

# Project Report

**Airborne Gravity Survey  
QUEST West, British Columbia - 2008  
Geoscience British Columbia Society**



*Sander Geophysics*



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2008

*Pictures courtesy of  
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## I. INTRODUCTION

Sander Geophysics Limited (SGL) conducted a high-definition aero-gravity survey for the Geoscience British Columbia Society (GBC) in the QUEST West area of British Columbia. *Figure 1* shows the geographical position of the survey area. Please refer to *Appendix I* for a Company Profile of Sander Geophysics Limited. The survey was flown from May 8 to July 16, 2008.

The total size of the survey was 25,499 line kilometres (see *Appendix II*). A total of 41 production flights were performed using a Eurocopter AS-350 B3, registration C-GSGH. The survey operations were conducted from Smithers Airport (CYVD).

The traverse lines were flown at 2000 m spacing and oriented east-west respective to the UTM zone. The control lines were flown at 17 km spacing, except for control line 999, and oriented at 150° respective to their UTM zone. Since the survey spanned two UTM zones (9N and 10N) the lines slightly change direction at the zone boundary. Control line 999 was flown along the boundary of the two UTM zones, and was separated from adjacent control lines by an average of 25.5 km. The survey was flown at a height of 200 m above a drapage surface which was designed taking into account the expected terrain and the performance of the aircraft at the altitudes to be encountered. The average ground speed was about 90 knots.

*Picture 1: Near Smithers, British Columbia*



## II. SURVEY AREA

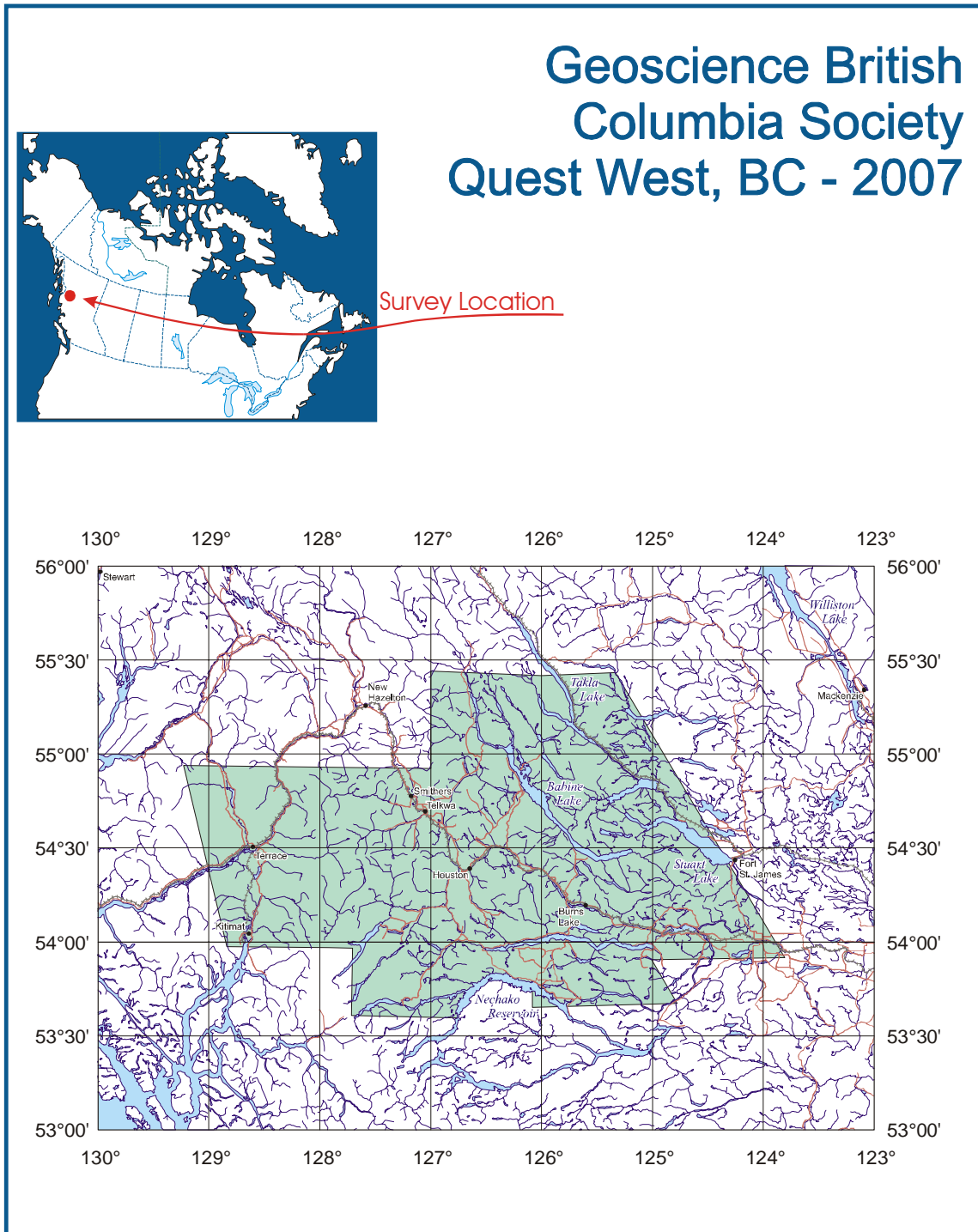
The survey block is situated in the west-central part of the province of British Columbia, Canada. The survey block consists of an irregular polygon, with a maximum length of 202 km and a maximum width of 207 km (survey location map *Figure 1*). The relief in the survey area ranges from rolling hills to steep mountains. The elevation ranges from 838 m to 2775 m above mean sea level.

Line coordinates of all flown survey lines are listed in *Appendix III*. The survey block is located within the perimeter defined by the following coordinates in *Table 1*:

**Table 1: Geographical Coordinates in WGS-84 UTM Zone 10N**

Corner	UTM-X	UTM-Y	Corner	UTM-X	UTM-Y	Corner	UTM-X	UTM-Y
1	243703.7	6093496	23	188353.6	5991829	45	114444.9	6016720
2	246916.2	6149459	24	185079.9	5992080	46	113699.7	6021664
3	310065.0	6144000	25	181806.8	5992332	47	112953.2	6026608
4	352214.5	6144001	26	178533.3	5992587	48	112207.4	6031553
5	447213.9	5976000	27	177664.2	5992655	49	111461.2	6036497
6	368701.6	5976000	28	172969.1	5993055	50	110715.7	6041440
7	382110.0	5950000	29	168388.6	5993444	51	109969.0	6046385
8	377110.1	5950000	30	163808.6	5993833	52	109223.0	6051329
9	301784.6	5950000	31	159227.6	5994222	53	108477.7	6056272
10	297170.8	5950390	32	154703.4	5994607	54	107731.1	6061217
11	296228.1	5950469	33	150066.3	5995001	55	106985.3	6066161
12	252421.3	5946142	34	145486.0	5995390	56	106239.2	6071105
13	202758.5	5950341	35	140904.6	5995780	57	105493.9	6076048
14	188237.2	5951589	36	136324.1	5996169	58	104747.5	6080993
15	188335.4	5952747	37	131742.4	5996558	59	104001.8	6085937
16	188805.5	5958294	38	127160.6	5996947	60	103255.8	6090881
17	189275.7	5963842	39	122579.7	5997337	61	102509.7	6095825
18	189746.4	5969390	40	117997.6	5997726	62	101015.7	6105764
19	190216.5	5974938	41	117301.5	5997785	63	105934.0	6105341
20	190686.6	5980486	42	116683.3	6001888	64	110411.0	6104956
21	191156.8	5986034	43	115937.2	6006832	65	240185.9	6093797
22	191626.9	5991582	44	115190.7	6011776			

**Figure 1: Map of Survey Area Showing Survey Block**



### III. SURVEY EQUIPMENT

SGL provided the following instrumentation for this survey (see *Appendix IV* for further details):

#### **Airborne Gravity System**

##### *SGL AIRGrav G2-7*

SGL's airborne gravimeter uses a Schuler tuned inertial platform. This platform supports three orthogonal accelerometers, which remain fixed in inertial space, independent of the manoeuvres of the aircraft, allowing precise correction of the effects of the movement of the aircraft. Accelerometer data are recorded at 128 Hz. SGL's airborne gravimeter is relatively tolerant of turbulent conditions. It delivers good results when flown under normal weather and turbulence conditions, similar to the conditions required for high-resolution magnetometer surveys. The instrument delivers gravity data consistently with a noise level better than 0.5 mGal with a half sine wave ground resolution of 1.8 to 2 km.

#### **Real-Time Differential GPS**

##### *Canadian-wide DGPS (CDGPS-C)*

The CDGPS receiver provides real-time differential GPS for the NavDAS on-board navigation system. The differential data set was relayed via a geosynchronous satellite serving different regions of Canada to the aircraft where the receiver optimized the corrections for the current location.

#### **Airborne Navigation and Data Acquisition System**

##### *SGNav and SGDAS-3*

The SGNav and SGDAS-3 are the latest versions 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 is 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 an altimeter analogue to digital converter and a 12-channel, dual-frequency NovAtel Millennium GPS receiver which automatically provides the UTC time base for the recorded data. In addition to providing essential post-mission positional data, the SGNav and SGDAS-3 computers process user-received GPS or real-time differentially corrected GPS (RDGPS) data and compare the data to the coordinates of a theoretical flight plan in order to guide pilots along the desired survey line in three dimensions.

#### **Navigation and Flight Path Recovery System**

##### *NovAtel 3951R*

Navigation and flight path recovery were provided by the SGL NavDAS system. The system utilizes a NovAtel Millennium GPS Receiver and a NovAtel OEM4-G2 GPS Receiver mounted in the navigation computer with a sampling rate of 0.1 s.

## Reference Data Acquisition System

### *SGL Gnd-Acq (GND1 & GND2)*

The Reference Data Acquisition computer is a portable PC-Pentium with an internal GPS card. 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. The reference data acquisition computer displays all incoming data on a LCD flat panel screen for visual inspection. The GPS data, sampled every 0.1 s, were recorded on the internal hard drive of the computer using the same format as the airborne data.

## GPS Base Station Receiver

### *NovAtel OEMV*

The NovAtel Millennium 16-channel receiver, used for the reference stations, forms an integral part of the SGL GND-ACQ system. The OEMV may be configured to receive real time differential corrections from any of the SBAS, CDGPS or Omnistar services. They provide averaged position and raw range information of all satellites in view, sampled every 0.1 s. The comparative navigation data supplied during all production flights allows for post-processed differential GPS (DGPS) corrections for every survey flight.

## Altimeters

### *Riegl LMS-Q140-80 Laser Rangefinder*

The Riegl laser altimeter is an eye safe laser, has a range of 1500 m, a resolution of 0.01 m with an accuracy of 5 cm. The laser altimeter data is sampled at 2.5 Hz.

### *King KRA-10A Radar Altimeter*

The King radar altimeter measures height above ground to a resolution of 0.5 m and an accuracy of 1% over a range up to 760 m. The radar altimeter data is sampled at 10 Hz.

### *Sensotec barometric altimeter sensor*

The barometric pressure sensor has an accuracy of  $\pm 4$  m, a resolution of 2 m, and a range up to 9,000 m above sea level. The barometric altimeter data is sampled at 4 Hz.

## Survey Aircraft

### *Eurocopter AS-350 B3 (C-GSGH)*

The Eurocopter AS-350 B3 is a modern high performance light helicopter powered by a Turbomeca Arriel 2B turbine engine. It can be outfitted for low level airborne geophysical surveys with magnetic sensors carried either internally or externally (in towed “birds” on a cable). For this survey no magnetic data was required, so a bird was not employed, and the gravimeter was installed in the cabin behind the pilots’ seats. A survey GPS antenna was mounted on the tail fin, clear of rotor, plus a DGPS data link for real time corrections. A complete description of all survey aircraft is given in *Appendix V*.



*Picture 2: C-GSGH Refuelling at Kitimat*



### **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.

## IV. SURVEY SPECIFICATIONS

### Data Recording

The following parameters were recorded during the course of the survey:

- Aircraft altitude measured by the barometric altimeter at intervals of 0.25 s.
- Terrain clearance provided by the radar altimeter at intervals of 0.01 s.
- Terrain clearance provided by the laser altimeter at intervals of 0.4 s.
- GPS positional data: (latitude, longitude, height, time, and raw range from each satellite being tracked) recorded at intervals of 0.1 s.
- Accelerometers (X, Y, Z) recorded with a 128 Hz sampling rate, accuracy to less than 1 mGal.

### Technical Specifications

The contract specified the following technical requirements:

- (a) Airborne Gravity..... the gravity line noise from intersection differences will be less than 0.7 mGal RMS for all intersections in the survey area, and will be less than 1.25 mGal RMS for an individual flight line, <sup>§</sup>after the following processing steps:
- i. Application of a 100 second line filter. The 100 second line filter is defined as having 0% pass at 70 seconds, 100% pass at 168 seconds, and a frequency mid-point of 100 seconds.
  - ii. Application of a 0th order (ie. one constant shift per line) levelling.
- <sup>§</sup> Note that areas with steep, large amplitude, linear gravity anomalies may have slightly higher intersection differences caused by directional filtering of those anomalies.
- (b) Location (x, y, z).....  $\leq 5$  m in X, Y, Z after differential correction
- (c) Horizontal deviation from planned flight lines..... not  $> 100$  m for a distance of  $> 4$  km (subject to the pilots' discretion in the interest of safety)
- (d) Vertical deviation from planned drape surface ..... not  $> 15$ m for a distance of  $> 7$  km (subject to the pilots' discretion in the interest of safety)
- (e) GPS satellites .....  $\geq 4$  common satellites on the airborne and ground GPS data

- (f) Data gaps .....  $\leq 0.5$  sec in any of the following channels: time, AIRGrav xyz accelerations, and airborne or ground GPS xyz

Data falling outside these specifications would be re-flown at SGL's expense. However, for minor departures, reflights may be waived if, after due discussion and in the judgment of client's representative, the data collected is adequate for the purpose for which it was flown. The following lines were re-flown to improve the data quality and meet the technical specifications above: 4050.00 and 4066.01

The final error level depends on survey line spacing, flight speed, and grid filtering wavelength.

