	2021
9141.01	57149.50	57338.50	570097.48	573234.23	624164.81	612467.46	2023	237	2021
9142.00	34181.50	35259.50	588021.24	572390.51	558110.16	616408.61	2016	228	2021
9142.01	56443.50	56563.50	570277.18	572387.23	624266.48	616384.76	2023	237	2021
9143.00	62450.50	63531.50	588208.61	570468.59	558187.52	624317.69	2014	223	2021
9144.00	61233.50	62327.50	570665.58	588413.94	624377.20	558183.55	2014	223	2021
9145.00	59974.50	61078.50	588595.60	570859.95	558292.57	624419.65	2014	223	2021
9146.00	58703.50	59818.50	571060.28	588793.90	624453.05	558314.33	2014	223	2021
9147.00	57380.50	58525.50	588992.62	571238.23	558362.53	624534.81	2014	223	2021
9148.00	56140.50	57217.50	571449.46	589182.30	624545.21	558404.08	2014	223	2021
9149.00	54812.50	55962.50	589377.62	571631.02	558452.51	624638.72	2014	223	2021
9150.00	53575.50	54662.50	571831.92	589566.37	624642.48	558514.45	2014	223	2021
9151.00	52239.50	53397.50	589766.46	572026.25	558556.92	624719.39	2014	223	2021
9152.00	57827.50	59030.50	572209.04	589952.23	624773.10	558623.62	2012	222	2021
9153.00	56617.50	57620.50	590152.98	572408.55	558671.38	624814.15	2012	222	2021
9154.00	55256.50	56447.50	572595.48	590343.95	624894.03	558712.98	2012	222	2021
9155.00	54038.50	55080.50	590536.29	572800.17	558788.19	624924.28	2012	222	2021
9156.00	52683.50	53884.50	572983.61	590719.95	624991.06	558842.50	2012	222	2021
9157.00	51503.50	52510.50	590920.71	573189.66	558903.99	625017.89	2012	222	2021
9158.00	45221.50	46375.50	573388.95	591108.62	625059.55	558963.87	2012	222	2021
9159.00	43959.50	45025.50	591297.13	573570.82	559007.74	625130.71	2012	222	2021
9160.00	42657.50	43809.50	573763.67	591495.98	625202.16	559056.48	2012	222	2021
9161.00	41365.50	42465.50	591689.83	573957.28	559127.10	625214.54	2012	222	2021
9162.00	40112.50	41240.50	574153.33	591882.52	625304.60	559133.20	2012	222	2021
9163.00	38870.50	39958.50	592079.04	574344.90	559183.78	625324.79	2012	222	2021
9164.00	39644.50	40637.50	592275.88	577146.60	559245.94	615645.86	2011	221	2021
9164.01	53514.50	53685.50	577162.97	574545.03	615587.71	625364.76	2017	230	2021
9165.00	38746.50	39488.50	580966.00	592467.32	602134.34	559286.78	2011	221	2021
9165.01	50881.50	51282.50	574726.39	580990.23	625448.48	602077.99	2017	230	2021
9166.00	37890.50	38579.50	592655.44	581687.97	559376.18	600251.29	2011	221	2021
9166.01	50281.50	50713.50	581704.82	574936.69	600204.47	625464.02	2017	230	2021
9167.00	36345.50	37459.50	575120.48	592844.24	625529.12	559429.30	2011	221	2021
9168.00	34983.50	36152.50	593045.72	575302.87	559451.92	625603.80	2011	221	2021
9169.00	54867.50	55995.50	575481.98	593235.37	625673.53	559507.60	2009	220	2021
9170.00	54120.50	54715.50	585050.34	575686.94	590793.33	625725.11	2009	220	2021
9170.02	51657.50	52209.50	585041.82	593425.54	590825.36	559589.77	2017	230	2021

SPECTROMETER FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9171.00	53374.50	53863.50	575884.15	584209.41	625743.97	594694.39	2009	220	2021
9171.01	49384.50	49970.50	593622.90	584202.86	559623.27	594730.43	2017	230	2021
9172.00	52114.50	53199.50	593809.00	576081.64	559676.24	625825.17	2009	220	2021
9173.00	56758.50	57967.50	594000.13	576277.51	559753.25	625836.04	2004	213	2021
9174.00	58143.50	59173.50	576465.37	594201.91	625928.06	559792.34	2004	213	2021
9175.00	34250.50	35411.50	594429.05	576658.68	559808.96	625983.53	2006	214	2021
9176.00	35545.50	36584.50	576848.29	594592.09	626019.34	559863.53	2006	214	2021
9177.00	36736.50	37530.50	594784.73	582779.16	559920.62	604686.42	2006	214	2021
9177.01	45766.50	46104.50	577062.50	582777.91	626025.14	604687.88	2009	220	2021
9178.00	44437.50	45588.50	594965.60	577247.97	560028.08	626091.23	2009	220	2021
9179.00	43149.50	44212.50	577431.31	595153.37	626188.21	560073.21	2009	220	2021
9180.00	41817.50	42964.50	595354.93	577621.28	560103.39	626244.14	2009	220	2021
9181.00	40633.50	41684.50	577816.20	595542.76	626292.45	560165.67	2009	220	2021
9182.00	55553.50	56580.50	578008.47	595733.73	626337.39	560236.18	2004	213	2021
9183.00	54191.50	55407.50	595928.49	578214.18	560278.01	626353.33	2004	213	2021
9184.00	52977.50	53987.50	578409.64	596125.74	626399.33	560328.75	2004	213	2021
9185.00	51578.50	52811.50	596327.67	578602.09	560344.97	626453.49	2004	213	2021
9186.00	45141.50	46328.50	596521.81	578788.29	560393.70	626538.74	2004	213	2021
9187.00	43964.50	44969.50	578882.78	596717.74	626559.86	560436.81	2004	213	2021
9188.00	42673.50	43864.50	596903.03	579175.71	560516.06	626627.92	2004	213	2021
9189.00	41459.50	42458.50	579366.98	597087.72	626687.48	560599.63	2004	213	2021
9190.00	40095.50	41297.50	597281.28	579556.98	560646.59	626737.11	2004	213	2021
9191.00	38885.50	39905.50	579752.55	597470.93	626769.10	560689.73	2004	213	2021
9192.00	37479.50	38735.50	597686.91	579953.64	560715.83	626811.46	2004	213	2021
9193.00	36250.50	37294.50	580127.84	597863.49	626909.35	560767.80	2004	213	2021
9194.00	34870.50	36114.50	598057.00	580334.33	560846.32	626931.37	2004	213	2021
9195.00	36956.50	37361.50	580529.86	587296.19	626965.07	601733.05	2009	220	2021
9195.01	33710.50	34375.50	598248.37	587294.42	560891.73	601746.13	2012	222	2021
9196.00	37527.50	38066.50	588004.88	580715.93	599848.48	627042.45	2009	220	2021
9196.01	34630.50	35281.50	587998.95	598442.71	599888.74	560944.93	2012	222	2021
9197.00	38227.50	38634.50	580907.08	587677.89	627105.62	601848.16	2009	220	2021
9197.01	35443.50	36110.50	598647.20	587683.70	560961.40	601842.65	2012	222	2021
9198.00	38795.50	39293.50	588411.12	581109.65	599946.65	627128.51	2009	220	2021
9198.01	36346.50	36987.50	588387.27	598828.84	599977.33	561035.36	2012	222	2021
9199.00	39455.50	39876.50	581299.55	588070.67	627193.89	601937.16	2009	220	2021
9199.01	37147.50	37819.50	599019.62	588062.01	561100.60	601988.68	2012	222	2021
9200.00	39997.50	40507.50	588784.00	581494.63	600022.74	627256.03	2009	220	2021
9200.01	38051.50	38692.50	588765.36	599203.08	600116.84	561164.61	2012	222	2021