### Survey Line Specifications

Survey lines were flown with the following specifications (line direction is with respect to the UTM zone reference frame):

	Line Direction	Line Spacing (m)
Traverse Lines	90° /270°	2000
Control Lines	150° /330°	17000

### Terrain Clearance

The survey was flown using a pre-planned drape surface designed to guide the aircraft over the topography in a consistent manner as close to target clearance as possible. The drape surface was prepared using digital elevation model (DEM) data from CGIAR Consortium for Spatial Information (CGIAR-CSI) (<http://srtm.csi.cgiar.org/>) sampled at 3 arc-seconds (approximately 90 m). This data are derived from USGS/NASA SRTM data that has been processed to provide continuous data. The DEM included an extension beyond the survey boundary to allow the aircraft to achieve the drape clearance before coming on line. The grid was smoothed using a climb and descent rate of 250 ft/nm along the survey lines. This rate is below the maximum climbing and descending capabilities of the survey aircraft. The nominal terrain clearance of 200 m was added to the drape surface.

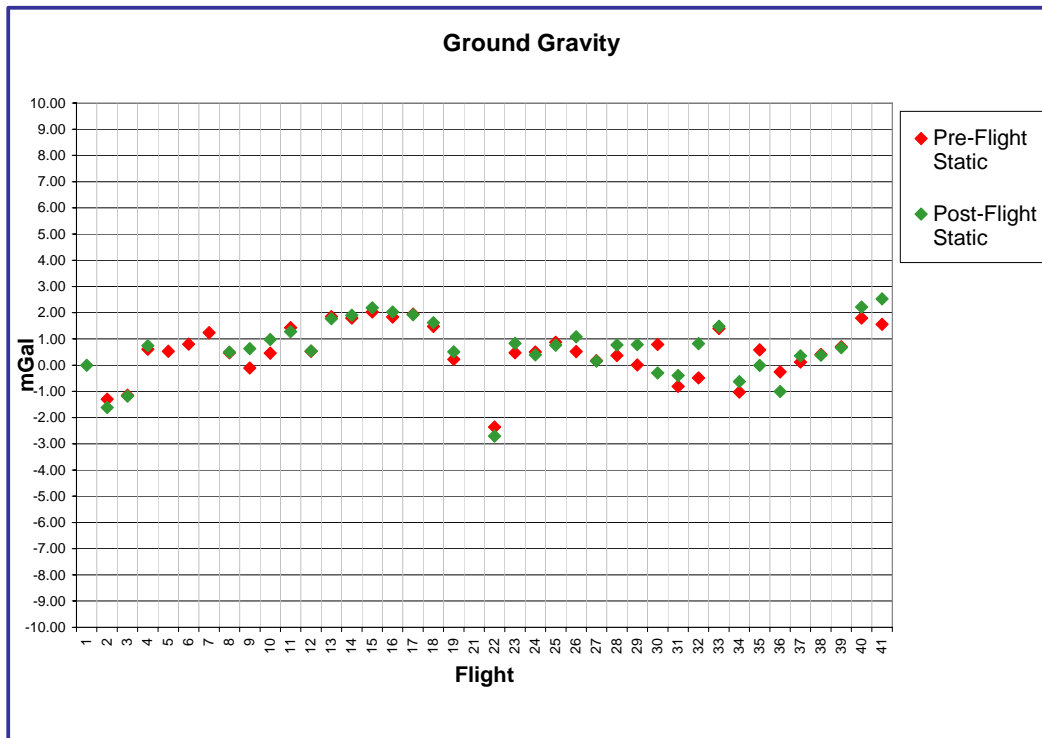


## V. SYSTEM TESTS

### Gravimeter Calibration

The gravimeter was originally calibrated using the BGI gravity marker in Prince George ( $9.81162140 \pm 0.000004 \text{ m/s}^2$ ). The airborne system was calibrated using this value in Prince George, and flown in fully operational mode to Smithers. The aircraft was parked in Smithers and data acquired for a period of 30 minutes to determine the local value of the gravity field. The value at Smithers was determined to be  $9.8127424 \text{ mGal}$ , and this value was used to calibrate all subsequent survey flights out of Smithers. The gravimeter's accelerometers were calibrated before the beginning of the survey. On start up before each flight, the AIRGrav system automatically aligns and calibrates its gyros. Before and after each flight, the consistency of the measured gravity was confirmed by recording data at the aircraft parking spot. The results, presented in *Figure 2*, are given as deviations from the local gravity value.

**Figure 2: Deviations from Local Gravity Value**

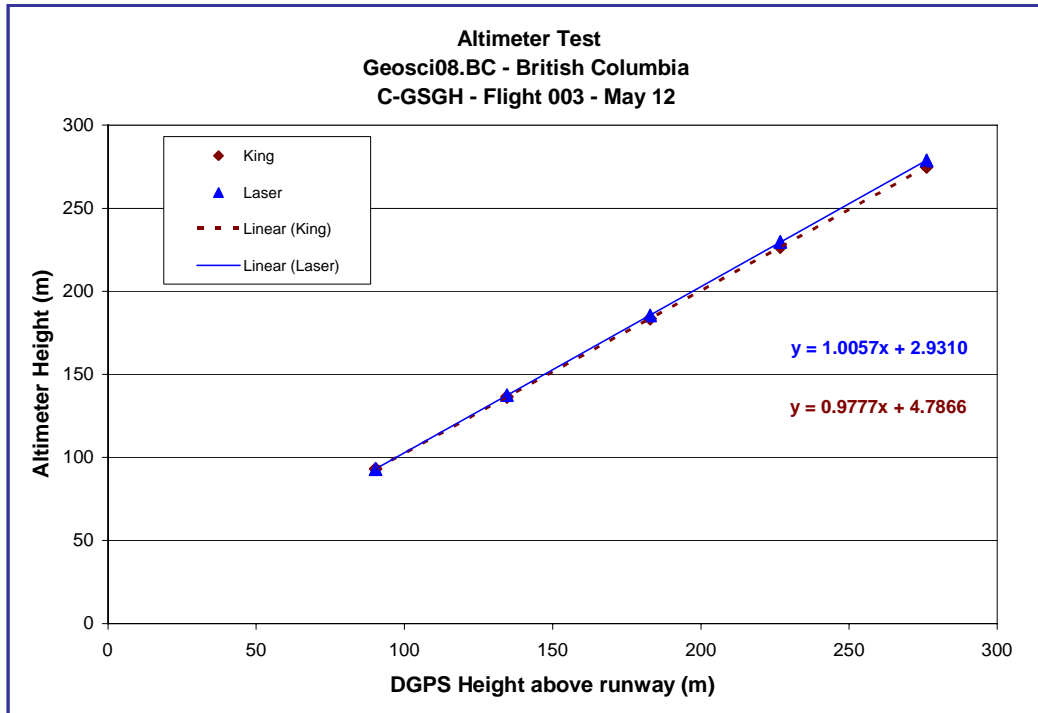


### Radar Altimeter Calibration

A test flight to calibrate the radar altimeter was flown on May 12, 2008 over the runway at Smithers Airport. Five passes were made over the runway with clearance heights ranging from 0 to 275 metres. The altimeter values were compared to the post-flight differentially corrected GPS altitude. An ideal altimeter would yield a slope of 1, and an intercept of 0 m.

The results of tests are plotted in *Figures 3*, and tabulated below. The linear coefficients were used to correct the altimeters during post-processing.

**Figure 3: Radar Altimeter Test, C-GSGH**



## VI. FIELD OPERATIONS

Flight operations were conducted from Smithers Airport (CYVD). The field office was established in the Aspen Motor Inn. Two base stations were set up at the Interior Helicopters hangar. Originally, both GPS antennae were set up outside the hangar. After the first flight they were moved to the hangar roof to provide an unobstructed view of the sky. Power was provided to the ground station using a grid feed and a battery backup. The computers were located on a shelf in the hangar.

The position of the GND1 ground station for Flight 001 was differentially corrected using data from GPS reference stations PRDS, WILL and YELL, which are part of the International GPS Service (IGS) Network, using data recorded on days 128 and 129 of 2008. The GND2 ground station was differentially corrected using GND1 as the reference point to ensure consistency. The positions of the GPS antennae after differential correction were (WGS-84 datum):

Ground station locations for Flight 001		
	GND1	GND2
Latitude:	N 54° 49' 06.1519"	N 54°49' 06.3017"
Longitude:	W 127° 11' 07.1240"	W 127° 11' 07.1368"
Elevation:	513.9211 m	514.3288 m

After both antennae were moved to the hangar roof the position of the GND1 ground station was differentially corrected using data from GPS reference stations PRDS, WILL and YELL using data recorded on days 131, 132 and 133 of 2008. The GND2 ground station was differentially corrected using GND1 as the reference point to ensure consistency. The positions of the GPS antennae after differential correction were (WGS-84 datum):

Ground station locations for Flights 002 - 041		
	GND1	GND2
Latitude:	N 54° 49' 08.1079"	N 54°49' 08.0878"
Longitude:	W 127° 11' 07.2396"	W 127° 11' 07.4765"
Elevation:	522.0241 m	522.0926 m

These two ground stations were used to apply post-mission differential corrections to the GPS position of the aircraft. The survey was completed in eleven weeks. Please refer to the Weekly Reports in *Appendix VI* for details.

## Field Personnel

The following technical personnel participated in field operations:

Party Chief\Geophysicist:	Lutz Wendorff / Max Buneta
Geophysicist:	Jay Archer / Leila Ertolahti
Aircraft Mechanic:	David Money / Simon Worswick
Helicopter Pilot:	Brian Simms / Richard Barrette
Helicopter Co-Pilot :	Owen Peterson
Technician:	Hao Liu

Picture 3: *Smithers Airport CYYD*



## VII. 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, generating traces of all of the data channels, and creating preliminary data grids. Final data processing and map production were performed at the SGL head office located in Ottawa, Canada.

### Gravity Data

Gravity data are recorded at 128 Hz. Accelerations are filtered and decimated to match GPS measurements using specially designed filters to avoid biasing the data. Gravity is calculated by subtracting the GPS-derived aircraft accelerations from the inertial accelerations. In survey flying, accelerations in an aircraft can reach 0.1 G, equivalent to 100,000 mGal. Data processing must extract gravity data from this very noisy environment. This is achieved by modelling the movements of the aircraft in flight by extremely accurate GPS measurements. The calculated gravity is corrected for the Eötvös effect and normal gravity and the sample interval is reduced to 2 Hz. These operations are all performed by SGL's proprietary GRAVGPS software.

The following standard corrections were applied to the gravity data:

- a. Eötvös correction,  $Eötvös = -v_x^2 / [(r/\sqrt{(1-e_2\sin^2\Phi)}) + h] - 2(0.00007292115\cos\Phi v_x) - v_y^2 / [(r(1-e_2)/\sqrt{(1-e_2\sin^2\Phi)}) + h]$  where  $\Phi$  is the latitude of the aircraft,  $v_x$  and  $v_y$  are the velocities of the aircraft in the x (east) and y (north) direction,  $r$  is the Earth's radius at the equator (6378137 m),  $\Phi$  is the latitude,  $e_2$  is a correction for Earth's flattening towards the poles (0.00669437999013), and  $h$  is the altitude of the plane above the GRS-80 ellipsoid;
- b. Normal gravity,  $g = 9.7803267714(1 + 0.00193185138639\sin^2\Phi) / \sqrt{(1 - 0.00669437999013\sin^2\Phi)}$ , where  $\Phi$  is the latitude of the aircraft;
- c. Free air correction,  $g_{fa} = -0.3086h$ , where  $h$  is height of the aircraft in metres above mean sea level;
- d. Bouguer,  $g_{sb} = 2\pi\gamma\rho h = 0.041925\rho h$ , where  $\gamma$  is the Universal Gravity constant,  $\rho$  is density for this project, and  $h$  is height of the surface of land or sea in metres above mean sea level;
- e. Curvature of the earth,  $g_{ec} = (1.464 h - 0.3533 h^2 + 0.000045 h^3) (\rho/2.67)$ , where  $h$  is height of the surface of land or sea in kilometres above mean sea level and  $\rho$  is density for the project;
- f. Terrain,  $g_t$ . See below for a description of the terrain correction technique;
- g. Static correction,  $g_{sc}$ , based on static ground recordings and repeat lines;
- h. Level correction,  $g_{lc}$ , based on line intersections;

Thus, Bouguer anomaly =  $G - g_{fa} - g_{sb} - g_{ec} + g_t - g_{sc} - g_{lc}$ , where  $G$  is the calculated gravity adjusted for Eötvös effect and normal gravity.

### Terrain Corrections

Shuttle Radar Terrain Mission (SRTM) data was used to calculate the terrain corrections for gravity processing. The SRTM data contains information in a grid with 100 m cell spacing, which is more dense than the line spacing for this survey, and therefore provides terrain data at a better resolution between the survey lines. Coverage up to 167 km from the survey block was kept for accurate regional corrections.

The presence of several significant lakes within the survey area was taken into account in the calculation of the terrain corrections. Depths of lakes were obtained from the government of British Columbia Ministry of the Environment web page as follows: <http://a100.gov.bc.ca/pub/filq/bathymapselect.do>. A density of 1.02g/cc was used for the fresh water in the lakes. In Addition, regional terrain corrections are effected by the presence of the Pacific Ocean. Bathymetric data was obtained from the U.S. National Oceanic and Atmospheric Administration National Geophysical Data Centre web site as follows: [http://Topex.ucsd.edu/www\\_html/mar\\_topo.html](http://Topex.ucsd.edu/www_html/mar_topo.html). A density of 1.02 g/cc was used for the sea water.

Terrain corrections were computed using software developed for SGL by the University of Calgary Geomatics department. The algorithm calculates terrain corrections using 2D FFT methods with a constant density. The terrain and Bouguer corrections were calculated on the bedrock using various densities. Through discussions with the client, the density of 2.67 g/cm<sup>3</sup> was chosen as the most appropriate density for the area and subsequently used in final processing.

Terrain corrections are filtered to match the degree of filtering applied to the gravity data as described below.

### Line Adjustments

The gravimetric data were levelled to compensate for instrument variations in two steps. A single constant shift determined from ground static recordings (described above in Section V – SYSTEM TESTS) was applied on a flight-by-flight basis. The pre- and post-flight readings were averaged for each flight and the difference between the average value and the local  $g$  value was removed. This acts as a simple but effective coarse levelling of the data.

Intersection statistics are then used to adjust individual survey lines. Unlike magnetic levelling, individual intersections are not used to make corrections. Instead, intersection differences from whole lines are averaged together thereby reducing errors from noise in the line data, and a single adjustment is applied to each survey line and each control line. The influence of noise on the statistics is further reduced by filtering the data before calculating differences at intersections. The degree of filtering required is dependant on the number of intersections that will be averaged. The more intersections there are, the less filtering is

required to remove the effects of noise. Therefore, less filtering is required for control lines since they cross many traverse lines, whilst the opposite is true for traverse lines. For very long survey lines it may be necessary to calculate adjustments to sections of each line based on statistics from groups of intersections rather than from entire survey lines.

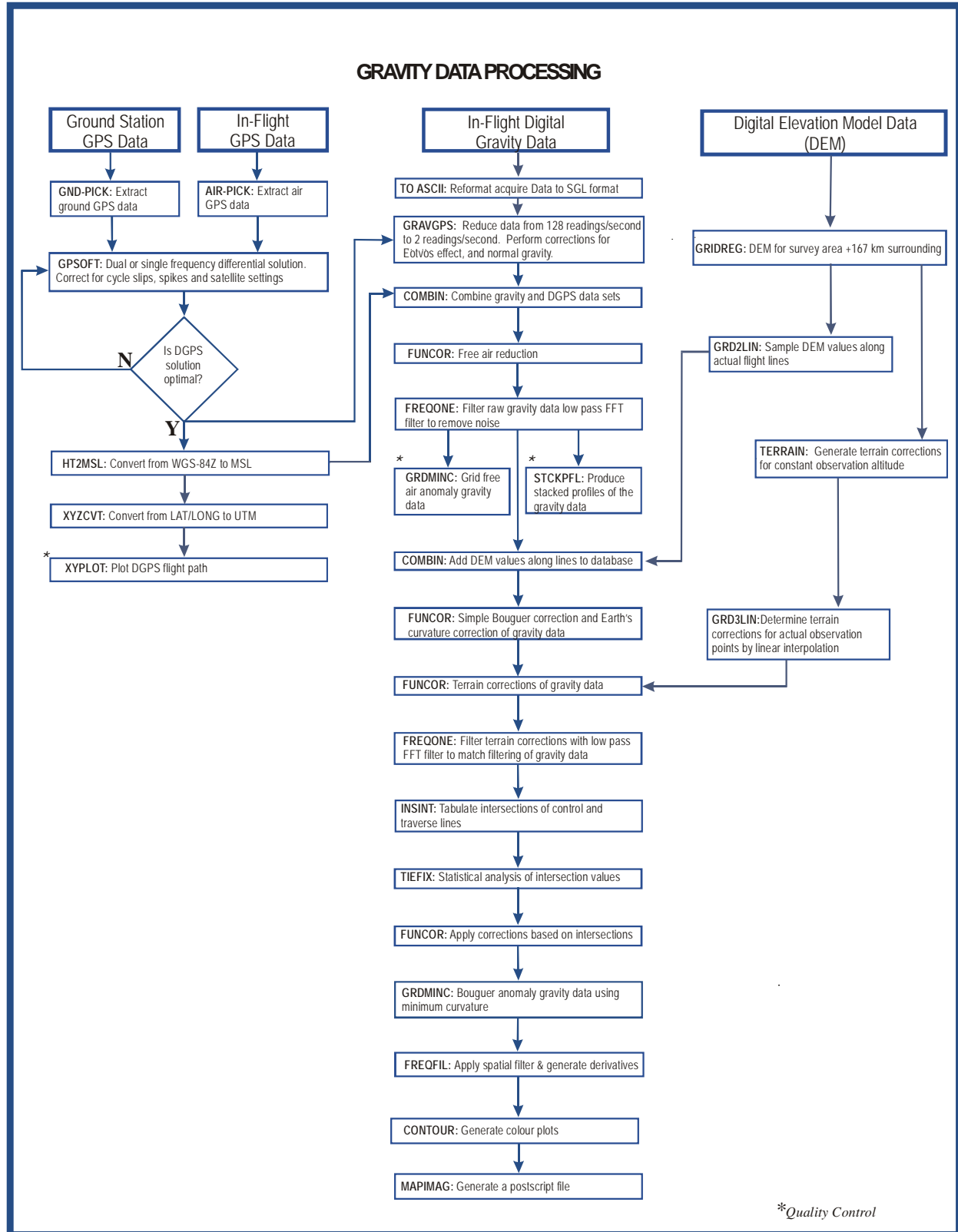
The adjustments are then smoothed and applied to line data that has been filtered to different degrees as described below. The degree of filtering applied to the data in order to calculate adjustments is independent of the degree of filtering applied to the data itself. Grids of adjusted data are inspected to determine if adjustments as determined are appropriate and the degree of filtering applied may be altered in response.

### **Gridding And Filtering**

Statistical noise in the data is reduced by applying a cosine tapered low pass filter to the time series line data. The degree of line filtering employed depends on the noise level of the data and resolution required. The degree of line filtering is always slightly less than the subsequent grid filtering to avoid biasing the data in the grid. For this survey, a 50 second half wavelength filter was employed. Having selected a suitable line filter, the data is gridded using a minimum curvature algorithm that averages all values within any given grid cell and interpolates the data between survey lines to produce a smooth grid. 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). Grids were generated using a 500 m grid cell size.

Low pass filtering, directly equivalent to spatial averaging, is then applied to the grid to cancel out noise and achieve better noise reduction than is possible by simply increasing the degree of line filtering. Essentially, the survey area is over-sampled by a line spacing that is smaller than the grid filter used. A range of grid filters are used and evaluated for noise levels and signal content. Final data for this survey was filtered with a 3 km half-wavelength (6.0 km full-wavelength) grid filter. The full-wavelength filtering parameters are 0% pass at 4.5 km, 100% pass at 9.0 km.

A gravity processing flowchart is presented in *Figure 4*.

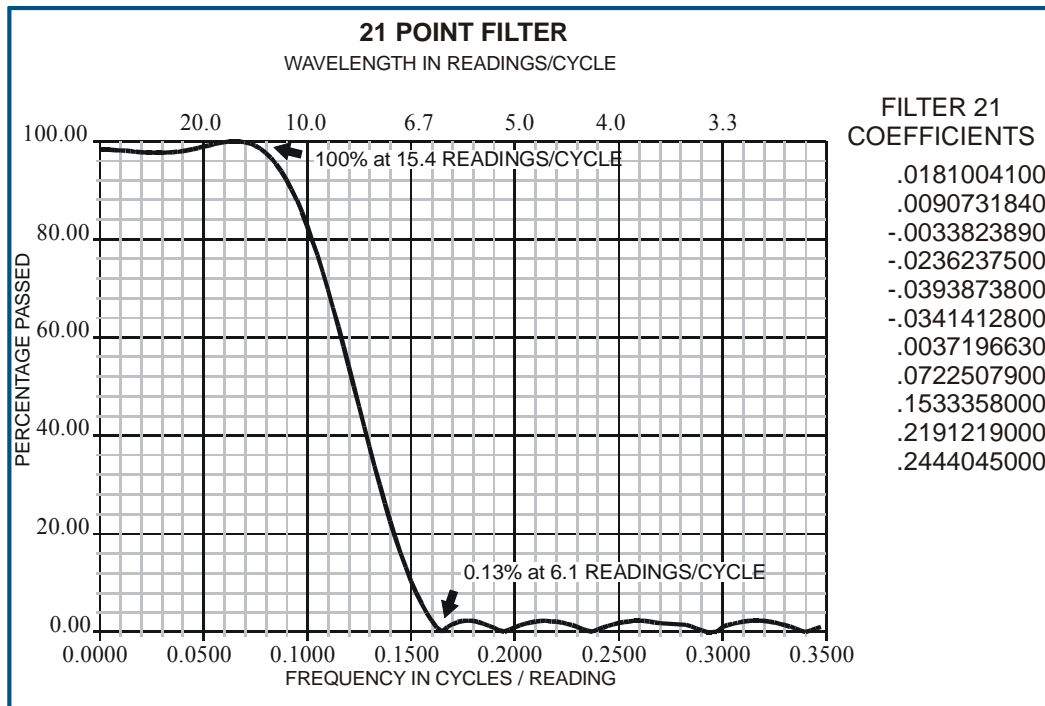
**Figure 4: Gravity Data Processing**



### Radar, Barometric and Laser Altimeter Data

The barometric altitude in metres was recorded at 4 Hz but was not used in processing because of the availability of more accurate GPS altitudes. The terrain clearance as measured by the radar altimeter in metres was recorded at 10 Hz. The laser altimeter recorded terrain clearance at 100 Hz. Even though the laser altimeter can record returns from more than 700 m above the ground with a high degree of certainty, some laser data dropouts occurred while flying over the mountainous parts of the survey area. Radar data was substituted for missing laser data when available for creation of the final altimeter channel, although some gaps remain in mountainous areas. The raw radar data were filtered to remove high frequency noise using a 21-point filter (Figure 5). The raw laser data were processed with an iterative de-spiking routine designed to remove early laser returns from trees. The final data were plotted and inspected for quality.

**Figure 5: 21 Point Filter**



## Positional Data

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 the combinations of L1 and L2 phase. The DGPS is processed repeatedly to obtain optimal aircraft accelerations for the calculation of gravity. The general data flow for GPSoft is illustrated in *Figure 6*.

Positional data were recorded in the WGS-84 datum in latitude and longitude. For processing purposes, the WGS-84 UTM data were calculated in Zone 10N. Parameters for the GRS-80 ellipsoid as used by the WGS-84 datum are:

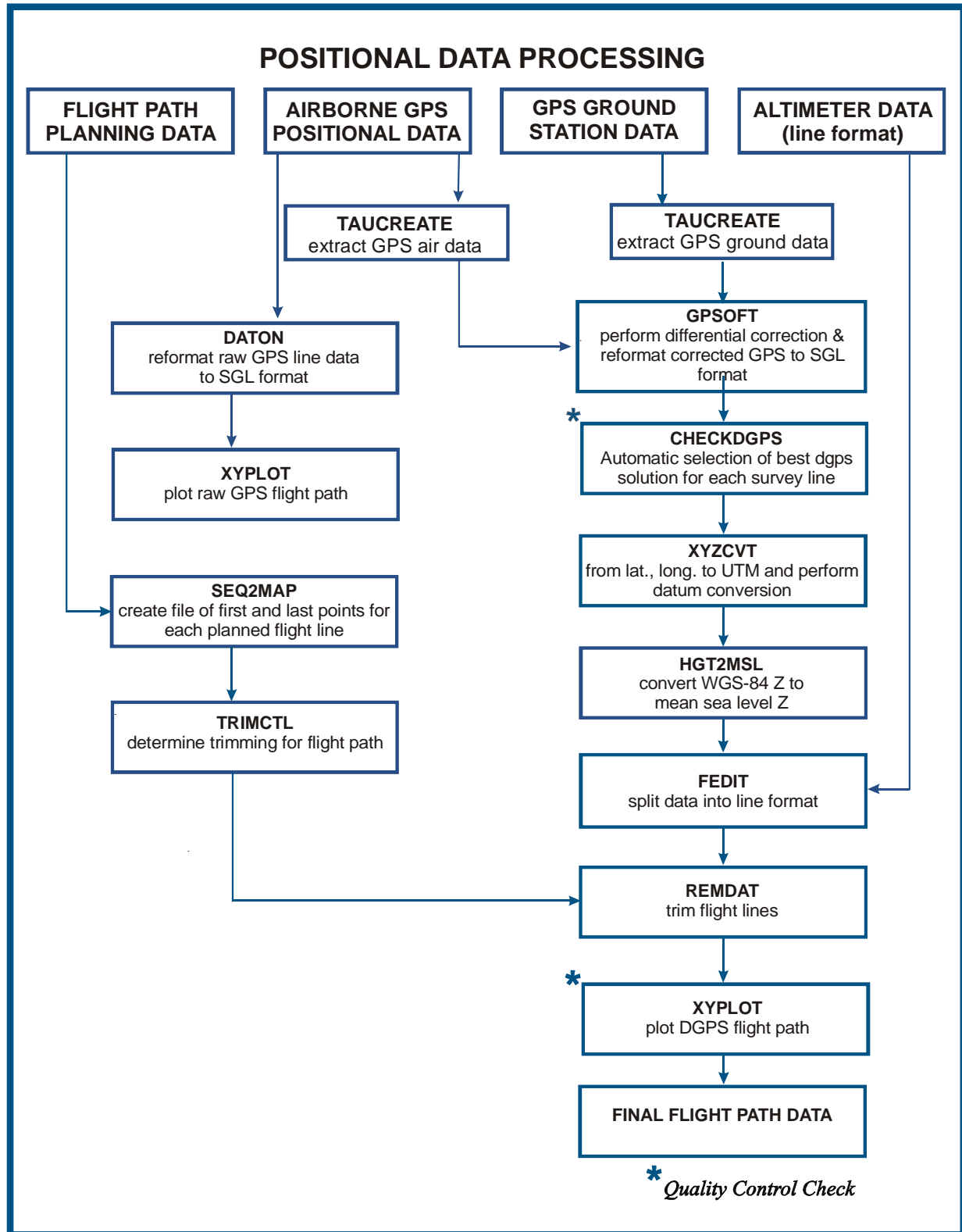
Ellipsoid:	GRS-80
Semi major axis:	6378137.0
1/flattening:	298.257222

Coordinates in NAD-83 are used for the final data and map products. NAD-83 uses the same ellipsoid as WGS-84 as defined above. Transformation from WGS084 to NAD-83 is defined by the following parameters:

X Shift	0.991 m
Y Shift	-1.9072 m
Z Shift	-0.5129 m
X Rotation	1.2581E-7 rad
Y Rotation	0.3599E-7 rad
Z Rotation	0.5607E-7 rad
Scale Factor	0.0

Elevation data were recorded relative to the GRS-80 ellipsoid and transformed to mean sea level (MSL) using the HTv2.0 geopotential model from the Canada Geodetic Survey Division (GSD) of Natural Resources Canada.