SPECTROMETER FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9201.00	49319.50	50006.50	587931.88	599410.57	604016.77	561190.22	2008	218	2021
9201.01	36416.50	36623.50	587936.33	584822.20	603979.56	615598.46	2009	220	2021
9201.02	40279.50	40465.50	581686.07	584841.28	627276.76	615526.55	2023	237	2021
9202.00	48368.50	49107.50	599613.95	587612.55	561230.98	605990.95	2008	218	2021
9202.01	41320.50	41659.50	581871.99	587615.69	627383.81	605978.04	2023	237	2021
9203.00	47305.50	48186.50	585713.92	599802.98	613809.43	561296.77	2008	218	2021
9203.01	42329.50	42527.50	582074.48	585730.37	627407.95	613759.83	2023	237	2021
9204.00	46217.50	47120.50	600002.21	585399.79	561348.31	615759.47	2008	218	2021
9204.01	43065.50	43234.50	582267.25	585418.03	627467.13	615704.35	2023	237	2021
9205.00	45194.50	46077.50	586115.73	600179.23	613874.55	561405.60	2008	218	2021
9205.01	43797.50	44012.50	582461.85	586126.76	627500.66	613821.23	2023	237	2021
9206.00	44117.50	45017.50	600379.70	585796.22	561455.31	615830.42	2008	218	2021
9206.01	44552.50	44730.50	582645.81	585803.14	627572.86	615800.75	2023	237	2021
9207.01	37810.50	38917.50	582841.95	600577.29	627624.68	561487.57	2023	237	2021
9208.00	42092.50	42942.50	600756.08	586686.75	561589.90	614064.10	2008	218	2021
9208.01	45325.50	45523.50	583033.93	586697.58	627628.51	614015.04	2023	237	2021
9209.00	44072.50	45133.50	586360.83	600954.46	616021.11	561622.26	2007	216	2021
9209.01	51690.50	51877.50	583234.05	586382.17	627692.05	615957.74	2023	237	2021
9210.00	43116.50	43953.50	601151.00	587073.87	561666.66	614155.58	2007	216	2021
9210.01	52442.50	52659.50	583423.51	587093.97	627795.11	614084.39	2023	237	2021
9211.00	41997.50	42926.50	587792.86	601344.38	612268.66	561717.08	2007	216	2021
9211.01	53258.50	53493.50	583625.80	587812.84	627791.22	612189.93	2023	237	2021
9212.01	39100.50	40147.50	601538.47	583818.78	561772.48	627848.29	2023	237	2021
9213.00	37767.50	38348.50	590764.44	600650.45	602711.01	565831.60	2006	214	2021
9213.01	54006.50	54391.50	584003.14	590774.68	627930.16	602669.82	2023	237	2021
9214.00	44696.50	45713.50	584195.83	600834.96	627982.79	565895.84	2003	210	2021
9215.00	43427.50	44538.50	601039.97	584393.15	565948.69	628042.35	2003	210	2021
9216.00	42249.50	43275.50	584582.79	601234.32	628097.72	565985.37	2003	210	2021
9217.00	40981.50	42075.50	601428.46	584781.54	566029.58	628117.78	2003	210	2021
9218.00	39830.50	40827.50	584963.51	601606.65	628201.51	566124.96	2003	210	2021
9219.00	38546.50	39650.50	601812.86	585161.92	566127.89	628243.84	2003	210	2021
9220.00	37394.50	38395.50	585357.75	601995.88	628292.71	566214.01	2003	210	2021
9221.00	48339.50	49426.50	602192.16	585549.13	566269.03	628341.61	2001	206	2021
9222.00	49569.50	50557.50	585750.45	602389.04	628364.80	566334.17	2001	206	2021
9223.00	50734.50	51850.50	602578.98	585935.32	566367.19	628444.95	2001	206	2021
9224.00	51995.50	52978.50	586137.44	602777.33	628473.71	566417.48	2001	206	2021
9225.00	53129.50	54232.50	602969.38	586328.77	566457.47	628535.32	2001	206	2021
9226.00	54392.50	55405.50	586507.76	603164.16	628623.53	566510.65	2001	206	2021

SPECTROMETER FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
9227.00	55577.50	56687.50	603350.28	586706.48	566568.01	628657.06	2001	206	2021
9228.00	56845.50	57851.50	586901.27	603544.47	628685.65	566615.11	2001	206	2021
9229.00	58023.50	59115.50	603740.71	587098.40	566682.12	628744.71	2001	206	2021
9230.00	33763.50	34840.50	603919.32	587279.44	566750.19	628831.99	2003	210	2021
9231.00	34991.50	35997.50	587484.08	604124.40	628840.58	566772.07	2003	210	2021
9232.00	36156.50	37285.50	604327.24	587665.26	566803.80	628932.03	2003	210	2021
901.00	42250.50	42283.50	564607.37	562630.95	543888.65	543357.67	2033	246	2021
902.00	41420.50	41661.50	562116.70	574727.28	545288.66	548669.17	2033	246	2021
903.00	40847.50	41200.50	582364.22	561578.03	552792.97	547218.25	2033	246	2021
904.00	40381.50	40764.50	561068.00	581827.39	549149.77	554719.05	2033	246	2021
905.00	39549.50	40230.50	601605.61	560586.63	562095.36	551088.48	2033	246	2021
906.00	33834.50	34487.50	601082.05	562670.34	564022.53	553722.72	2040	258	2021
906.01	52370.50	52410.50	560025.10	562691.85	553013.50	553726.85	2040	258	2021
907.00	46117.50	46852.50	559557.98	604387.75	554957.97	566976.67	2040	258	2021
908.00	51453.50	52244.50	603927.19	558989.87	568934.00	556881.57	2040	258	2021
909.00	63828.50	64573.50	558523.15	603384.64	558817.78	570862.47	2040	258	2021
910.00	36072.50	36843.50	602856.76	557967.96	572783.92	560734.58	2046	264	2021
911.00	47721.50	48471.50	557471.29	602351.13	562686.72	574722.07	2046	264	2021
912.00	37609.50	38399.50	601807.69	556929.37	576646.75	564611.46	2043	261	2021
913.00	49811.50	50498.50	556464.98	601308.05	566564.52	578587.89	2043	261	2021
914.00	35731.50	36566.50	600817.47	555902.42	580519.40	568481.33	2044	262	2021
915.00	46717.50	47512.50	600298.94	555360.78	582452.93	570397.06	2046	264	2021
916.00	45900.50	46598.50	554857.00	599735.37	572337.02	584379.52	2046	264	2021
917.00	45038.50	45786.50	599260.44	554362.73	586315.21	574278.81	2046	264	2021
918.00	44176.50	44931.50	553813.82	598699.46	576200.26	588238.70	2046	264	2021
919.00	47228.50	48001.50	598171.28	553293.97	590170.58	578128.67	2042	260	2021
920.00	48118.50	48828.50	552830.66	597708.35	580084.13	592112.28	2042	260	2021
921.00	34688.50	35400.50	552273.97	597154.49	582008.86	594034.89	2044	262	2021
922.00	33783.50	34599.50	596643.94	551748.85	595970.81	583934.86	2044	262	2021
923.00	48804.50	49594.50	596138.37	551217.40	597901.79	585866.89	2038	253	2021
924.00	49729.50	50408.50	550712.19	595634.68	587792.39	599843.26	2038	253	2021
925.00	56996.50	57723.50	595079.37	550209.72	601763.54	589731.42	2036	250	2021
926.00	57870.50	58705.50	549663.26	594585.60	591657.40	603699.23	2036	250	2021
927.00	59006.50	59688.50	549147.46	594049.54	593591.43	605632.34	2023	237	2021
928.00	52453.50	53196.50	593529.04	548662.29	607559.88	595535.56	2026	240	2021
929.00	35347.50	36042.50	548146.58	592999.02	597468.41	609492.72	2009	220	2021
930.00	34388.50	35223.50	592475.03	547589.70	611422.01	599394.67	2009	220	2021
931.00	48352.50	49185.50	591990.35	547085.57	613361.33	601317.61	2015	225	2021

SPECTROMETER FLOWN LINES – Tellus A9 Block

IRENET 95 ITM

Line	Start Time (seconds)	End Time (seconds)	Start X (m)	End X (m)	Start Y (m)	End Y (m)	Flight	Day	Year
932.00	35954.50	36715.50	591452.90	546591.45	615285.08	603258.83	2025	238	2021
933.00	48374.50	49094.50	546051.09	590969.27	605185.28	617227.99	2025	238	2021
934.00	49403.50	50064.50	545571.61	590454.69	607134.49	619167.88	2015	225	2021
935.00	53794.50	54534.50	589920.08	545018.50	621091.98	609052.85	2021	236	2021
936.00	50305.50	51135.50	589385.04	544478.25	623014.14	610977.46	2015	225	2021
937.00	36960.50	37692.50	588839.02	543981.10	624940.60	612919.88	2021	236	2021
938.00	51297.50	51959.50	543463.23	588318.73	614850.55	626877.72	2015	225	2021
939.00	59202.50	59937.50	587864.62	542930.59	628826.69	616791.56	2036	250	2021