**Figure 6: Positional Data Processing**



## VIII. FINAL PRODUCTS

### Geosoft GRIDS

Grid cell size = 500m

Name	Units	Description
GRVBG3KM.grd	mGal	Free air gravity, 3km half-wavelength filter
GRVFA3KM.grd	mGal	Bouguer gravity, 3km half-wavelength filter, 2.67 g/cc
FVDBG3KM.grd	Eötvös	FVD of bouguer gravity, 3km half-wavelength filter, 2.67 g/cc

### GEOSOFT FORMAT ASCII LINE DATA ( Grav.XYZ )

COL	NAME	FORMAT	UNIT	DESCRIPTION
1	SECOND	F10.2	second	Fiducial Time
2	YEAR	A6	-	Year
3	DAY	A5	-	Day of year
4	FLT	A4	-	Flight number
5	LINE	A8	-	Line number
6	LATNAD83	F15.7	degrees	Latitude NAD-83
7	LONGNAD83	F15.7	degrees	Longitude NAD-83
8	UTMXN10N	F15.2	m	NAD-83 UTM 10N X
9	UTMYN10N	F15.2	m	NAD-83 UTM 10N Y
10	UTMXN09N	F15.2	m	NAD-83 UTM 09N X
11	UTMYN09N	F15.2	m	NAD-83 UTM 09N Y
12	GPSZNAD83	F10.2	m	Height above NAD-83 ellipsoid
13	MSLZ	F10.2	m	Height above mean sea level
14	LALT	F10.1	m	Laser altimeter
15	FZ	F12.2	mGal	Gravimeter vertical acceleration
16	AZ	F12.2	mGal	GPS vertical acceleration
17	GRVRAW	F12.2	mGal	Raw gravity (FZ - AZ), unfiltered
18	GRVLAT	F12.2	mGal	Latitude corrected gravity, unfiltered
19	GRVEOT	F12.2	mGal	Eötvös corrected gravity, unfiltered
20	GRVFRA	F12.2	mGal	Free air gravity, unfiltered
21	GRVFRA100	F10.2	mGal	Free air gravity, 50s half-wavelength line filter
22	GRVFRAL100	F10.2	mGal	Free air gravity, intersection adjusted, 50s half-wavelength line filter
23	BATH	F10.2	m	Terrain used for bouguer correction, using SRTM data with bathymetry for offshore areas
24	TERRAIN	F10.2	m	Terrain used for bouguer correction, using SRTM data only
25	SBGCOR	F10.2	mGal	Simple bouguer correction, 2.67g/cc density
26	GRVBGL100	F10.2	mGal	Simple bouguer gravity, intersection adjusted, 50s half-wavelength line filter, 2.67g/cc density
27	GRVFRAL3KM	F12.2	mGal	Free air gravity, 50s half-wavelength line filter, 3km half-wavelength spatial filter

28	GRVBGL3KM	F10.2	mGal	Simple bouguer gravity, 50s half-wavelength line filter, 3km half-wavelength spatial filter, 2.67g/cc density
29	FVDBGL3KM	F10.2	Eötvös	First vertical derivative of simple bouguer gravity, 50s half-wavelength line filter, 3km half-wavelength spatial filter, 2.67g/cc density

## Map Products

At 1:500 000 (full survey) and at 1:250 000(one for each of five map sheets)

Map Name	Units	Description
BOU	mGal	Final terrain corrected Bouguer Gravity, 3 km half wavelength filter, 2.67 g/cc
DTM	m	Digital Terrain Model; colour and contours
FRE	mGal	Free Air Gravity, 3 km half wavelength filter
FVG	Eötvös	First Vertical derivative of Final Bouguer gravity, 3 km half wavelength filter, 2.67 g/cc

## IX. PROJECT SUMMARY

SURVEY LOCATION		
Survey Title:	An Airborne Gravimetric Survey over the QUEST West area of British Columbia	
Survey Location:	Smithers, British Columbia	
Survey Duration:	May 8, 2008 to July 16, 2008	
Client:	Geoscience British Columbia Society (GBC)	
Address:	410 – 890 West Pender Street Vancouver, BC V6C 1J9	
Client Contacts:	C.D. ('Lyn) Anglin, PhD. Tel: (604)662-4147 ext 23 Email: anglin@geosciencebc.com	
Field Office Location:	Aspen Motor Inn 4268 Hwy. 16, Box 756 Smithers, BC	
Airport Used:	Smithers Airport (CYYD)	
SURVEY SPECIFICATIONS		
Horizontal/Vertical Datum:	WGS-84	
Raw Recorded Data:	WGS-84	
Delivered Data:	NAD-83	
Line Direction:	Traverse: E-W	Control: ~N-S
Line Spacing:	Traverse: 2000 m	Control: 17000 m
Total lkm Flown:	25,499 lkm	
Survey Speed:	90 knots (ground speed)	
Survey Altitude:	200 m (nominal)	
Survey Flight Numbers:	001-041	

<b>SURVEY AIRCRAFT AND EQUIPMENT</b>	
Aircraft Used:	Helicopter EUROCOPTER AS-350 B3 (C-GSGH)
Radar Altimeter:	King
Laser Altimeter:	Riegl LMS-Q140-80
Barometric Sensor:	Sensotec
Gravimeter (Air):	G2-7
GPS Receiver (Air):	C-DAC: NovAtel OEM4-G2 GPS Receiver G-DAC: NovAtel Millennium GPS Receiver
DGPS Receiver (Air):	Omnistar 3000LR GPS Receiver
GPS Receiver (Local Ground):	NovAtel Millennium, 12 channels
GPS Receiver (Local Ground):	NovAtel Millennium, 12 channels
<b>FIELD PERSONNEL</b>	
Party Chief\Geophysicist:	Lutz Wendorff / Max Buneta
Geophysicist:	Jay Archer / Leila Ertolahti
Helicopter Chief Pilot:	Brian Simms / Richard Barrette
Helicopter co-pilot:	Owen Peterson
Aircraft Maintenance Engineer:	David Money / Simon Worswick
Technician:	Hao Liu
<b>DATA PROCESSING PERSONNEL</b>	
Data Processing Manager	Martin Bates
Gravity Data	Sol Meyer
Maps	Sol Meyer







**APPENDIX I**





# SANDER GEOPHYSICS

## COMPANY PROFILE

Sander Geophysics Limited (SGL) specializes in high resolution airborne surveys for petroleum and mineral exploration, and environmental mapping. The company carries out airborne gravity, magnetic, electromagnetic and radiometric surveys worldwide using fixed-wing aircraft and helicopters.

### HISTORY

SGL was founded in 1956. The first airborne surveys were performed as early as 1958, and by 1967 airborne geophysical surveying had become the mainstay of the company. Operations have continued and expanded under the same ownership since 1956.

### WORLDWIDE OPERATIONS

The company's head office and aircraft maintenance hangar are located at the International Airport in Ottawa, Canada. SGL also has operational bases strategically located around the world.



*Sander Geophysics' head office and hangar*

Sander Geophysics maintains a fully-equipped electronics workshop for research, development and production of geophysical instruments. SGL has a state-of-the-art data processing department and a fully digital cartographic department. Sander Geophysics is also an Approved Maintenance Organization (AMO), and can perform all required aircraft maintenance and modifications.

### PERSONNEL

Sander Geophysics has over 150 experienced full-time employees, including geophysicists, software and hardware engineers, aircraft maintenance engineers and pilots.

Chairman:	George Sander, Ph.D.
Co-Presidents:	Stephan Sander, M.Sc. Luise Sander, M.Sc.
Marketing/Project Manager:	Malcolm Argyle, B.Sc., P.Geo.
Data Processing Manager:	Martin Bates, Ph.D.
HR/Administration Manager:	Michael Taylor
Accounting Manager:	Deborah Hine, B.A.
Engineering and Development:	Stephen Ferguson, M.Sc. François Belanger, M.Eng.
Flight Operations Manager:	Keith Hazelton, Pilot, A.M.E.
Director of Aircraft Maintenance:	Gerry McGrath, A.M.E.
Field Operations Manager:	Reed Archer, B.Sc., P.Geo.

### SERVICES

The company specializes in airborne surveys using the following methods: gravity, magnetic total field, magnetic gradient, electromagnetic and radiometric. Surveys are performed using SGL's specially modified airplanes and helicopters. A standard product on all of our surveys is a digital elevation model (DEM) derived from SGL's scanning LiDAR (Light Detection and Ranging) system or a combination of radar and laser profiler data.

Sander Geophysics offers gravimetric surveying with the company's AIRGrav (Airborne Inertially Referenced Gravimeter) system. AIRGrav was designed specifically for the unique characteristics of the airborne environment, and is the highest resolution airborne gravimeter available. In addition, AIRGrav can be flown in an efficient survey aircraft during normal daytime conditions. AIRGrav is routinely flown in combination with magnetometer and/or gamma-ray spectrometer systems in the company's airplanes and helicopters.

SGL also provides environmental monitoring services using gamma-ray spectrometers and specialized processing to detect and quantify natural and anthropogenic radiation.

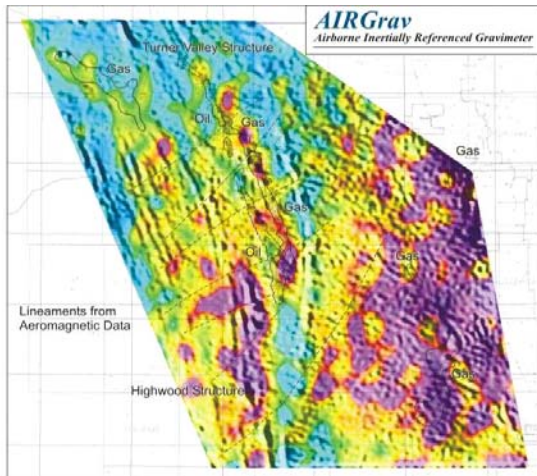
### SANDER GEOPHYSICS

260 Hunt Club Road, Ottawa, Ontario K1V 1C1 Canada  
Phone: 613-521-9626 Fax: 613-521-0215 Email: info@sgl.com Website: www.sgl.com

EXPLORATION

RESEARCH

INTERPRETATION



*First Vertical Derivative (FVD) of the Terrain Corrected Bouguer Gravity with Shadow of the FVD of the Total Magnetic Intensity*

Immediate data processing is part of our standard quality control procedure, and provides our clients with rapid results for evaluation while the survey is in progress. SGL offers a full range of data enhancement programs and provides complete interpretational services by experienced geoscientists. Available products include:

- Vertical gradient contour and colour maps
- Shaded relief maps of any parameter
- NASVD processed gamma-ray spectrometer data
- Frequency slices - high/low-pass or band-pass filtered
- Calculated digital terrain models
- Amplitude of the analytic signal
- Reduction-to-the-pole
- Upward or downward continuation
- Three-dimensional modeling

## SAFETY

Sander Geophysics is a founding 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 is proud of its perfect safety record, and attributes its safe operations to the quality and experience of its field crews and flight operations crew, combined with management's ongoing commitment to safety.

## AIRCRAFT

SGL owns and operates fifteen geophysical aircraft, including eight Cessna Grand Caravans, all equipped for geophysical surveys. Several of the Grand Caravans have been modified to allow the installation of a tri-axial magnetic gradiometer system, consisting of two wingtip magnetometers to measure the horizontal gradient, and two vertically separated, tail boom mounted magnetometers to measure the vertical gradient. SGL has three new Diamond DA42 Twin Stars that are modified for gravity and horizontal magnetic gradient surveys. SGL also has an AS 350 B3 helicopter equipped for gravity, magnetic and radiometric surveys. The B3 is a modern, high powered helicopter suitable for operating in areas of high altitude and steep terrain. Extensive modifications have been made to all of SGL's survey aircraft to reduce their magnetic effect. Typical figures of merit for SGL's fixed-wing aircraft are less than 1 nT. All of SGL's aircraft are flown and maintained by permanent employees of Sander Geophysics.



*SGL's AS 350 B3 helicopter*

## RESEARCH & DEVELOPMENT

SGL is dedicated to research and development. Nearly one-third of the company's resources are devoted to developing new and more efficient instrumentation for airborne geophysical surveying. In addition, the company has an ongoing program of designing, developing and refining a full suite of software for geophysical data processing.



**APPENDIX II**



Geoscience British Columbia Society - 2008  
QUEST West - Planned Lines in WGS-84

SEGMENT NO	START		END		LENGTH	
	LAT	LONG	LAT	LONG	NM	KM
C0402.0	N53:40.22	W125:32.46	N55:24.89	W125:39.11	104.91	194.30
C0403.0	N53:40.59	W125:14.31	N55:25.27	W125:20.17	104.91	194.30
C0404.0	N53:40.90	W124:56.15	N55:07.29	W125:00.30	86.56	160.30
C0405.0	N53:55.19	W124:38.54	N54:48.17	W124:40.68	53.08	98.30
C0406.0	N53:55.42	W124:20.27	N54:29.00	W124:21.37	33.64	62.30
C0407.0	N53:55.60	W124:02.00	N54:10.86	W124:02.38	15.28	28.30
C0500.0	N54:05.11	W128:52.76	N54:56.42	W128:52.61	51.37	95.14
C0501.0	N53:59.05	W128:34.48	N54:56.37	W128:33.88	57.40	106.30
C0502.0	N53:58.97	W128:16.18	N54:56.28	W128:15.15	57.40	106.30
C0503.0	N53:58.83	W127:57.88	N54:56.14	W127:56.42	57.40	106.30
C0504.0	N53:37.17	W127:40.27	N54:55.95	W127:37.70	78.91	146.14
C0505.0	N53:36.86	W127:22.14	N54:55.72	W127:18.97	79.00	146.30
C0506.0	N53:36.59	W127:04.01	N55:25.61	W126:58.74	109.23	202.30
C0507.0	N53:36.27	W126:45.89	N55:25.27	W126:39.80	109.23	202.30
C0508.0	N53:47.77	W126:27.05	N55:24.89	W126:20.86	97.35	180.30
T0999.0	N55:24.32	W126:00.00	N53:39.67	W126:00.00	104.85	194.18
T4006.0	N53:39.66	W126:00.11	N53:41.13	W124:46.62	43.73	80.99
T4007.0	N53:40.74	W126:00.11	N53:42.19	W124:47.66	43.09	79.81
T4008.0	N53:41.82	W126:00.11	N53:43.26	W124:48.70	42.46	78.63
T4009.0	N53:42.90	W126:00.11	N53:44.32	W124:49.71	41.84	77.48
T4010.0	N53:43.98	W126:00.11	N53:45.38	W124:50.73	41.22	76.33
T4011.0	N53:45.06	W126:00.11	N53:46.45	W124:51.74	40.60	75.18
T4012.0	N53:46.14	W126:00.11	N53:47.51	W124:52.76	39.98	74.03
T4013.0	N53:47.22	W126:00.11	N53:48.57	W124:53.78	39.35	72.88
T4014.0	N53:48.30	W126:00.11	N53:49.64	W124:54.81	38.73	71.72
T4015.0	N53:49.38	W126:00.11	N53:50.70	W124:55.83	38.10	70.56
T4016.0	N53:50.45	W126:00.11	N53:51.77	W124:56.52	37.68	69.78
T4017.0	N53:51.53	W126:00.11	N53:52.84	W124:56.57	37.63	69.69
T4018.0	N53:52.61	W126:00.11	N53:53.92	W124:56.62	37.59	69.61
T4019.0	N53:53.69	W126:00.10	N53:55.79	W123:47.32	78.53	145.44
T4020.0	N53:54.77	W126:00.10	N53:56.86	W123:48.38	77.88	144.23
T4021.0	N53:55.85	W126:00.10	N53:57.93	W123:49.43	77.22	143.01
T4022.0	N53:56.93	W126:00.10	N53:59.00	W123:50.49	76.56	141.80
T4023.0	N53:58.01	W126:00.10	N54:00.07	W123:51.54	75.91	140.58
T4024.0	N53:59.09	W126:00.10	N54:01.15	W123:52.60	75.25	139.36
T4025.0	N54:00.17	W126:00.10	N54:02.22	W123:53.66	74.59	138.15
T4026.0	N54:01.25	W126:00.10	N54:03.29	W123:54.72	73.94	136.93
T4027.0	N54:02.32	W126:00.10	N54:04.36	W123:55.78	73.28	135.71
T4028.0	N54:03.40	W126:00.10	N54:05.43	W123:56.84	72.62	134.50
T4029.0	N54:04.48	W126:00.10	N54:06.50	W123:57.91	71.97	133.28
T4030.0	N54:05.56	W126:00.10	N54:07.57	W123:58.97	71.31	132.06
T4031.0	N54:06.64	W126:00.10	N54:08.64	W124:00.03	70.65	130.85
T4032.0	N54:07.72	W126:00.10	N54:09.71	W124:01.10	70.00	129.63
T4033.0	N54:08.80	W126:00.10	N54:10.78	W124:02.16	69.34	128.42
T4034.0	N54:09.88	W126:00.10	N54:11.85	W124:03.23	68.68	127.20
T4035.0	N54:10.96	W126:00.10	N54:12.91	W124:04.30	68.03	125.98
T4036.0	N54:12.04	W126:00.10	N54:13.98	W124:05.37	67.37	124.77
T4037.0	N54:13.11	W126:00.10	N54:15.05	W124:06.44	66.71	123.55
T4038.0	N54:14.19	W126:00.10	N54:16.12	W124:07.51	66.06	122.33
T4039.0	N54:15.27	W126:00.10	N54:17.19	W124:08.58	65.40	121.12
T4040.0	N54:16.35	W126:00.10	N54:18.26	W124:09.65	64.74	119.90
T4041.0	N54:17.43	W126:00.10	N54:19.33	W124:10.72	64.09	118.69
T4042.0	N54:18.51	W126:00.10	N54:20.39	W124:11.80	63.43	117.47

Geoscience British Columbia Society - 2008  
QUEST West - Planned Lines in WGS-84

SEGMENT NO	START		END		LENGTH	
	LAT	LONG	LAT	LONG	NM	KM
T4043.0	N54:19.59	W126:00.10	N54:21.46	W124:12.87	62.77	116.25
T4044.0	N54:20.67	W126:00.10	N54:22.53	W124:13.95	62.11	115.04
T4045.0	N54:21.75	W126:00.10	N54:23.60	W124:15.03	61.46	113.82
T4046.0	N54:22.83	W126:00.10	N54:24.66	W124:16.11	60.80	112.60
T4047.0	N54:23.90	W126:00.10	N54:25.73	W124:17.19	60.14	111.39
T4048.0	N54:24.98	W126:00.10	N54:26.80	W124:18.27	59.49	110.17
T4049.0	N54:26.06	W126:00.09	N54:27.87	W124:19.35	58.83	108.96
T4050.0	N54:27.14	W126:00.09	N54:28.93	W124:20.30	58.25	107.88
T4051.0	N54:28.22	W126:00.09	N54:30.00	W124:21.51	57.52	106.52
T4052.0	N54:29.30	W126:00.09	N54:31.06	W124:22.59	56.86	105.31
T4053.0	N54:30.38	W126:00.09	N54:32.13	W124:23.68	56.20	104.09
T4054.0	N54:31.46	W126:00.09	N54:33.20	W124:24.76	55.55	102.87
T4055.0	N54:32.54	W126:00.09	N54:34.26	W124:25.85	54.89	101.66
T4056.0	N54:33.61	W126:00.10	N54:35.33	W124:26.94	54.23	100.44
T4057.0	N54:34.69	W126:00.10	N54:36.39	W124:28.03	53.58	99.22
T4058.0	N54:35.77	W126:00.10	N54:37.46	W124:29.12	52.92	98.01
T4059.0	N54:36.85	W126:00.10	N54:38.52	W124:30.21	52.26	96.79
T4060.0	N54:37.93	W126:00.10	N54:39.59	W124:31.30	51.61	95.58
T4061.0	N54:39.01	W126:00.10	N54:40.65	W124:32.39	50.95	94.36
T4062.0	N54:40.09	W126:00.10	N54:41.72	W124:33.48	50.29	93.14
T4063.0	N54:41.17	W126:00.10	N54:42.78	W124:34.58	49.64	91.93
T4064.0	N54:42.25	W126:00.10	N54:43.85	W124:35.67	48.98	90.71
T4065.0	N54:43.32	W126:00.10	N54:44.91	W124:36.77	48.32	89.49
T4066.0	N54:44.40	W126:00.10	N54:45.97	W124:37.87	47.67	88.28
T4067.0	N54:45.48	W126:00.10	N54:47.04	W124:38.96	47.01	87.06
T4068.0	N54:46.56	W126:00.10	N54:48.10	W124:40.06	46.35	85.85
T4069.0	N54:47.64	W126:00.10	N54:49.17	W124:41.16	45.70	84.63
T4070.0	N54:48.72	W126:00.10	N54:50.23	W124:42.26	45.04	83.41
T4071.0	N54:49.80	W126:00.10	N54:51.29	W124:43.37	44.38	82.20
T4072.0	N54:50.88	W126:00.10	N54:52.35	W124:44.47	43.73	80.98
T4073.0	N54:51.96	W126:00.10	N54:53.42	W124:45.57	43.07	79.76
T4074.0	N54:53.03	W126:00.10	N54:54.48	W124:46.68	42.41	78.55
T4075.0	N54:54.11	W126:00.10	N54:55.54	W124:47.78	41.76	77.33
T4076.0	N54:55.19	W126:00.10	N54:56.60	W124:48.89	41.10	76.11
T4077.0	N54:56.27	W126:00.10	N54:57.67	W124:50.00	40.44	74.90
T4078.0	N54:57.35	W126:00.10	N54:58.73	W124:51.11	39.78	73.68
T4079.0	N54:58.43	W126:00.10	N54:59.79	W124:52.22	39.13	72.47
T4080.0	N54:59.51	W126:00.10	N55:00.85	W124:53.33	38.47	71.25
T4081.0	N55:00.59	W126:00.10	N55:01.91	W124:54.44	37.81	70.03
T4082.0	N55:01.67	W126:00.10	N55:02.97	W124:55.55	37.16	68.82
T4083.0	N55:02.74	W126:00.10	N55:04.03	W124:56.67	36.50	67.60
T4084.0	N55:03.82	W126:00.10	N55:05.09	W124:57.78	35.84	66.38
T4085.0	N55:04.90	W126:00.10	N55:06.16	W124:58.90	35.19	65.17
T4086.0	N55:05.98	W126:00.11	N55:07.22	W125:00.01	34.53	63.95
T4087.0	N55:07.06	W126:00.11	N55:08.28	W125:01.13	33.87	62.74
T4088.0	N55:08.14	W126:00.11	N55:09.34	W125:02.25	33.22	61.52
T4089.0	N55:09.22	W126:00.11	N55:10.40	W125:03.37	32.56	60.30
T4090.0	N55:10.30	W126:00.11	N55:11.45	W125:04.49	31.90	59.09
T4091.0	N55:11.38	W126:00.11	N55:12.51	W125:05.61	31.25	57.87
T4092.0	N55:12.45	W126:00.11	N55:13.57	W125:06.73	30.59	56.65
T4093.0	N55:13.53	W126:00.11	N55:14.63	W125:07.86	29.93	55.44
T4094.0	N55:14.61	W126:00.11	N55:15.69	W125:08.98	29.28	54.22
T4095.0	N55:15.69	W126:00.11	N55:16.75	W125:10.11	28.62	53.00
T4096.0	N55:16.77	W126:00.11	N55:17.81	W125:11.24	27.96	51.79



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SEGMENT NO	START		END		LENGTH	
	LAT	LONG	LAT	LONG	NM	KM
T4097.0	N55:17.85	W126:00.11	N55:18.87	W125:12.36	27.31	50.57
T4098.0	N55:18.93	W126:00.11	N55:19.93	W125:13.49	26.65	49.36
T4099.0	N55:20.01	W126:00.11	N55:20.98	W125:14.62	25.99	48.14
T4100.0	N55:21.08	W126:00.12	N55:22.04	W125:15.75	25.34	46.92
T4101.0	N55:22.16	W126:00.12	N55:23.10	W125:16.88	24.68	45.71
T4102.0	N55:23.24	W126:00.12	N55:24.16	W125:18.02	24.02	44.49
T4103.0	N55:24.32	W126:00.12	N55:25.21	W125:19.08	23.41	43.35
T5002.0	N53:37.19	W127:42.89	N53:36.33	W126:44.55	34.75	64.36
T5003.0	N53:38.27	W127:42.86	N53:37.41	W126:44.70	34.63	64.13
T5004.0	N53:39.35	W127:42.83	N53:38.46	W126:43.26	35.45	65.66
T5005.0	N53:40.43	W127:42.80	N53:39.52	W126:42.30	35.99	66.65
T5006.0	N53:41.51	W127:42.76	N53:40.56	W126:39.86	37.40	69.27
T5006.1	N53:39.90	W126:09.50	N53:39.66	W125:59.89	5.72	10.60
T5007.0	N53:42.59	W127:42.73	N53:41.60	W126:38.28	38.31	70.95
T5007.1	N53:40.98	W126:09.42	N53:40.74	W125:59.89	5.68	10.51
T5008.0	N53:43.66	W127:42.70	N53:42.70	W126:39.08	37.80	70.01
T5008.1	N53:42.05	W126:09.35	N53:41.82	W125:59.89	5.63	10.43
T5009.0	N53:44.74	W127:42.66	N53:43.72	W126:36.19	39.48	73.11
T5009.1	N53:43.13	W126:09.28	N53:42.90	W125:59.89	5.58	10.34
T5010.0	N53:45.82	W127:42.63	N53:44.78	W126:35.16	40.05	74.18
T5010.1	N53:44.21	W126:09.21	N53:43.98	W125:59.89	5.54	10.26
T5011.0	N53:46.90	W127:42.60	N53:45.82	W126:33.31	41.12	76.15
T5011.1	N53:45.34	W126:11.30	N53:45.06	W125:59.89	6.78	12.55
T5012.0	N53:47.98	W127:42.56	N53:46.85	W126:30.95	42.48	78.68
T5012.1	N53:46.51	W126:15.33	N53:46.14	W125:59.89	9.17	16.98
T5013.0	N53:49.06	W127:42.53	N53:47.22	W125:59.89	60.88	112.74
T5014.0	N53:50.13	W127:42.50	N53:48.30	W125:59.89	60.83	112.66
T5015.0	N53:51.21	W127:42.46	N53:49.38	W125:59.89	60.78	112.57
T5016.0	N53:52.29	W127:42.43	N53:50.45	W125:59.89	60.74	112.49
T5017.0	N53:53.37	W127:42.40	N53:51.53	W125:59.89	60.69	112.40
T5018.0	N53:54.45	W127:42.36	N53:52.61	W125:59.89	60.65	112.32
T5019.0	N53:55.53	W127:42.33	N53:53.69	W125:59.89	60.60	112.23
T5020.0	N53:56.60	W127:42.30	N53:54.77	W125:59.89	60.56	112.15
T5021.0	N53:57.68	W127:42.27	N53:55.85	W125:59.89	60.51	112.06
T5022.0	N53:59.17	W128:50.37	N53:56.93	W125:59.89	100.68	186.46
T5023.0	N54:00.25	W128:50.80	N53:58.01	W125:59.89	100.89	186.85
T5024.0	N54:01.33	W128:51.24	N53:59.09	W125:59.89	101.10	187.24
T5025.0	N54:02.41	W128:51.67	N54:00.17	W125:59.89	101.31	187.63
T5026.0	N54:03.49	W128:52.11	N54:01.25	W125:59.89	101.53	188.03
T5027.0	N54:04.57	W128:52.54	N54:02.32	W125:59.89	101.74	188.42
T5028.0	N54:05.65	W128:52.98	N54:03.40	W125:59.89	101.95	188.81
T5029.0	N54:06.73	W128:53.41	N54:04.48	W125:59.89	102.16	189.21
T5030.0	N54:07.81	W128:53.85	N54:05.56	W125:59.90	102.38	189.60
T5031.0	N54:08.88	W128:54.29	N54:06.64	W125:59.90	102.59	189.99
T5032.0	N54:09.96	W128:54.72	N54:07.72	W125:59.90	102.80	190.39
T5033.0	N54:11.04	W128:55.16	N54:08.80	W125:59.90	103.01	190.78
T5034.0	N54:12.12	W128:55.60	N54:09.88	W125:59.90	103.22	191.17
T5035.0	N54:13.20	W128:56.04	N54:10.96	W125:59.90	103.44	191.56
T5036.0	N54:14.28	W128:56.47	N54:12.04	W125:59.90	103.65	191.96
T5037.0	N54:15.36	W128:56.91	N54:13.11	W125:59.90	103.86	192.35
T5038.0	N54:16.44	W128:57.35	N54:14.19	W125:59.90	104.07	192.75
T5039.0	N54:17.51	W128:57.79	N54:15.27	W125:59.90	104.29	193.14
T5040.0	N54:18.59	W128:58.23	N54:16.35	W125:59.90	104.50	193.53
T5041.0	N54:19.67	W128:58.68	N54:17.43	W125:59.90	104.71	193.93