SGL

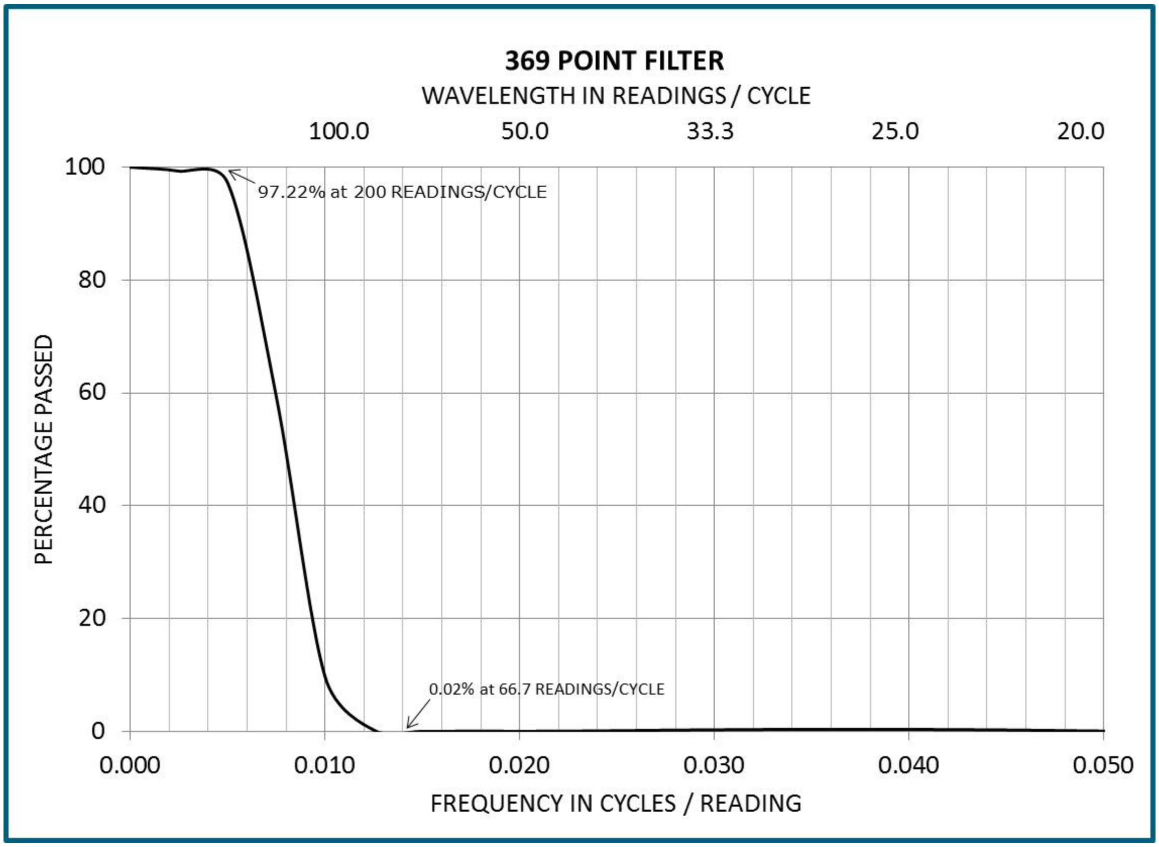
Appendix VIII

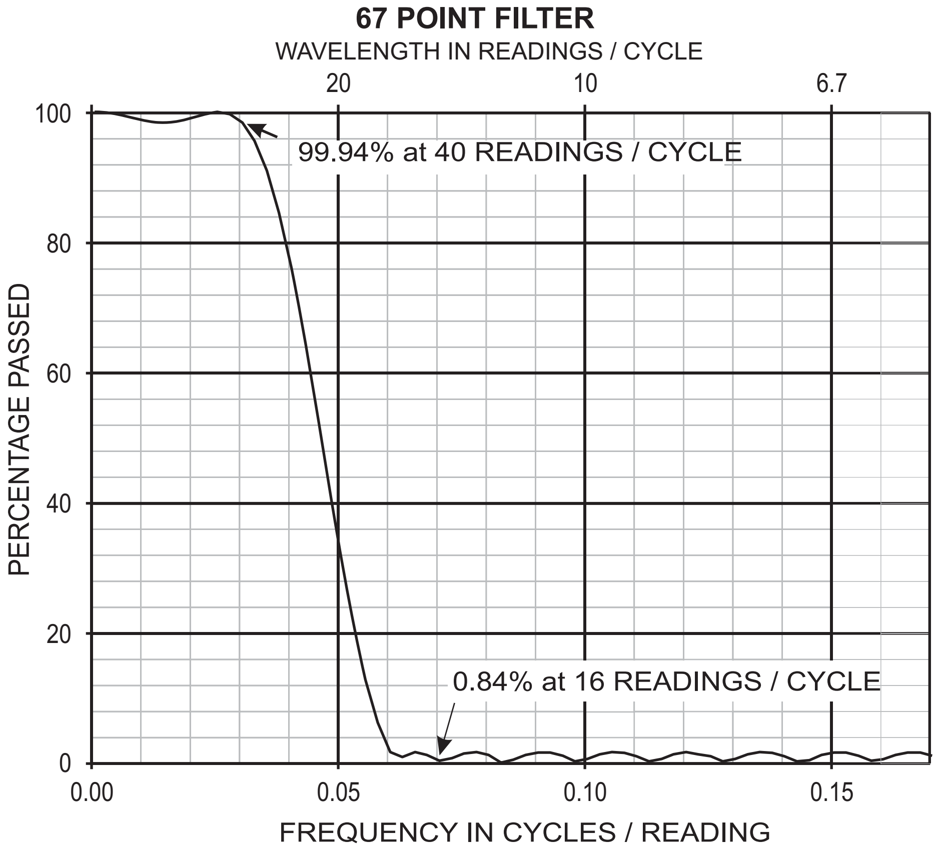
Reflight List – A9 Block

Line No.	Flight	Reflight Line No.	Reflight Flight No.	Reason for Reflight
930.0.0	2009	930.0.1	2026	FEM data (start to T9150)
931.0.0	2015	931.0.1	2026	FEM data
934.0.0	2015	934.0.1	2026	FEM data
936.0.0	2015	936.0.1	2026	FEM data
938.0.0	2015	938.0.1	2026	FEM data
9038.0.0	2042	9038.0.1	2046	FEM data (C937 to north end)
9050.0.0	2044	9050.0.1	2046	FEM data (C936 to north end)
9053.0.0	2044	9053.0.1	2046	FEM data (C919 to C921)
9070.0.0	2029	9070.0.1	2046	Magnetic data
9167.0.0	2011	9167.0.1	2023	FEM data (C932 to C935)
9169.0.0	2009	9169.0.1	2017	FEM data (C910 to C916)
9170.0.1	2009	9170.0.2	2017	FEM data (C911 to C914)
9175.0.0	2006	9175.0.1	2023	FEM data (C937 to north end of line)
9186.0.0	2004	9186.0.1	2023	FEM data (C932 to C935)
9207.0.0	2008	9207.0.1	2023	FEM data
9212.0.0	2007	9212.0.1	2023	FEM data

SGL

Appendix IX


369 POINT FILTER
WAVELENGTH IN READINGS / CYCLE
100.0
50.0
33.3
25.0
20.0
100
80
60
40
20
0
PERCENTAGE PASSED
97.22% at 200 READINGS/CYCLE
0.02% at 66.7 READINGS/CYCLE
0.000
0.010
0.020
0.030
0.040
0.050
FREQUENCY IN CYCLES / READING



FILTER 67 COEFFICIENTS

-.0073813819
.0017786870
.0022008393
.0028708524
.0036799926
.0044552023
.0050366484
.0052816825
.0050482578
.0042355750
.0028043608
.0007561474
.0018169265
-.0047570802
-.0078405226
-.010776499
-.013235446
-.014878507
-.015358825
-.014386294
-.011729066
-.0072475690
-.0009241524
.0071362499
.016706382
.027417007
.038819272
.050368667
.061476381
.071564890
.080079578
.086310541
.090552829
.091944844

SGL

Appendix X

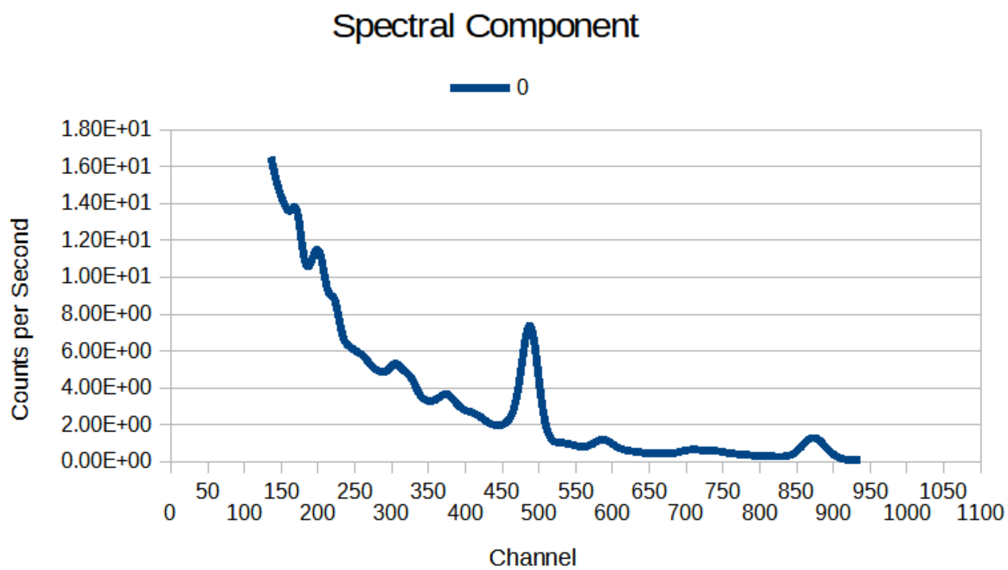
Survey Lines with Diurnal Correction from GND1 – A9 Block

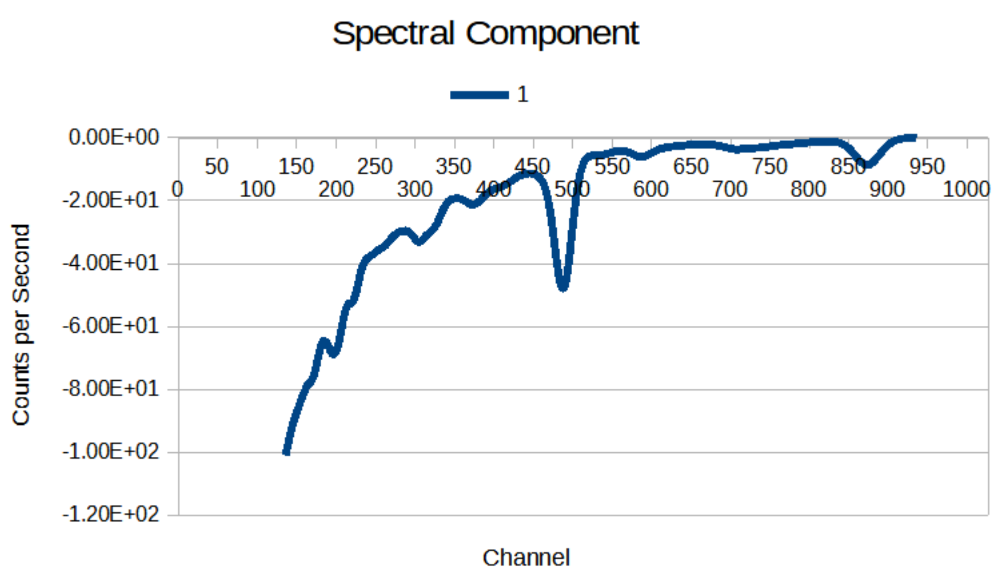
Flight	Line	Portion of line
2014	9150.0.0	Minority
2015	934.0.0	Minority
2021	9108.0.0	Majority
2021	9107.0.0	Majority
2023	9201.0.1	Entirety
2023	9205.0.1	Entirety
2023	927.0.0	Majority
2027	9099.0.0	Minority
2027	9098.0.0	Minority
2028	9091.0.0	Majority
2028	9090.0.0	Entirety
2028	9089.0.0	Majority
2028	9088.0.0	Entirety
2028	9087.0.0	Entirety
2036	939.0.0	Majority
2036	9068.0.0	Entirety
2036	9067.0.0	Majority
2040	9027.0.0	Minority
2040	9063.0.0	Minority
2042	9035.0.0	Minority
2043	9041.0.0	Minority
2044	9053.0.0	Minority