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SEGMENT NO	START		END		LENGTH	
	LAT	LONG	LAT	LONG	NM	KM
T5042.0	N54:20.75	W128:59.12	N54:18.51	W125:59.90	104.92	194.32
T5043.0	N54:21.83	W128:59.56	N54:19.59	W125:59.90	105.14	194.71
T5044.0	N54:22.91	W129:00.00	N54:20.67	W125:59.90	105.35	195.11
T5045.0	N54:23.99	W129:00.44	N54:21.75	W125:59.90	105.56	195.50
T5046.0	N54:25.06	W129:00.89	N54:22.82	W125:59.89	105.77	195.89
T5047.0	N54:26.14	W129:01.33	N54:23.90	W125:59.89	105.99	196.29
T5048.0	N54:27.22	W129:01.77	N54:24.98	W125:59.89	106.20	196.68
T5049.0	N54:28.30	W129:02.22	N54:26.06	W125:59.89	106.41	197.08
T5050.0	N54:29.38	W129:02.66	N54:27.14	W125:59.89	106.63	197.47
T5051.0	N54:30.46	W129:03.11	N54:28.22	W125:59.89	106.84	197.86
T5052.0	N54:31.53	W129:03.55	N54:29.30	W125:59.89	107.05	198.26
T5053.0	N54:32.61	W129:04.00	N54:30.38	W125:59.89	107.26	198.65
T5054.0	N54:33.69	W129:04.45	N54:31.46	W125:59.89	107.48	199.05
T5055.0	N54:34.77	W129:04.89	N54:32.54	W125:59.89	107.69	199.44
T5056.0	N54:35.85	W129:05.34	N54:33.61	W125:59.89	107.90	199.83
T5057.0	N54:36.92	W129:05.79	N54:34.69	W125:59.89	108.11	200.23
T5058.0	N54:38.00	W129:06.24	N54:35.77	W125:59.89	108.33	200.62
T5059.0	N54:39.08	W129:06.68	N54:36.85	W125:59.89	108.54	201.02
T5060.0	N54:40.16	W129:07.13	N54:37.93	W125:59.89	108.75	201.41
T5061.0	N54:41.24	W129:07.58	N54:39.01	W125:59.89	108.97	201.81
T5062.0	N54:42.31	W129:08.03	N54:40.09	W125:59.89	109.18	202.20
T5063.0	N54:43.39	W129:08.48	N54:41.17	W125:59.89	109.39	202.59
T5064.0	N54:44.47	W129:08.93	N54:42.25	W125:59.89	109.61	202.99
T5065.0	N54:45.55	W129:09.38	N54:43.32	W125:59.89	109.82	203.38
T5066.0	N54:46.63	W129:09.84	N54:44.40	W125:59.89	110.03	203.78
T5067.0	N54:47.70	W129:10.29	N54:45.48	W125:59.89	110.24	204.17
T5068.0	N54:48.78	W129:10.74	N54:46.56	W125:59.89	110.46	204.57
T5069.0	N54:49.86	W129:11.19	N54:47.64	W125:59.89	110.67	204.96
T5070.0	N54:50.94	W129:11.65	N54:48.72	W125:59.89	110.88	205.36
T5071.0	N54:52.01	W129:12.10	N54:49.80	W125:59.89	111.10	205.75
T5072.0	N54:53.09	W129:12.55	N54:50.88	W125:59.89	111.31	206.14
T5073.0	N54:54.17	W129:13.01	N54:51.96	W125:59.88	111.52	206.54
T5074.0	N54:55.25	W129:13.46	N54:53.03	W125:59.88	111.73	206.93
T5075.0	N54:56.33	W129:13.91	N54:54.11	W125:59.88	111.95	207.33
T5076.0	N54:56.44	W127:00.35	N54:55.19	W125:59.88	34.90	64.64
T5077.0	N54:57.51	W127:00.30	N54:56.27	W125:59.88	34.86	64.55
T5078.0	N54:58.59	W127:00.24	N54:57.35	W125:59.88	34.81	64.47
T5079.0	N54:59.67	W127:00.19	N54:58.43	W125:59.88	34.76	64.38
T5080.0	N55:00.75	W127:00.14	N54:59.51	W125:59.88	34.72	64.30
T5081.0	N55:01.82	W127:00.08	N55:00.59	W125:59.88	34.67	64.21
T5082.0	N55:02.90	W127:00.03	N55:01.67	W125:59.88	34.62	64.12
T5083.0	N55:03.98	W127:00.00	N55:02.74	W125:59.88	34.59	64.06
T5084.0	N55:05.06	W127:00.00	N55:03.82	W125:59.88	34.58	64.03
T5085.0	N55:06.14	W127:00.00	N55:04.90	W125:59.88	34.56	64.01
T5086.0	N55:07.22	W127:00.00	N55:05.98	W125:59.88	34.54	63.98
T5087.0	N55:08.29	W127:00.00	N55:07.06	W125:59.88	34.53	63.95
T5088.0	N55:09.37	W127:00.00	N55:08.14	W125:59.88	34.51	63.92
T5089.0	N55:10.45	W127:00.00	N55:09.22	W125:59.88	34.50	63.89
T5090.0	N55:11.53	W127:00.00	N55:10.30	W125:59.88	34.48	63.86
T5091.0	N55:12.61	W127:00.00	N55:11.38	W125:59.88	34.47	63.83
T5092.0	N55:13.69	W127:00.00	N55:12.45	W125:59.88	34.45	63.81
T5093.0	N55:14.77	W127:00.00	N55:13.53	W125:59.88	34.44	63.78
T5094.0	N55:15.84	W127:00.00	N55:14.61	W125:59.88	34.42	63.75
T5095.0	N55:16.92	W127:00.00	N55:15.69	W125:59.88	34.41	63.72

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SEGMENT NO	START		END		LENGTH	
	LAT	LONG	LAT	LONG	NM	KM
T5096.0	N55:18.00	W127:00.00	N55:16.77	W125:59.88	34.39	63.69
T5097.0	N55:19.08	W127:00.00	N55:17.85	W125:59.88	34.37	63.66
T5098.0	N55:20.16	W127:00.00	N55:18.93	W125:59.88	34.36	63.63
T5099.0	N55:21.24	W127:00.00	N55:20.01	W125:59.88	34.34	63.60
T5100.0	N55:22.32	W127:00.00	N55:21.08	W125:59.88	34.33	63.58
T5101.0	N55:23.39	W127:00.00	N55:22.16	W125:59.88	34.31	63.55
T5102.0	N55:24.47	W127:00.00	N55:23.24	W125:59.88	34.30	63.52
T5103.0	N55:25.55	W127:00.00	N55:24.32	W125:59.84	34.31	63.53

Total control line length = 1095.67 nautical miles  
 = 2029.18 kilometers.

Total traverse line length = 12672.69 nautical miles  
 = 23469.83 kilometers.

Total length of all lines = 13768.36 nautical miles  
 = 25499.01 kilometers.





**APPENDIX III**



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 ACTUAL FLOWN LINES  
 NAD 83 UTM 10 N

LINE No.	START TIME	END TIME	MIN X (m)	MAX X (m)	MIN Y (m)	MAX Y (m)	FLT	DAY	YEAR
401.00	73661.50	75347.50	301780.27	305064.33	5949912.16	6026580.24	22	160	2008
401.01	73575.50	74863.00	305051.68	307364.63	6026555.97	6080581.88	24	163	2008
401.02	79584.50	81118.50	307351.85	310071.09	6080503.49	6144081.43	24	163	2008
402.00	81116.00	83915.50	332110.16	332163.26	5949764.46	6070588.63	22	160	2008
402.01	75374.50	77115.00	332112.81	332174.75	6070602.04	6144234.63	30	172	2008
403.00	82238.50	84068.50	352131.00	352151.59	5949763.76	6026743.64	32	174	2008
403.01	89253.50	92025.00	352117.20	352161.14	6026710.05	6144245.26	32	174	2008
404.00	84542.00	88385.00	372109.34	372155.43	5949768.53	6110246.77	32	174	2008
405.00	82159.50	84541.50	392134.11	392166.81	5973760.37	6074236.13	26	168	2008
406.00	80141.00	81676.50	412122.23	412162.00	5973756.53	6038233.61	26	168	2008
407.00	89836.00	90536.00	432113.06	432174.50	5973754.29	6004248.34	28	170	2008
410.00	86734.50	88993.00	115610.92	123725.96	6009000.48	6103823.90	35	181	2008
411.00	89790.50	90637.00	140548.91	143706.26	6065550.43	6102334.07	11	146	2008
411.01	91992.50	92477.00	134658.73	136442.45	5996284.98	6017454.40	41	197	2008
411.02	94606.00	95724.50	136430.39	140552.50	6017370.93	6065584.74	41	197	2008
412.00	87133.50	88731.00	157727.85	163661.59	6031385.68	6100626.27	11	146	2008
412.01	90585.50	91474.50	154593.73	157732.81	5994590.58	6031414.72	41	197	2008
413.00	59441.50	61996.50	174556.51	183611.60	5992930.99	6098911.80	37	183	2008
414.00	58025.50	61386.00	191112.54	203564.81	5951241.09	6097184.44	24	163	2008
415.00	61362.00	64883.50	211058.23	223522.76	5949398.44	6095461.93	38	184	2008
416.00	80055.00	81852.00	241709.56	248247.47	6073509.07	6149590.31	16	152	2008
416.01	83062.00	85292.00	233562.95	241689.93	5978019.83	6073488.94	25	166	2008
416.02	65404.00	66123.00	230998.37	233558.31	5947722.29	5978042.60	38	184	2008
417.00	85958.50	88858.50	250931.06	261531.49	5946033.51	6070536.78	23	162	2008
417.01	83553.50	85295.00	261526.24	268197.07	6070451.76	6147858.57	24	163	2008
418.00	79050.50	80528.00	272723.66	278010.08	5966265.82	6028387.85	23	162	2008
418.01	68758.00	71576.00	278013.05	288129.06	6028391.80	6146145.21	30	172	2008
4002.00	61682.00	63221.00	188154.44	252510.66	5946137.01	5951589.04	24	163	2008
4003.00	69628.50	71098.50	188319.31	252445.14	5948147.09	5953573.86	40	193	2008
4004.00	71388.00	72908.00	188494.77	254150.63	5950007.11	5955571.82	40	193	2008
4005.00	73133.00	74648.50	188663.75	255302.07	5951922.26	5957559.80	40	193	2008
4006.00	74942.00	76547.00	188822.34	258087.37	5953695.79	5959553.90	40	193	2008
4006.10	75758.00	77883.00	291254.49	382735.23	5949975.84	5950892.44	22	160	2008
4007.00	76760.00	78392.50	188985.49	259911.80	5955550.33	5961554.33	40	193	2008
4007.10	78101.00	80268.50	291435.78	381645.99	5951965.56	5952882.49	22	160	2008
4008.00	78603.00	79382.50	224915.86	259160.55	5957618.34	5960520.85	40	193	2008
4008.01	82189.50	83021.50	189161.71	224932.30	5960509.96	5963551.44	40	193	2008
4008.10	77295.00	79353.50	291598.75	380561.04	5953961.26	5954878.42	27	169	2008
4009.00	83210.50	84864.00	189320.66	262414.65	5959351.91	5965536.81	40	193	2008
4009.10	74995.00	77107.50	291769.13	379488.06	5955980.73	5956868.16	27	169	2008
4010.00	85134.00	86852.00	189499.94	263652.81	5961260.74	5967552.51	40	193	2008
4010.10	83353.50	83741.50	291926.65	308538.44	5957987.41	5958870.75	23	162	2008
4010.11	84145.00	85807.00	308474.26	378427.64	5957987.44	5958025.01	27	169	2008
4011.00	80763.50	81102.00	251518.99	265782.10	5963085.58	5964290.07	23	162	2008
4011.01	62582.50	64099.00	189679.19	251548.49	5964290.20	5969516.13	37	183	2008
4011.10	82714.50	83149.00	289739.47	306986.94	5959995.16	5961060.47	23	162	2008
4011.11	86042.50	87706.00	306950.36	377360.72	5959975.57	5960028.30	27	169	2008
4012.00	81275.00	81640.50	251809.27	268469.79	5964866.47	5966278.09	23	162	2008
4012.01	64334.50	65803.50	189829.77	251844.48	5966276.30	5971526.80	37	183	2008
4012.10	81972.50	82539.50	285389.40	307986.27	5961994.36	5963434.83	23	162	2008
4012.11	87895.50	89487.50	308008.06	376292.83	5961992.97	5962025.62	27	169	2008
4013.00	83986.00	85354.00	250509.56	308988.49	5963992.68	5968390.09	23	162	2008
4013.01	90266.50	91792.00	309011.98	375237.46	5963977.67	5964021.54	27	169	2008
4013.02	66014.00	67484.00	190016.04	250480.57	5968390.48	5973518.08	37	183	2008
4014.00	63837.50	64840.00	257916.61	302511.86	5965999.15	5969761.77	24	163	2008
4014.01	91985.50	93678.50	302475.63	374145.08	5965991.63	5966013.02	27	169	2008
4014.02	64508.00	65291.50	223519.44	257938.51	5969773.22	5972690.44	40	193	2008
4014.03	68289.50	69088.50	190175.92	223538.97	5972695.14	5975516.46	40	193	2008

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LINE No.	START TIME	END TIME	MIN X (m)	MAX X (m)	MIN Y (m)	MAX Y (m)	FLT	DAY	YEAR
4015.00	65032.50	66055.50	261011.48	302597.85	5968010.18	5971518.11	24	163	2008
4015.01	84014.50	85685.50	302573.54	373082.84	5967990.55	5968010.24	28	170	2008
4015.02	62704.50	64341.50	190337.05	260981.65	5971524.45	5977513.96	40	193	2008
4016.00	66292.00	67231.00	258910.13	302677.00	5969994.84	5973717.63	24	163	2008
4016.01	77585.50	79192.00	302635.03	372392.61	5969987.93	5970017.90	28	170	2008
4016.02	60943.50	62480.00	190525.70	258942.79	5973706.15	5979510.57	40	193	2008
4017.00	71243.00	74344.50	238661.77	372378.65	5971983.96	5977483.32	27	169	2008
4017.01	66639.00	67761.00	190685.12	238698.69	5977431.73	5981496.91	38	184	2008
4018.00	74155.50	78575.50	262819.73	449434.24	5973988.77	5977399.59	1	129	2008
4018.01	59044.00	60691.00	190849.77	262850.14	5977394.21	5983495.83	40	193	2008
4019.00	85987.50	89360.00	302923.44	448309.48	5975978.28	5976029.90	28	170	2008
4019.01	65696.00	68407.50	191018.28	303057.83	5975987.46	5985493.48	39	185	2008
4020.00	73859.00	77263.50	303015.25	447167.58	5977950.66	5978022.04	28	170	2008
4020.01	68627.00	71241.00	191192.73	303008.01	5977996.54	5987477.34	39	185	2008
4021.00	68795.00	73630.50	239136.11	446036.52	5979930.80	5985436.37	28	170	2008
4021.01	68448.00	69559.50	191353.77	239170.38	5985436.88	5989483.93	38	184	2008
4022.00	77709.00	82690.50	234202.43	444904.57	5981962.51	5987855.50	25	166	2008
4022.01	68142.50	70948.00	117300.49	234230.38	5987851.30	5997788.64	37	183	2008
4023.00	68667.00	69628.00	260721.53	303266.32	5983991.64	5987592.75	25	166	2008
4023.01	74261.00	77464.00	303193.07	443779.27	5983983.42	5984031.24	25	166	2008
4023.02	75363.50	78883.00	116999.10	260736.91	5987610.93	5999821.69	37	183	2008
4024.00	64165.00	68475.50	260511.83	442645.83	5985981.90	5989637.25	25	166	2008
4024.01	79102.50	82604.50	116699.06	260539.62	5989633.55	6001860.08	37	183	2008
4025.00	59036.00	63929.00	226717.82	441521.51	5987972.85	5994513.55	25	166	2008
4025.01	82931.00	85533.50	116386.15	226746.58	5994516.50	6003892.09	37	183	2008
4026.00	68617.00	69401.00	300420.46	332394.76	5989986.97	5990278.40	24	163	2008
4026.01	73633.00	76211.00	332367.22	440386.96	5989873.30	5990011.95	26	168	2008
4026.02	71765.00	73947.00	209020.59	300438.73	5990262.30	5998033.11	39	185	2008
4026.03	81674.00	83817.50	116040.88	208985.97	5998029.69	6005938.51	41	197	2008
4027.00	67788.50	68419.50	303541.07	332577.93	5991988.73	5992019.71	24	163	2008
4027.01	65663.50	67043.50	244490.53	303584.26	5992008.63	5997050.43	26	168	2008
4027.02	70816.50	73376.00	332556.72	439262.55	5991961.19	5992015.17	26	168	2008
4027.03	83800.50	86820.50	115788.66	244506.77	5997017.79	6007965.79	38	184	2008
4028.00	69046.00	70378.50	244722.26	303693.13	5993993.61	5999012.85	22	160	2008
4028.01	67372.50	70581.50	303622.87	438120.85	5993962.72	5994008.61	26	168	2008
4028.02	80501.50	83590.50	115424.52	244732.46	5999008.49	6010014.51	38	184	2008
4029.00	64278.00	68843.00	244615.12	436993.92	5995983.97	6001026.89	22	160	2008
4029.01	77180.50	80288.00	115156.75	244637.63	6001018.78	6012044.50	38	184	2008
4030.00	59668.00	64059.00	243413.61	435851.71	5997973.74	6003145.48	22	160	2008
4030.01	70064.50	73119.00	114844.84	243437.98	6003136.26	6014076.60	38	184	2008
4031.00	70362.00	73277.00	305702.28	434727.35	5999984.54	6000011.65	21	158	2008
4031.01	84988.50	86469.50	244507.39	305689.18	5999861.79	6005065.97	21	158	2008
4031.02	87873.50	89331.50	181980.04	244531.15	6005050.19	6010378.34	40	193	2008
4031.03	84570.50	86221.50	114492.21	182020.62	6010374.97	6016123.17	41	197	2008
4032.00	65778.50	70156.00	243601.41	433608.17	6001977.76	6007125.21	21	158	2008
4032.01	89534.00	90367.00	206892.30	243640.69	6007133.14	6010261.09	40	193	2008
4032.02	79104.50	81254.00	114203.35	206918.65	6010256.76	6018168.06	41	197	2008
4033.00	72764.50	74159.00	242610.58	304030.90	6003995.15	6009237.05	19	156	2008
4033.01	90858.50	93951.00	303907.67	432480.33	6003969.17	6004013.20	28	170	2008
4033.02	83385.50	86459.00	113927.18	242634.72	6009232.22	6020190.11	36	182	2008
4034.00	68220.00	72560.50	242722.41	431330.64	6005977.15	6011244.30	19	156	2008
4034.01	79981.00	83126.00	113616.19	242738.64	6011223.55	6022233.43	36	182	2008
4035.00	63606.50	67990.00	242752.24	430213.18	6007977.84	6013239.38	19	156	2008
4035.01	76632.00	79757.00	113287.02	242781.62	6013234.14	6024261.94	36	182	2008
4036.00	83168.50	84571.00	246406.28	304377.24	6009993.06	6014932.22	18	154	2008
4036.01	78708.00	81557.50	304310.31	429070.15	6009968.64	6010029.93	21	158	2008
4036.02	92179.00	95282.50	112978.92	246399.49	6014971.57	6026296.01	35	181	2008
4037.00	82691.00	84703.50	161364.00	247529.97	6016828.70	6024192.98	17	153	2008



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LINE No.	START TIME	END TIME	MIN X (m)	MAX X (m)	MIN Y (m)	MAX Y (m)	FLT	DAY	YEAR
4037.01	81643.50	82958.00	247470.39	304377.19	6011999.52	6016851.83	18	154	2008
4037.02	81772.00	84662.00	304392.85	427945.08	6011990.65	6012022.09	21	158	2008
4037.03	75365.50	76131.50	112610.41	145642.32	6025533.50	6028348.92	29	171	2008
4037.04	89625.50	90054.50	143103.42	161386.33	6024184.78	6025744.83	41	197	2008
4038.00	80446.00	82500.00	160296.68	246034.91	6018982.40	6026289.46	17	153	2008
4038.01	77039.50	81322.50	245956.10	426819.14	6013968.60	6018987.11	18	154	2008
4038.02	74032.50	75177.00	112383.79	160313.55	6026285.49	6030379.48	29	171	2008
4039.00	78192.50	80132.50	159223.50	244031.08	6021153.34	6028396.64	17	153	2008
4039.01	67918.00	69334.50	243963.88	304634.62	6016000.68	6021163.50	18	154	2008
4039.02	73922.50	76811.50	304558.61	425689.68	6015958.01	6016020.18	18	154	2008
4039.03	72596.00	73739.00	112057.88	159245.63	6028393.29	6032405.16	29	171	2008
4040.00	76112.50	78000.00	158144.42	241041.20	6023421.72	6030500.94	17	153	2008
4040.01	63138.00	67531.00	240957.46	424545.11	6017986.48	6023429.25	18	154	2008
4040.02	71221.00	72343.50	111766.60	158176.46	6030490.55	6034447.84	29	171	2008
4041.00	73785.50	75728.00	157084.34	242044.06	6025340.04	6032587.21	17	153	2008
4041.01	58694.50	62924.50	241954.12	423429.44	6019969.36	6025354.05	18	154	2008
4041.02	69599.50	70745.00	111449.96	157121.20	6032591.72	6036495.27	29	171	2008
4042.00	65565.00	69075.00	156014.57	304896.68	6021993.98	6034702.54	17	153	2008
4042.01	78517.50	81149.50	304802.75	422294.15	6021986.18	6022034.10	19	156	2008
4042.02	68332.00	69394.00	111146.88	156012.38	6034696.97	6038518.46	29	171	2008
4043.00	61953.00	65345.00	154945.71	304976.67	6023977.87	6036783.23	17	153	2008
4043.01	81331.50	84132.50	304896.53	421153.55	6023964.38	6024030.93	19	156	2008
4043.02	67013.50	68071.50	110825.11	154979.54	6036798.84	6040566.54	29	171	2008
4044.00	79678.00	83305.00	255905.33	420030.85	6025972.29	6030192.78	14	151	2008
4044.01	68059.00	71535.50	110527.15	255944.65	6030183.84	6042609.71	36	182	2008
4045.00	75523.50	79431.00	256009.21	418897.10	6027988.88	6032190.34	14	151	2008
4045.01	64323.50	67821.00	110230.76	256036.99	6032190.24	6044639.45	36	182	2008
4046.00	83524.00	86039.50	306619.45	417757.55	6029985.96	6030018.99	14	151	2008
4046.01	59337.00	61637.00	151759.51	254985.71	6034280.58	6043100.57	17	153	2008
4046.02	88097.50	89300.00	255015.71	306594.46	6029995.87	6034276.28	14	151	2008
4046.03	71829.00	72809.00	109925.15	151800.94	6043096.77	6046681.66	36	182	2008
4047.00	83605.50	86256.50	305244.47	416631.17	6031970.65	6032019.27	8	143	2008
4047.01	84506.50	86105.00	234915.37	305329.35	6032000.52	6038015.64	19	156	2008
4047.02	63739.00	66686.50	109609.62	234936.24	6038004.99	6048712.18	29	171	2008
4048.00	86293.00	87868.00	235005.55	305392.24	6034000.57	6039993.76	19	156	2008
4048.01	74186.00	76660.00	305323.34	415502.13	6033980.01	6034014.42	23	162	2008
4048.02	61050.00	64025.00	109315.51	235000.12	6040009.72	6050752.95	36	182	2008
4049.00	71410.00	71871.50	394913.57	414384.21	6035980.02	6036012.42	23	162	2008
4049.01	76517.00	78717.00	305459.11	394889.99	6035969.95	6036011.03	32	174	2008
4049.02	94938.50	96580.00	235998.94	305453.46	6035996.31	6041927.39	32	174	2008
4049.03	60177.50	63227.50	109009.58	235974.59	6041930.92	6052789.59	35	181	2008
4050.01	68039.00	71516.00	249008.64	398023.44	6037963.31	6042833.48	14	151	2008
4050.02	70806.00	71161.50	397935.38	413375.01	6037981.23	6038012.30	23	162	2008
4050.03	80618.00	81546.00	108679.06	147579.57	6051499.12	6054828.61	29	171	2008
4050.04	96278.50	98767.50	147548.70	263539.03	6041593.19	6051500.20	41	197	2008
4051.00	77045.50	79472.50	146498.62	248942.76	6044841.18	6053600.89	12	147	2008
4051.01	64154.50	67818.50	248908.51	394273.69	6039987.66	6044842.95	14	151	2008
4051.02	70177.50	70584.50	394205.43	412105.79	6039995.90	6040012.97	23	162	2008
4051.03	81834.50	82755.50	108383.25	146511.45	6053600.71	6056860.52	29	171	2008
4052.00	74094.50	76635.00	146507.12	247838.01	6046951.95	6055612.98	12	147	2008
4052.01	60461.50	63820.00	247819.22	390983.15	6041897.38	6046940.94	14	151	2008
4052.02	69484.50	69942.00	391020.42	410981.15	6041992.35	6042007.32	23	162	2008
4052.03	82996.00	83893.00	108078.23	146488.84	6055595.36	6058881.40	29	171	2008
4053.00	64559.00	68354.00	147411.08	305792.67	6043997.65	6057557.75	12	147	2008
4053.01	68696.00	69273.00	385602.10	409860.76	6043987.70	6044277.61	23	162	2008
4053.02	84174.00	85131.00	107797.12	147397.20	6057576.22	6060933.70	29	171	2008
4053.03	74318.50	76076.00	305810.02	384479.65	6043980.73	6044015.05	32	174	2008
4054.00	91377.50	94887.50	240505.03	388032.45	6045987.18	6051591.48	8	143	2008

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LINE No.	START TIME	END TIME	MIN X (m)	MAX X (m)	MIN Y (m)	MAX Y (m)	FLT	DAY	YEAR
4054.01	90882.50	93165.50	145606.91	240488.66	6051590.98	6059704.34	11	146	2008
4054.02	68098.50	68600.50	388066.59	408716.78	6045985.32	6046015.49	23	162	2008
4054.03	85276.50	86194.50	107476.74	145584.22	6059714.41	6062971.69	29	171	2008
4055.00	89231.50	91157.50	305925.73	388090.18	6047974.28	6048030.81	8	143	2008
4055.01	60398.50	64335.50	142290.14	306018.76	6048000.97	6062008.92	12	147	2008
4055.02	67417.00	67872.50	388018.78	407583.01	6047988.84	6048028.96	23	162	2008
4055.03	86585.50	87426.50	107144.53	142310.50	6062000.48	6065013.72	29	171	2008
4056.00	61094.50	63192.00	141237.98	229340.53	6056559.56	6064102.16	3	133	2008
4056.01	67546.50	69382.00	229260.43	306085.52	6049992.10	6056576.17	3	133	2008
4056.02	80781.00	83109.50	306017.17	406459.23	6049978.25	6050027.14	8	143	2008
4056.03	63743.50	64549.50	106874.09	141272.08	6064099.17	6067047.61	35	181	2008
4057.00	63404.00	67301.00	140189.86	306182.31	6052001.59	6066202.82	3	133	2008
4057.01	78028.50	80371.00	306098.02	405322.01	6051972.49	6052016.17	8	143	2008
4057.02	64838.00	65643.50	106501.55	140225.10	6066199.28	6069092.62	35	181	2008
4058.00	71612.00	73929.50	251008.59	350890.72	6053977.23	6058722.39	7	142	2008
4058.01	80838.50	83495.00	139144.03	250988.65	6058723.96	6068311.84	11	146	2008
4058.02	64795.50	66071.50	350818.64	404186.84	6053993.07	6054010.22	23	162	2008
4058.03	66009.00	66785.50	106195.75	139184.76	6068302.10	6071121.20	35	181	2008
4059.00	74174.50	77357.50	243060.90	380194.14	6055968.94	6061412.27	8	143	2008
4059.01	77821.00	80409.00	138103.42	243100.74	6061405.09	6070400.14	11	146	2008
4059.02	66272.50	66863.50	380114.76	403070.32	6055984.25	6056009.32	23	162	2008
4059.03	67073.00	67866.00	105891.73	138133.16	6070397.84	6073162.94	35	181	2008
4060.00	77613.50	81122.50	254007.61	401929.93	6057974.27	6062480.98	3	133	2008
4060.01	57322.50	60049.50	137060.85	254031.44	6062477.37	6072491.08	12	147	2008
4060.02	68123.00	68876.50	105597.17	137086.41	6072501.14	6075203.42	35	181	2008
4061.00	73380.00	77264.50	238255.11	400809.84	6059895.33	6065843.10	3	133	2008
4061.01	84613.00	87036.00	136023.71	238790.74	6065797.03	6074625.18	9	144	2008
4061.02	69138.00	69876.50	105320.64	136058.82	6074601.06	6077243.24	35	181	2008
4062.00	81645.00	86921.00	181162.72	399668.85	6061985.47	6072748.25	2	132	2008
4062.01	87267.00	88410.50	134985.35	181196.44	6072757.17	6076701.13	9	144	2008
4062.02	70124.00	70872.50	104984.97	135005.72	6076706.61	6079272.22	35	181	2008
4063.00	77578.00	81344.00	241322.39	398545.59	6063897.53	6069594.46	2	132	2008
4063.01	87361.50	88806.50	181852.22	241405.26	6069588.21	6074695.27	2	132	2008
4063.03	88643.00	89763.00	133934.98	181896.77	6074685.19	6078825.53	9	144	2008
4063.04	71146.00	71857.00	104704.60	133973.83	6078810.25	6081306.31	35	181	2008
4064.00	81490.00	82717.00	254654.38	306768.72	6065991.23	6070461.02	3	133	2008
4064.01	74550.00	77375.50	135508.04	254686.83	6070459.00	6080686.07	11	146	2008
4064.02	82825.50	85000.00	306732.61	397408.89	6065989.13	6066016.98	31	173	2008
4064.03	76386.00	77181.50	104366.26	135487.43	6080690.18	6083357.85	35	181	2008
4065.00	56795.50	58379.00	160706.54	227735.77	6074778.33	6080528.51	3	133	2008
4065.01	58930.50	59996.50	306802.61	351788.84	6067920.19	6068005.20	6	140	2008
4065.02	90052.50	90778.50	131869.50	160789.20	6080519.36	6083003.93	9	144	2008
4065.03	88574.50	90450.50	227660.42	306871.98	6067987.33	6074780.18	19	156	2008
4065.04	77466.50	78124.50	104095.72	131898.53	6082999.48	6085387.02	35	181	2008
4065.05	60619.50	61693.50	351762.50	396286.23	6067993.80	6068009.76	39	185	2008
4066.00	58660.00	60381.00	157605.23	231031.90	6076506.05	6082805.64	3	133	2008
4066.02	91069.50	91760.50	130838.25	157643.07	6082805.31	6085102.76	9	144	2008
4066.03	84581.00	86099.50	230952.95	306945.00	6069992.79	6076501.10	22	160	2008
4066.04	62910.00	64179.50	306865.43	359594.25	6069978.32	6070022.77	23	162	2008
4066.05	78409.00	79054.50	103782.90	130871.51	6085116.91	6087407.47	35	181	2008
4066.06	59518.00	60367.00	359460.21	395152.69	6069984.82	6070019.25	39	185	2008
4067.00	82984.50	84083.50	261982.16	307027.25	6071991.71	6075854.93	3	133	2008
4067.01	91976.50	95350.50	129808.95	262025.49	6075858.46	6087192.33	9	144	2008
4067.02	62456.00	62723.00	306996.37	318095.14	6071993.40	6072049.58	23	162	2008
4067.03	80637.50	82495.00	318108.43	394018.70	6071979.53	6072019.54	31	173	2008
4067.04	79320.50	79962.00	103454.42	129787.43	6087202.66	6089463.81	35	181	2008
4068.00	81657.00	84169.50	128777.68	232760.78	6080368.50	6089298.35	4	138	2008
4068.01	61760.00	62278.00	295410.52	317439.23	6073974.88	6075000.31	23	162	2008