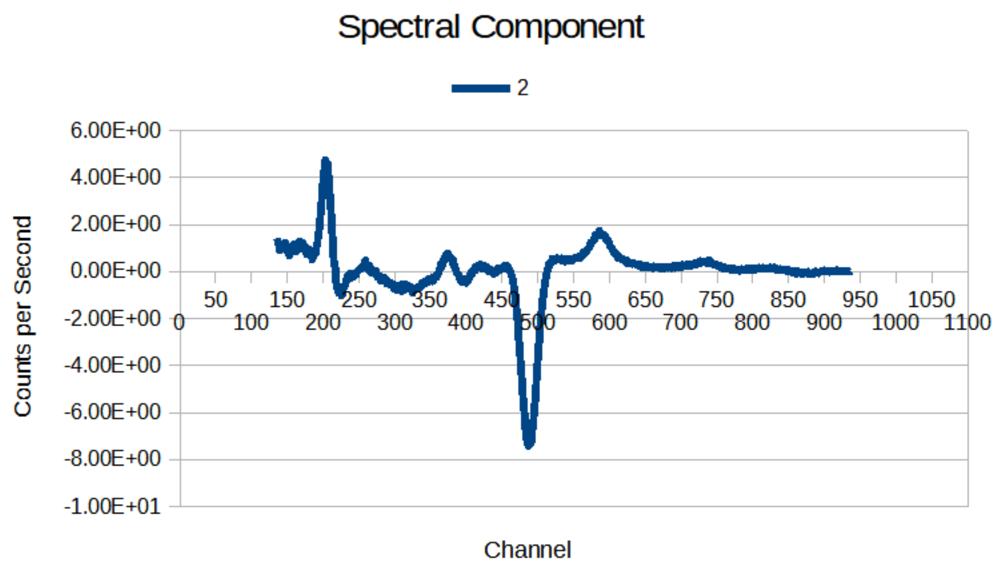
SGL

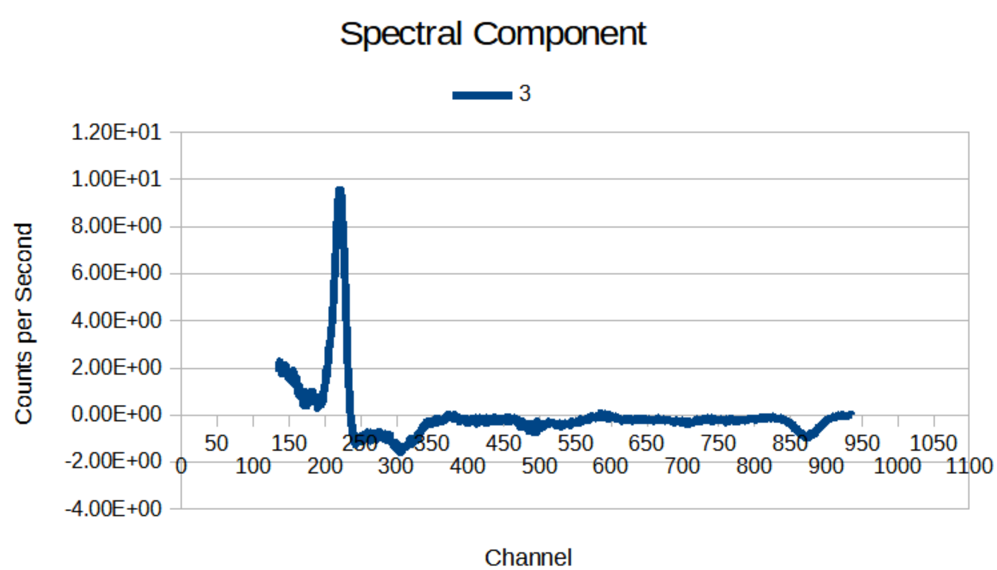
Appendix XI

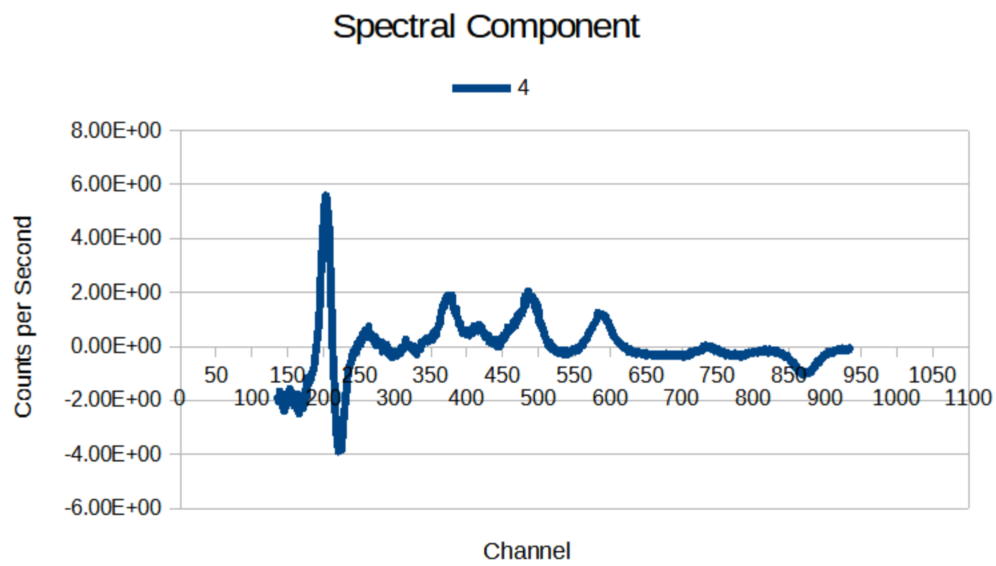
Spectral Components – A9 Block

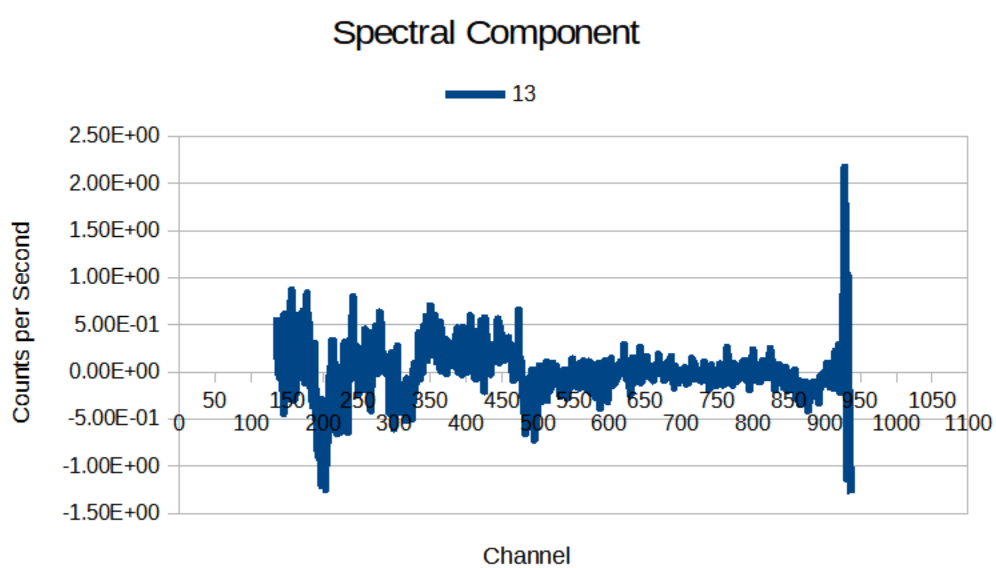


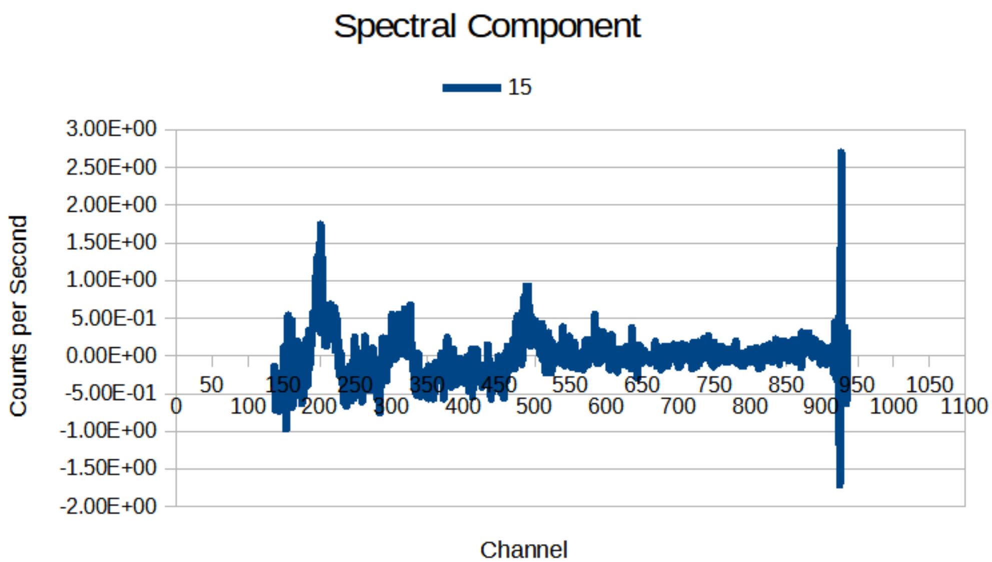


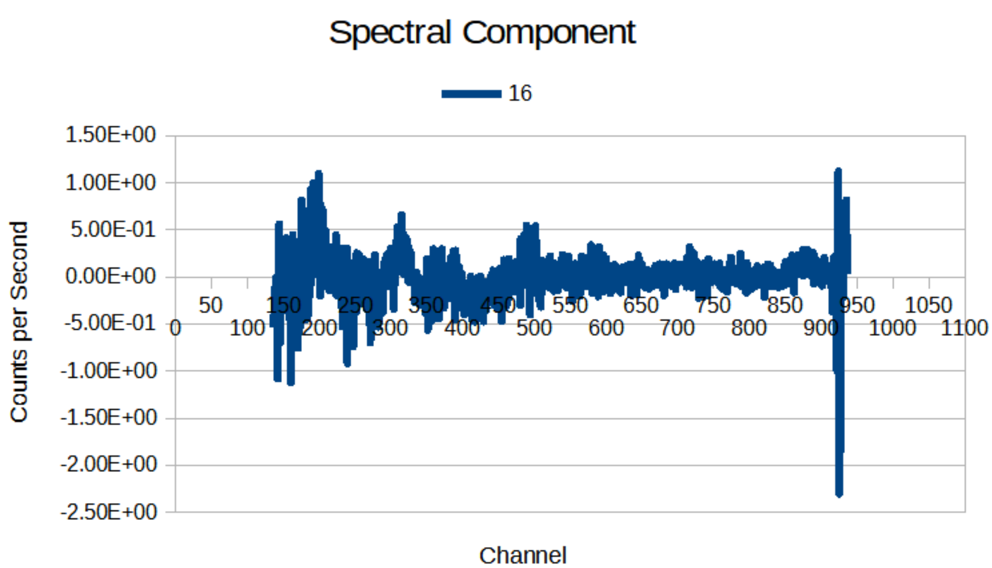

Spectral Component
2
6.00E+00
4.00E+00
2.00E+00
0.00E+00
-2.00E+00
-4.00E+00
-6.00E+00
-8.00E+00
-1.00E+01
Counts per Second
0 50 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000 1050 1100
Channel

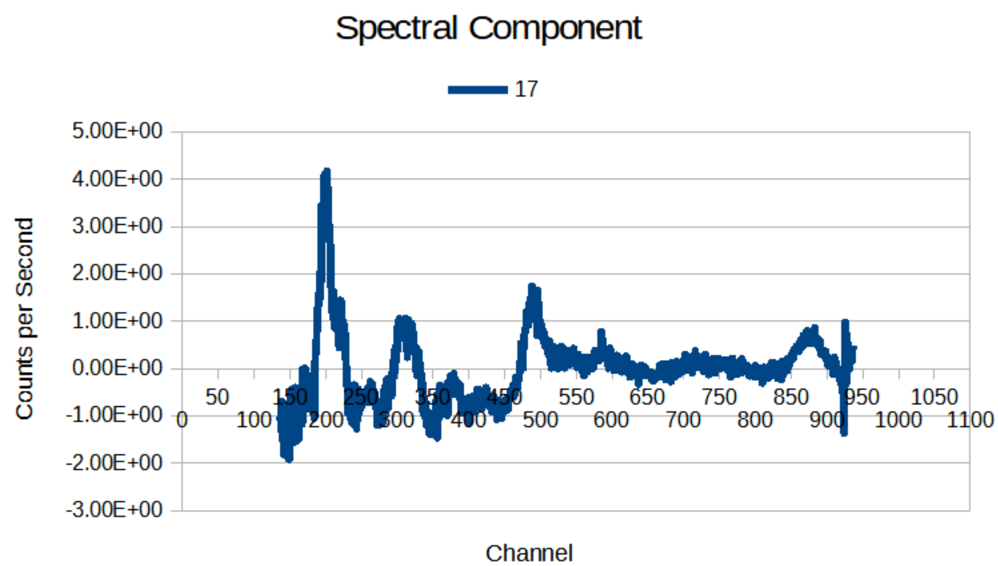

Spectral Component
3
1.20E+01
1.00E+01
8.00E+00
6.00E+00
4.00E+00
2.00E+00
0.00E+00
-2.00E+00
-4.00E+00
Counts per Second
0 50 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000 1050 1100
Channel

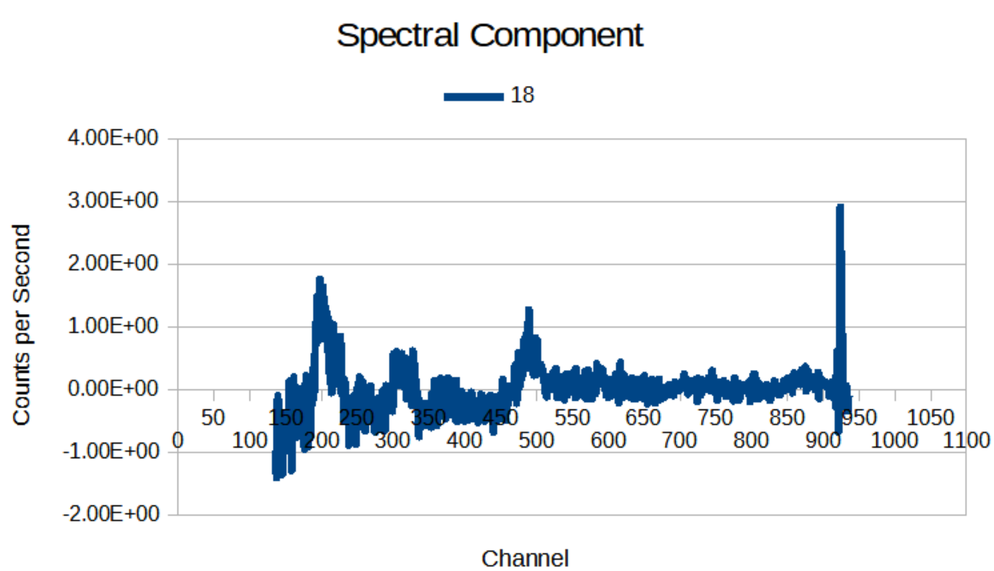

Spectral Component
4
8.00E+00
6.00E+00
4.00E+00
2.00E+00
0.00E+00
-2.00E+00
-4.00E+00
-6.00E+00
Counts per Second
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
1050
1100
Channel

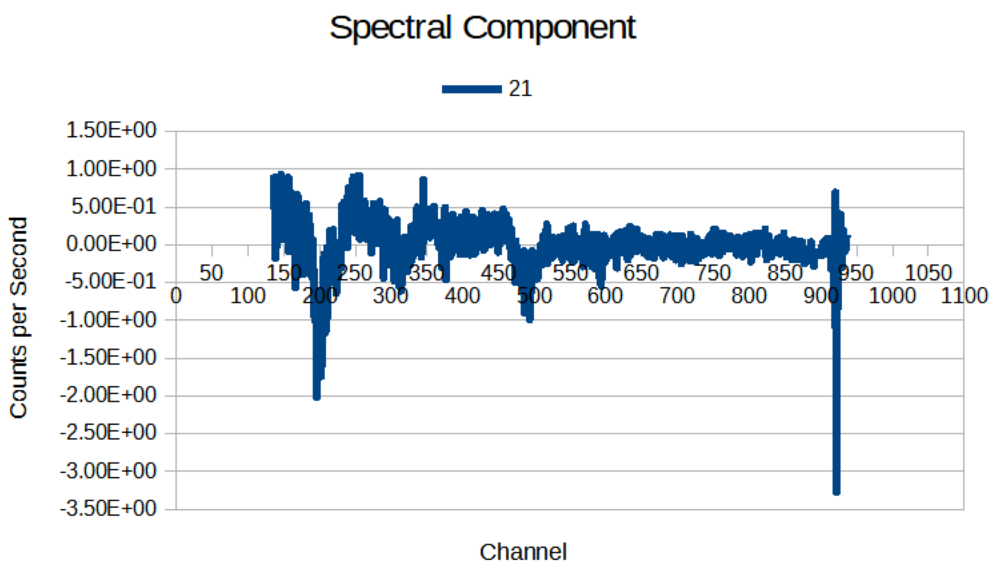

Spectral Component
13
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
-5.00E-01
-1.00E+00
-1.50E+00
Counts per Second
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
1050
1100
Channel

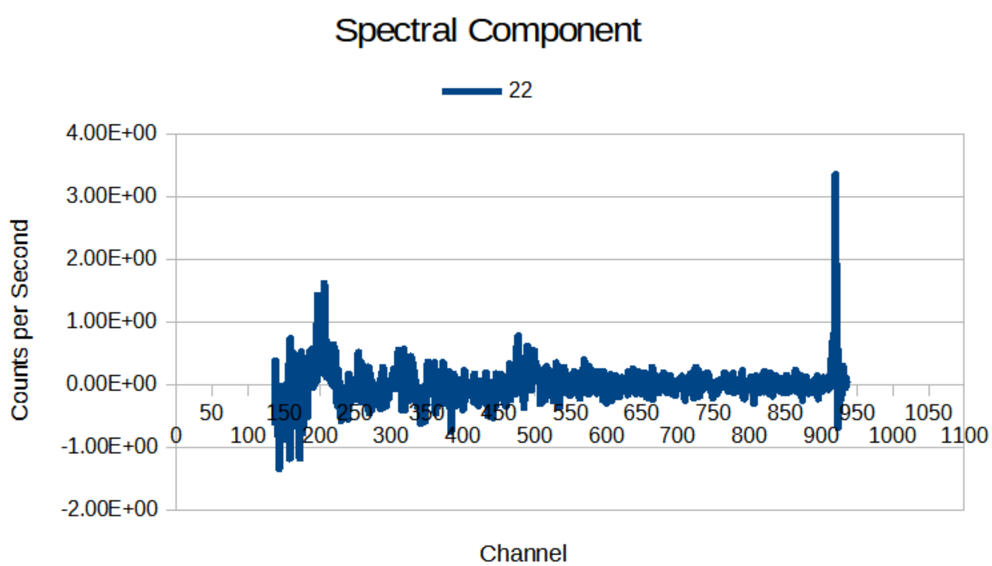

Spectral Component
15
3.00E+00
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
-5.00E-01
-1.00E+00
-1.50E+00
-2.00E+00
Counts per Second
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
1050
1100
Channel


Spectral Component
16
1.50E+00
1.00E+00
5.00E-01
0.00E+00
-5.00E-01
-1.00E+00
-1.50E+00
-2.00E+00
-2.50E+00
Counts per Second
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
1050
1100
Channel


Spectral Component
17
5.00E+00
4.00E+00
3.00E+00
2.00E+00
1.00E+00
0.00E+00
-1.00E+00
-2.00E+00
-3.00E+00
Counts per Second
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
1050
1100
Channel


Spectral Component
18
4.00E+00
3.00E+00
2.00E+00
1.00E+00
0.00E+00
-1.00E+00
-2.00E+00
Counts per Second
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
1050
1100
Channel


Spectral Component
21
Counts per Second
Channel


Spectral Component
22
Counts per Second
Channel

SGL

Appendix XII

Uranium Shifting and Scaling List – A9 Block

Uranium Shift (cps)	Uranium Scale	Line	Start Time (seconds)	End Time (seconds)
0.0	0.80	9001.0.0	37783.5	37849.5
0.0	0.70	9002.0.0	38637.5	38683.5
0.0	0.60	9018.0.0	39524.5	39572.5
0.0	0.80	9020.0.0	42789.5	42828.5
0.0	0.80	9021.0.0	44526.5	44574.5
0.0	0.60	9024.0.0	48176.5	48202.5
0.0	0.60	9024.0.0	48218.5	48244.5
0.7	1.00	9028.0.0	37958.5	38006.5
0.7	1.00	9029.0.0	39790.5	39770.5
0.7	1.00	9035.0.0	51562.5	51601.5
0.7	1.00	9036.0.0	53396.5	53384.5
0.0	0.60	9065.0.0	65405.5	65457.5
0.0	0.60	9066.0.0	63889.5	63949.5
0.0	0.60	9067.0.0	62098.5	62154.5
0.0	0.80	9092.0.0	41374.5	41404.5
0.0	0.60	9093.0.0	51699.5	51756.5
0.0	0.80	9093.0.0	51378.5	51486.5
0.0	0.70	9100.0.0	45363.5	45399.5
0.0	0.70	9101.0.0	43658.5	43702.5
0.0	0.70	9102.0.0	42704.5	42740.5
0.0	0.80	9123.0.0	39813.5	39901.5
0.0	0.80	9124.0.0	39106.5	39040.5
0.0	0.80	9174.0.0	58739.5	58539.5
0.0	0.80	9175.0.0	34749.5	34967.5
0.7	1.00	9176.0.0	35710.5	35738.5
0.0	0.70	9176.0.0	35762.5	35810.5
0.0	0.80	9176.0.0	35944.5	36154.5
0.0	0.80	9177.0.0	37224.5	37477.5
0.0	0.80	9177.0.0	37478.5	99999.9
0.4	1.00	9177.0.1	45956.5	46015.5
0.0	1.20	9178.0.0	44914.5	44950.5
0.2	1.00	9178.0.0	45366.5	45392.5
0.2	1.00	9179.0.0	43329.5	43378.5
0.5	1.00	9180.0.0	42676.5	42736.5
0.5	1.00	9182.0.0	55727.5	55762.5
0.5	1.00	9183.0.0	55158.5	55198.5
0.0	0.60	9213.0.0	0.0	37790.5
0.0	0.80	9213.0.0	37791.0	37833.5

Appendix XIII

Digital Video Inventory – A9 Block

Flight Line	Flight	YEAR	Data Time Start	Data Time End	Video Filename (.avi)
9001.00	2025	2021	37062.30	38165.00	T9001.0B_2025
9001.01	2033	2021	42506.80	42607.90	T9001.0F_2033
9002.00	2025	2021	38325.10	39468.30	T9002.0F_2025
9002.01	2033	2021	42804.50	42942.10	T9002.0B_2033
9003.00	2025	2021	39625.70	40785.70	T9003.0B_2025
9003.01	2033	2021	43117.60	43189.10	T9003.0F_2033
9004.00	2025	2021	41626.50	42767.70	T9004.0F_2025
9004.01	2033	2021	43435.30	43542.70	T9004.0B_2033
9005.00	2025	2021	42916.60	44017.60	T9005.0B_2025
9005.01	2033	2021	43729.80	43862.70	T9005.0F_2033
9006.00	2025	2021	44212.90	45412.80	T9006.0F_2025
9006.01	2033	2021	44127.80	44194.20	T9006.0B_2033
9007.00	2025	2021	45557.60	46672.20	T9007.0B_2025
9007.01	2033	2021	44328.50	44431.50	T9007.0F_2033
9008.00	2025	2021	46897.80	48063.70	T9008.0F_2025
9008.01	2033	2021	44716.10	44782.90	T9008.0B_2033
9009.00	2033	2021	44981.70	46199.70	T9009.0F_2033
9010.00	2033	2021	46349.50	47587.30	T9010.0B_2033
9011.00	2033	2021	47797.10	48987.90	T9011.0F_2033
9012.00	2033	2021	49158.10	49532.90	T9012.0B_2033
9012.01	2033	2021	49785.00	50613.00	T9012.0B_2033
9013.00	2033	2021	50783.30	51973.80	T9013.0F_2033
9014.00	2033	2021	58382.10	59572.50	T9014.0F_2033
9015.00	2033	2021	59706.50	60944.10	T9015.0B_2033
9016.00	2033	2021	61113.70	62306.00	T9016.0F_2033
9017.00	2033	2021	62435.20	63662.60	T9017.0B_2033
9018.00	2035	2021	39125.20	40335.60	No Video
9019.00	2035	2021	40492.90	40937.30	No Video
9019.01	2035	2021	41391.10	42221.00	No Video
9020.00	2035	2021	42403.50	43555.80	No Video
9021.00	2035	2021	43729.50	44979.40	No Video
9022.00	2035	2021	45109.70	46267.90	No Video
9023.00	2035	2021	46420.50	47676.10	No Video
9024.00	2035	2021	47803.40	48980.40	No Video
9025.00	2035	2021	49150.20	49514.40	No Video
9025.01	2035	2021	49831.80	50683.90	No Video
9026.00	2040	2021	34782.20	36018.70	T9026.0F_2040
9027.00	2040	2021	36215.50	37395.40	T9027.0B_2040
9028.00	2040	2021	37564.10	38803.40	T9028.0F_2040
9029.00	2040	2021	39002.40	40218.70	T9029.0B_2040
9030.00	2040	2021	40411.60	41667.00	T9030.0F_2040
9031.00	2040	2021	41836.50	43043.70	T9031.0B_2040
9032.00	2040	2021	43175.20	44390.40	T9032.0F_2040
9033.00	2040	2021	44578.20	45793.50	T9033.0B_2040
9034.00	2042	2021	49815.50	51002.80	T9034.0B_2042
9035.00	2042	2021	51176.50	52425.60	T9035.0F_2042
9036.00	2042	2021	52601.60	53759.80	T9036.0B_2042

Digital Video Inventory – A9 Block

Flight Line	Flight	YEAR	Data Time Start	Data Time End	Video Filename (.avi)
9037.00	2042	2021	53926.00	55165.90	T9037.0F_2042
9038.00	2042	2021	55351.20	56451.40	T9038.0B_2042
9038.01	2046	2021	42100.50	42169.20	T9038.0B_2046
9039.00	2043	2021	38900.40	40057.30	T9039.0F_2043
9040.00	2043	2021	40226.20	41510.40	T9040.0B_2043
9041.00	2043	2021	41690.90	42837.90	T9041.0F_2043
9042.00	2043	2021	43018.70	44305.90	T9042.0B_2043
9043.00	2043	2021	44479.80	45641.30	T9043.0F_2043
9044.00	2043	2021	45775.50	47012.80	T9044.0B_2043
9045.00	2043	2021	47196.00	48102.70	T9045.0F_2043
9045.01	2046	2021	41700.30	41954.80	T9045.0F_2046
9046.00	2043	2021	48346.10	49297.70	T9046.0B_2043
9046.01	2046	2021	41175.80	41408.20	T9046.0B_2046
9047.00	2044	2021	37103.80	38306.30	T9047.0F_2044
9048.00	2044	2021	38559.70	39772.10	T9048.0B_2044
9049.00	2044	2021	39934.70	41170.10	T9049.0F_2044
9050.00	2044	2021	41425.70	42551.60	T9050.0B_2044
9050.01	2046	2021	42462.80	42559.00	T9050.0F_2046
9051.00	2044	2021	42693.60	43905.20	T9051.0f_2044
9052.00	2044	2021	44034.40	45231.90	T9052.0B_2044
9053.00	2044	2021	45383.70	45953.40	T9053.0B_2044
9053.01	2046	2021	43623.60	43690.80	T9053.0B_2046
9053.05	2044	2021	46015.30	46601.70	T9053.0F_2044
9054.00	2046	2021	37227.10	38455.80	T9054.0F_2046
9055.00	2046	2021	38603.50	39770.00	T9055.0B_2046
9056.00	2046	2021	39908.00	41099.50	T9056.0F_2046
9057.00	2040	2021	62278.10	63403.80	T9057.0B_2040
9058.00	2040	2021	60806.90	62061.50	T9058.0F_2040
9059.00	2040	2021	59539.40	60636.10	T9059.0B_2040
9060.00	2040	2021	58066.70	59304.20	T9060.0F_2040
9061.00	2040	2021	56826.80	57924.10	T9061.0B_2040
9062.00	2040	2021	55407.90	56633.90	T9062.0F_2040
9063.00	2040	2021	54193.70	55279.40	T9063.0B_2040
9064.00	2040	2021	52761.10	54009.40	T9064.0F_2040
9065.00	2036	2021	65040.70	66234.70	T9065.0F_2036
9066.00	2036	2021	63082.10	64286.50	T9066.0B_2036
9067.00	2036	2021	61742.70	62941.40	T9067.0F_2036_1
9068.00	2036	2021	60297.20	61529.50	T9068.0B_2036
9069.00	2029	2021	60483.80	61643.70	T9069.0B_2029
9070.00	2029	2021	59191.80	60328.50	T9070.0F_2029
9071.00	2029	2021	57799.10	58980.70	T9071.0B_2029
9072.00	2029	2021	56462.70	57621.80	T9072.0F_2029
9073.00	2029	2021	55101.70	56271.80	T9073.0B_2029
9074.00	2029	2021	53799.40	54951.30	T9074.0F_2029
9075.00	2029	2021	52414.10	53594.70	T9075.0B_2029
9076.00	2029	2021	51100.50	52264.20	T9076.0F_2029
9077.00	2029	2021	43673.90	44835.30	T9077.0B_2029

Digital Video Inventory – A9 Block

Flight Line	Flight	YEAR	Data Time Start	Data Time End	Video Filename (.avi)
9078.00	2029	2021	42375.80	43533.70	T9078.0F_2029
9079.00	2029	2021	41038.20	42216.10	T9079.0B_2029
9080.00	2029	2021	39714.80	40855.80	T9080.0F_2029
9081.00	2029	2021	38355.90	39538.80	T9081.0B_2029
9082.00	2029	2021	37066.30	38206.60	T9082.0F_2029
9083.00	2029	2021	35672.60	36846.90	T9083.0B_2029
9084.00	2029	2021	34349.20	35498.00	T9084.0F_2029
9085.00	2028	2021	50287.30	51442.10	T9085.0F_2028
9086.00	2028	2021	48981.20	50111.60	T9086.0B_2028
9087.00	2028	2021	47673.50	48816.60	T9087.0F_2028
9088.00	2028	2021	46334.20	47502.30	T9088.0B_2028
9089.00	2028	2021	44986.20	46143.70	T9089.0F_2028
9090.00	2028	2021	43678.50	44818.60	T9090.0B_2028
9091.00	2028	2021	42311.60	43515.10	T9091.0F_2028
9092.00	2028	2021	41025.40	42152.80	T9092.0B_2028
9093.00	2027	2021	51337.60	52470.30	T9093.0B_2027
9094.00	2028	2021	39682.80	40860.60	T9094.0F_2028
9095.00	2027	2021	49961.90	51190.80	T9095.0F_2027
9096.00	2026	2021	53823.00	54950.20	T9096.0B_2026
9097.00	2027	2021	48634.10	49790.30	T9097.0B_2027
9098.00	2027	2021	47213.20	48442.00	T9098.0F_2027
9099.00	2027	2021	45925.80	47075.50	T9099.0B_2027
9100.00	2027	2021	44581.70	45776.20	T9100.0F_2027
9101.00	2027	2021	43283.00	44440.70	T9101.0B_2027
9102.00	2027	2021	41942.20	43128.70	T9102.0F_2027
9103.00	2021	2021	57804.40	58964.80	T9103.0B_2021_1
9104.00	2021	2021	56493.60	57665.10	T9104.0F_2021
9105.00	2021	2021	55024.90	56203.00	T9105.0B_2021
9106.00	2021	2021	47230.60	48408.40	T9106.0F_2021
9107.00	2021	2021	45945.80	47088.20	T9107.0B_2021
9108.00	2021	2021	44644.70	45773.50	T9108.0F_2021
9109.00	2021	2021	43368.50	44477.70	T9109.0B_2021
9110.00	2021	2021	42071.40	43186.40	T9110.0F_2021
9111.00	2021	2021	40820.10	41935.30	T9111.0B_2021
9112.00	2021	2021	39509.80	40623.40	T9112.0F_2021
9113.00	2021	2021	38230.60	39318.30	T9113.0B_2021
9114.00	2019	2021	57541.80	58704.30	T9114.0B_2019
9115.00	2019	2021	56290.50	57356.20	T9115.0F_2019
9116.00	2019	2021	54989.50	56125.50	T9116.0B_2019
9117.00	2019	2021	53740.10	54820.40	T9117.0F_2019
9118.00	2019	2021	52396.80	53565.60	T9118.0B_2019
9119.00	2019	2021	51113.50	52218.50	T9119.0F_2019_2
9120.00	2019	2021	43321.80	44437.80	T9120.0B_2019
9121.00	2019	2021	42061.80	43139.90	T9121.0F_2019
9122.00	2019	2021	40789.70	41888.20	T9122.0B_2019
9123.00	2019	2021	39544.30	40634.20	T9123.0F_2019_1
9124.00	2019	2021	38267.40	39388.60	T9124.0B_2019

Digital Video Inventory – A9 Block

Flight Line	Flight	YEAR	Data Time Start	Data Time End	Video Filename (.avi)
9125.00	2019	2021	37019.30	38119.50	T9125.0F_2019
9126.00	2019	2021	35741.50	36843.50	T9126.0B_2019
9127.00	2019	2021	34510.40	35614.50	T9127.0F_2019
9128.00	2018	2021	60930.80	62108.80	T9128.0F_2018
9129.00	2018	2021	62266.00	63350.60	T9129.0B_2018
9130.00	2017	2021	53881.20	55050.00	T9130.0B_2017
9131.00	2018	2021	53238.90	54392.40	T9131.0F_2018
9132.00	2018	2021	54604.40	55670.40	T9132.0B_2018
9133.00	2018	2021	55823.20	56959.70	T9133.0F_2018
9134.00	2018	2021	57152.30	58241.00	T9134.0B_2018
9135.00	2018	2021	58390.30	59524.50	T9135.0F_2018
9136.00	2018	2021	59732.80	60819.10	T9136.0B_2018
9137.00	2017	2021	48075.00	49213.10	T9137.0B_2017
9138.00	2017	2021	46810.70	47926.20	T9138.0F_2017
9139.00	2017	2021	45525.50	46634.00	T9139.0B_2017
9140.00	2017	2021	44101.80	45264.80	T9140.0F_2017
9141.00	2016	2021	35449.40	36282.90	T9141.0B_2016
9141.01	2023	2021	57148.90	57339.20	No Video
9142.00	2016	2021	34181.20	35260.20	T9142.0F_2016
9142.01	2023	2021	56443.60	56564.20	No Video
9143.00	2014	2021	62449.90	63531.60	T9143.0F_2014
9144.00	2014	2021	61233.80	62327.50	T9144.0B_2014
9145.00	2014	2021	59973.90	61078.60	T9145.0F_2014
9146.00	2014	2021	58703.30	59819.00	T9146.0B_2014
9147.00	2014	2021	57380.40	58525.40	T9147.0F_2014
9148.00	2014	2021	56140.20	57217.70	T9148.0B_2014
9149.00	2014	2021	54812.60	55962.40	T9149.0F_2014
9150.00	2014	2021	53575.00	54662.80	T9150.0B_2014
9151.00	2014	2021	52239.70	53397.80	T9151.0F_2014
9152.00	2012	2021	57827.50	59030.80	T9152.0B_2012
9153.00	2012	2021	56617.50	57620.90	T9153.0F_2012
9154.00	2012	2021	55256.80	56447.60	T9154.0B_2012
9155.00	2012	2021	54038.30	55080.80	T9155.0F_2012
9156.00	2012	2021	52683.70	53885.00	T9156.0B_2012
9157.00	2012	2021	51503.10	52510.90	T9157.0F_2012_1
9158.00	2012	2021	45221.00	46376.30	T9158.0B_2012
9159.00	2012	2021	43959.20	45025.80	T9159.0F_2012
9160.00	2012	2021	42657.70	43810.00	T9160.0B_2012
9161.00	2012	2021	41364.90	42466.10	T9161.0F_2012
9162.00	2012	2021	40112.70	41240.60	T9162.0B_2012
9163.00	2012	2021	38870.70	39959.00	T9163.0F_2012
9164.00	2011	2021	39644.50	40671.50	T9164.0F_2011
9164.01	2017	2021	53548.90	53686.30	T9164.0F_2017
9165.00	2011	2021	38746.00	39488.50	T9165.0B_2011
9165.01	2017	2021	50881.50	51282.60	T9165.0B_2017
9166.00	2011	2021	37890.10	38580.30	T9166.0F_2011
9166.01	2017	2021	50281.50	50714.30	T9166.0F_2017

Digital Video Inventory – A9 Block

Flight Line	Flight	YEAR	Data Time Start	Data Time End	Video Filename (.avi)
9167.00	2011	2021	36574.60	37460.20	T9167.0B_2011
9167.01	2023	2021	55668.50	55890.70	No Video
9168.00	2011	2021	34983.60	36152.70	T9168.0F_2011
9169.01	2017	2021	52389.30	52742.20	T9169.0F_2017_1
9169.05	2009	2021	54867.80	55618.70	T9169.0B_2009
9170.00	2009	2021	54119.90	54715.40	T9170.0F_2009
9170.01	2009	2021	56435.10	56664.80	T9170.0F_2009_1
9170.02	2017	2021	51891.90	52210.30	T9170.0B_2017
9171.00	2009	2021	53374.30	53864.20	T9171.0B_2009
9171.01	2017	2021	49384.40	49971.00	T9171.0F_2017
9172.00	2009	2021	52114.40	53199.50	T9172.0F_2009
9173.00	2004	2021	56757.90	57968.20	T9173.0F_2004
9174.00	2004	2021	58143.70	59174.00	T9174.0B_2004
9175.00	2006	2021	34250.80	35340.30	T9175.0F_2006
9175.01	2023	2021	55177.90	55247.00	No Video
9176.00	2006	2021	35545.50	36584.50	T9176.0B_2006
9177.00	2006	2021	36736.70	37531.40	T9177.0F_2006
9177.01	2009	2021	45765.80	46105.40	T9177.0B_2009
9178.00	2009	2021	44436.90	45589.20	T9178.0F_2009
9179.00	2009	2021	43149.70	44213.40	T9179.0B_2009
9180.00	2009	2021	41817.30	42964.40	T9180.0F_2009
9181.00	2009	2021	40633.70	41685.10	T9181.0B_2009
9182.00	2004	2021	55553.60	56581.40	T9182.0B_2004
9183.00	2004	2021	54190.90	55408.20	T9183.0F_2004
9184.00	2004	2021	52977.10	53988.20	T9184.0B_2004
9185.00	2004	2021	51578.60	52812.30	T9185.0F_2004
9186.00	2004	2021	45141.70	46083.00	T9186.0F_2004
9186.01	2023	2021	58080.80	58307.00	No Video
9187.00	2004	2021	43964.10	44969.40	T9187.0B_2004
9188.00	2004	2021	42673.40	43865.00	T9188.0F_2004
9189.00	2004	2021	41459.50	42459.30	T9189.0B_2004
9190.00	2004	2021	40094.90	41297.80	T9190.0F_2004
9191.00	2004	2021	38885.10	39906.10	T9191.0B_2004
9192.00	2004	2021	37479.50	38736.40	T9192.0F_2004
9193.00	2004	2021	36250.70	37294.70	T9193.0B_2004
9194.00	2004	2021	34870.10	36115.10	T9194.0F_2004
9195.00	2009	2021	36956.00	37362.10	T9195.0B_2009
9195.01	2012	2021	33710.30	34376.50	T9195.0F_2012
9196.00	2009	2021	37527.10	38066.90	T9196.0F_2009
9196.01	2012	2021	34630.20	35282.00	T9196.0B_2012
9197.00	2009	2021	38227.50	38635.40	T9197.0B_2009
9197.01	2012	2021	35443.80	36111.50	T9197.0F_2012
9198.00	2009	2021	38795.20	39294.20	T9198.0F_2009
9198.01	2012	2021	36345.90	36987.80	T9198.0B_2012
9199.00	2009	2021	39455.30	39877.10	T9199.0B_2009
9199.01	2012	2021	37147.20	37819.80	T9199.0F_2012
9200.00	2009	2021	39997.70	40507.80	T9200.0F_2009

Digital Video Inventory – A9 Block

Flight Line	Flight	YEAR	Data Time Start	Data Time End	Video Filename (.avi)
9200.01	2012	2021	38051.60	38693.20	T9200.0B_2012
9201.00	2008	2021	49319.30	50006.70	T9201.0B_2008
9201.01	2009	2021	36416.10	36624.20	T9201.0F_2009
9201.02	2023	2021	40278.90	40465.40	No Video
9202.00	2008	2021	48368.70	49108.10	T9202.0F_2008
9202.01	2023	2021	41320.80	41660.40	No Video
9203.00	2008	2021	47305.70	48186.80	T9203.0B_2008
9203.01	2023	2021	42329.40	42528.30	No Video
9204.00	2008	2021	46217.50	47121.00	T9204.0F_2008
9204.01	2023	2021	43065.50	43234.70	No Video
9205.00	2008	2021	45194.10	46077.80	T9205.0B_2008
9205.01	2023	2021	43797.20	44012.70	No Video
9206.00	2008	2021	44117.50	45018.50	T9206.0F_2008
9206.01	2023	2021	44552.50	44730.60	No Video
9207.01	2023	2021	37810.50	38917.40	No Video
9208.00	2008	2021	42092.00	42942.60	T9208.0F_2008
9208.01	2023	2021	45324.80	45524.30	No Video
9209.00	2007	2021	44072.20	45134.00	T9209.0B_2007
9209.01	2023	2021	51689.90	51877.70	No Video
9210.00	2007	2021	43116.40	43953.70	T9210.0F_2007
9210.01	2023	2021	52442.80	52659.80	No Video
9211.00	2007	2021	41997.40	42926.80	T9211.0B_2007
9211.01	2023	2021	53257.90	53493.60	No Video
9212.01	2023	2021	39100.50	40148.20	No Video
9213.00	2006	2021	37767.40	38348.60	T9213.0B_2006
9213.01	2023	2021	54006.40	54392.10	No Video
9214.00	2003	2021	44696.40	45713.90	T9214.0B_2003
9215.00	2003	2021	43427.30	44538.70	T9215.0F_2003
9216.00	2003	2021	42249.70	43275.60	T9216.0B_2003
9217.00	2003	2021	40981.70	42076.10	T9217.0F_2003
9218.00	2003	2021	39830.70	40828.30	T9218.0B_2003
9219.00	2003	2021	38546.80	39650.70	T9219.0F_2003
9220.00	2003	2021	37394.40	38396.00	T9220.0B_2003
9221.00	2001	2021	48339.20	49426.80	T9221.0F_2001
9222.00	2001	2021	49568.90	50558.30	T9222.0B_2001
9223.00	2001	2021	50734.30	51850.90	T9223.0F_2001
9224.00	2001	2021	51995.00	52978.90	T9224.0B_2001
9225.00	2001	2021	53129.50	54233.00	T9225.0F_2001
9226.00	2001	2021	54392.70	55405.70	T9226.0B_2001
9227.00	2001	2021	55577.40	56687.80	T9227.0F_2001
9228.00	2001	2021	56845.10	57851.80	T9228.0B_2001
9229.00	2001	2021	58023.20	59116.10	T9229.0F_2001
9230.00	2003	2021	33763.00	34840.40	T9230.0F_2003
9231.00	2003	2021	34991.00	35997.80	T9231.0B_2003
9232.00	2003	2021	36156.80	37285.50	T9232.0F_2003
901.00	2033	2021	42249.90	42283.70	C0901.0B_2033
902.00	2033	2021	41420.40	41662.20	C0902.0F_2033

Digital Video Inventory – A9 Block

Flight Line	Flight	YEAR	Data Time Start	Data Time End	Video Filename (.avi)
903.00	2033	2021	40847.80	41200.50	C0903.0B_2033
904.00	2033	2021	40381.60	40764.80	C0904.0F_2033
905.00	2033	2021	39549.70	40231.20	C0905.0B_2033
906.00	2040	2021	33834.60	34488.20	C0906.0B_2040
906.01	2040	2021	52370.70	52411.30	C0906.0F_2040
907.00	2040	2021	46116.90	46853.30	C0907.0F_2040
908.00	2040	2021	51454.00	52244.50	C0908.0B_2040
909.00	2040	2021	63827.90	64573.80	C0909.0F_2040
910.00	2046	2021	36072.30	36843.80	C0910.0B_2046
911.00	2046	2021	47721.10	48471.70	C0911.0F_2046
912.00	2043	2021	37609.10	38399.70	C0912.0B_2043
913.00	2043	2021	49810.80	50498.80	C0913.0F_2043
914.00	2044	2021	35731.90	36566.90	C0914.0B_2044
915.00	2046	2021	46717.90	47512.50	C0915.0B_2046
916.00	2046	2021	45900.50	46599.10	C0916.0F_2046
917.00	2046	2021	45038.80	45787.10	C0917.0B_2046
918.00	2046	2021	44176.60	44932.10	C0918.0F_2046
919.00	2042	2021	47228.00	48001.60	C0919.0B_2042
920.00	2042	2021	48117.80	48828.40	C0920.0F_2042
921.00	2044	2021	34688.40	35400.90	C0921.0F_2044
922.00	2044	2021	33783.40	34599.80	C0922.0B_2044
923.00	2038	2021	48804.60	49594.50	C0923.0B_2038
924.00	2038	2021	49729.50	50408.40	C0924.0F_2038
925.00	2036	2021	56996.30	57724.00	C0925.0B_2036
926.00	2036	2021	57870.70	58705.70	C0926.0F_2036
927.00	2023	2021	59006.70	59688.90	No Video
928.00	2026	2021	52453.30	53197.20	C0928.0B_2026
929.00	2009	2021	35347.10	36043.10	C0929.0F_2009
930.00	2009	2021	34388.00	34693.40	C0930.0B_2009
930.01	2026	2021	60323.20	60799.60	C0930.0F_2026
931.01	2026	2021	56541.60	57279.30	C0931.0F_2026
932.00	2025	2021	35954.20	36716.10	C0932.0B_2025
933.00	2025	2021	48374.50	49094.50	C0933.0F_2025
934.01	2026	2021	57472.40	58182.30	C0934.0B_2026
935.00	2021	2021	53794.60	54534.90	C0935.0B_2021
936.01	2026	2021	58325.40	59097.70	C0936.0F_2026
937.00	2021	2021	36959.90	37692.80	C0937.0B_2021
938.01	2026	2021	59293.80	60015.80	C0938.0B_2026
939.00	2036	2021	59202.80	59937.60	C0939.0B_2036