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 ACTUAL FLOWN LINES  
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LINE No.	START TIME	END TIME	MIN X (m)	MAX X (m)	MIN Y (m)	MAX Y (m)	FLT	DAY	YEAR
4068.02	78636.00	80392.00	317408.41	392880.05	6073988.87	6074016.89	31	173	2008
4068.03	67571.50	69026.50	232764.10	295394.86	6074999.94	6080368.33	32	174	2008
4068.04	80255.00	80884.00	103161.64	128808.15	6089293.95	6091503.33	35	181	2008
4069.00	84438.00	86943.50	127748.68	234141.59	6082261.83	6091385.93	4	138	2008
4069.01	61207.50	61537.50	294309.56	307203.29	6075980.73	6077081.80	23	162	2008
4069.02	77358.00	79283.50	307123.83	391759.56	6075980.82	6076013.33	24	163	2008
4069.03	85360.50	86823.00	234117.15	294349.51	6077101.89	6082271.91	31	173	2008
4069.04	81119.50	81713.50	102859.85	127765.22	6091397.73	6093536.47	35	181	2008
4070.00	87221.50	89911.50	126701.95	233098.22	6084367.62	6093501.56	4	138	2008
4070.01	59202.50	60950.00	233021.31	307282.54	6077996.36	6084367.33	23	162	2008
4070.02	71535.00	73569.50	307214.36	390624.81	6077981.39	6078012.04	32	174	2008
4070.03	81983.00	82584.50	102553.44	126734.82	6093488.37	6095578.39	35	181	2008
4071.00	90174.00	92661.50	125679.53	231983.73	6086471.72	6095593.27	4	138	2008
4071.01	75185.50	77063.50	307278.07	389503.30	6079979.47	6080018.27	24	163	2008
4071.02	96958.50	98041.50	261625.24	307322.27	6079988.96	6083932.77	27	169	2008
4071.03	82816.00	83375.00	102246.90	125706.51	6095588.40	6097634.84	35	181	2008
4071.04	56916.50	57624.50	231965.68	261640.06	6083918.97	6086470.24	39	185	2008
4072.00	72370.50	74936.50	124655.28	231495.56	6088524.03	6097703.97	5	139	2008
4072.01	84782.00	87806.00	260356.33	388363.93	6081958.76	6086025.36	26	168	2008
4072.02	83649.50	84208.50	101952.37	124676.35	6097692.36	6099652.86	35	181	2008
4072.03	99727.00	100415.50	231513.75	260392.05	6086040.54	6088518.33	41	197	2008
4073.00	75271.00	77883.00	125513.20	234294.75	6090296.20	6099632.74	5	139	2008
4073.01	96819.00	98547.50	234251.79	307547.92	6083992.94	6090291.71	28	170	2008
4073.02	69364.50	71219.00	307404.75	387223.43	6083966.27	6084027.48	32	174	2008
4073.03	84445.50	85008.50	101640.50	125492.72	6099634.50	6101686.23	35	181	2008
4074.00	78108.50	80791.00	121609.28	233751.89	6092340.37	6101984.18	5	139	2008
4074.01	74649.00	78249.00	233721.25	386108.19	6085976.63	6092338.67	31	173	2008
4074.02	85228.00	85717.00	101326.22	121646.54	6101983.57	6103741.37	35	181	2008
4075.00	81035.00	83652.50	121780.16	229985.16	6094673.51	6103985.17	5	139	2008
4075.01	82353.00	85961.50	229942.00	384967.68	6087973.65	6094679.45	10	145	2008
4075.02	85942.00	86405.00	101024.40	121806.70	6103980.24	6105757.41	35	181	2008
4076.00	74380.00	77833.00	243361.72	383838.46	6089975.07	6095529.31	10	145	2008
4077.00	71357.50	74739.50	243522.59	382711.44	6091956.38	6097527.99	9	144	2008
4078.00	74943.00	78214.00	243700.58	381579.92	6093985.64	6099525.95	9	144	2008
4079.00	78429.00	79979.50	243877.25	308052.28	6095992.77	6101516.92	9	144	2008
4079.01	78106.50	79784.00	307985.51	380439.22	6095990.17	6096013.81	10	145	2008
4080.00	80173.50	81690.00	244045.50	308141.79	6098007.28	6103506.16	9	144	2008
4080.01	80235.50	81974.50	308114.11	379308.90	6097975.97	6098025.21	10	145	2008
4081.00	59629.50	62829.00	244222.32	378178.17	6099990.37	6105500.99	10	145	2008
4082.00	63007.50	64603.50	308217.36	377061.97	6101975.27	6102021.55	10	145	2008
4082.01	69117.00	70660.00	244384.08	308284.15	6101997.33	6107499.96	11	146	2008
4083.00	64820.50	66488.50	308339.22	375925.23	6103985.87	6104017.28	10	145	2008
4083.01	67219.50	68699.00	244533.61	308387.63	6103987.73	6109492.33	11	146	2008
4084.00	66687.00	69739.50	244647.60	374795.13	6105983.26	6111510.78	10	145	2008
4085.00	61505.00	63723.00	281012.37	373666.08	6107959.63	6110369.42	11	146	2008
4085.01	77363.00	78221.50	244767.46	281037.98	6110361.68	6113489.79	13	148	2008
4086.00	63917.50	66952.00	244870.05	372540.98	6109982.96	6115488.17	11	146	2008
4087.00	67671.50	70736.50	244993.61	371395.81	6111971.31	6117492.42	13	148	2008
4088.00	70964.50	72328.50	308754.96	370269.40	6113983.26	6114011.59	13	148	2008
4088.01	59966.00	61477.00	245115.11	308789.22	6113998.75	6119481.72	30	172	2008
4089.00	72532.00	74001.50	308826.36	369126.72	6115984.63	6116013.21	13	148	2008
4089.01	61652.00	63158.00	245214.36	308918.61	6115992.48	6121492.01	30	172	2008
4090.00	74207.50	77021.50	245342.19	368002.31	6117982.74	6123482.89	13	148	2008
4091.00	58650.50	61633.50	245449.34	366871.80	6119971.67	6125492.03	15	152	2008
4092.00	61834.00	64645.50	245559.76	365754.61	6121985.12	6127486.70	15	152	2008
4093.00	70689.50	73622.50	245678.62	364620.47	6123970.66	6129469.13	16	152	2008
4094.00	73830.00	75108.50	309248.04	363482.68	6125976.02	6126018.45	16	152	2008
4094.01	75400.00	76913.00	245803.20	309322.89	6125995.69	6131477.40	33	175	2008

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LINE No.	START TIME	END TIME	MIN X (m)	MAX X (m)	MIN Y (m)	MAX Y (m)	FLT	DAY	YEAR
4095.00	75323.00	76580.00	310508.03	362359.66	6127980.04	6128020.23	16	152	2008
4095.01	77728.00	79262.50	245913.00	310486.08	6127899.89	6133468.59	34	180	2008
4096.00	76779.00	79576.50	246032.59	361225.42	6129984.04	6135484.48	16	152	2008
4097.00	63851.00	66604.00	246137.53	360087.57	6131941.22	6137472.99	30	172	2008
4098.00	82962.00	85647.00	246250.45	358952.00	6133980.21	6139477.17	30	172	2008
4099.00	81573.00	82758.50	309713.88	357821.11	6135983.85	6136007.46	30	172	2008
4099.01	77266.50	78745.50	246370.55	309716.12	6136008.62	6141477.83	33	175	2008
4100.00	80313.50	81362.00	309799.47	356699.75	6137982.40	6138014.49	30	172	2008
4100.01	83059.00	84590.50	246475.61	309820.42	6137998.44	6143468.30	34	180	2008
4101.00	78957.50	80063.50	309887.65	355568.42	6139980.96	6140013.25	30	172	2008
4101.01	81339.00	82865.00	246598.41	309899.43	6139999.43	6145465.72	34	180	2008
4102.00	77736.00	78769.50	309976.46	354441.77	6141991.08	6142009.91	30	172	2008
4102.01	79637.00	81135.00	246716.78	309990.76	6142000.93	6147459.73	34	180	2008
4103.00	81453.00	82956.50	246820.82	310102.83	6143999.10	6149472.13	24	163	2008
4103.01	66967.50	67969.50	310035.41	353390.15	6143979.06	6144012.03	30	172	2008



**APPENDIX IV**



**Geoscience British Columbia  
Aero-Grav Heli-borne Survey - 2008**

S/N	Item Name	Description	Mfgr
300001001706820	Sat Phone (2226) 8816-2145-2226	Motorola MS1-20, Satellite Series 9505 Eurocopter AS350 B3, Engine Turbomeca, mod. Arriel 2B, S/N 22419,	Motorola
3748	Aircraft C-GSGH		Eurocopter
DAB06340140	GPS Receiver	Millennium Standard OEMV-3, 72-ch, L1/L2	NovAtel
GND-38	Ground Station Computer	input 12 VDC	SGL
GND-48	Ground station computer	input 12VDC	SGL
GND-60	Ground station computer	input 12VDC	SGL
NVH04490021	GPS Antenna	Model 702, L1/L2 Kinematic GPS Antenna	Novatel
NVH05410055	GPS Antenna	Model 702, L1/L2 Kinematic GPS Antenna	Novatel
PODB24-09	Power Distribution Box	110/220 AC to 24DC	DUNN Systems
SVA05280062	GPS Receiver	OEM4 24-channel dual frequency receiver	Novatel
XE8YV-A00648	Monitor LCD 8"	Model 800YV TFT LCD Monitor	Xenarc Technologies
XE8YV-A00685	Monitor LCD 8"	Model 800YV TFT LCD Monitor	Xenarc Technologies
1000633542	Computer - single board	Viper 830 Celeron 566MHz SBS w/128MB SD RAM	Teknor Industrial Computers Inc.
300001001706820	Sat Phone (2226) 8816-2145-2226	Motorola MS1-20, Satellite Series 9505 Eurocopter AS350 B3, Engine Turbomeca, mod. Arriel 2B, S/N 22419,	Motorola
3748	Aircraft C-GSGH		Eurocopter
5PJAJT4B	60GB Hard Drive	60GB Rotary Hard Drive, Model ST96812A	Seagate
5PJAXVGN	60GB Hard Drive	60GB Rotary Hard Drive, Model ST96812A	Seagate
BAK012207024691	Keyboard	model 860-DP-PS/2, with HulaPoint mouse	Stealth Computer Corporation
BAK030504043684	Keyboard	model 860-DP-PS/2, with HulaPoint mouse	Stealth Computer Corporation
DGTR008	Gyro Loop Control Board	Gesbus Computer Card	SGL
FX02680	Power inverter 110V - 60Hz	Outback sealed 2024 with Turbo inverter	Outback
FX029687	Power inverter 110V - 60Hz	Outback FX2524T power inverter	Outback
G-DAC-10	AirGrav Data Acquisition Computer		SGL
GND-38	Ground Station Computer	input 12 VDC	SGL
GND-48	Ground station computer	input 12VDC	SGL
NVH04490021	GPS Antenna	Model 702, L1/L2 Kinematic GPS Antenna	Novatel
NVH05410055	GPS Antenna	Model 702, L1/L2 Kinematic GPS Antenna	Novatel
PODB24-09	Power Distribution Box	110/220 AC to 24DC	DUNN Systems
RELAYS011	Relay Board	Relay Board	SGL
SDCFB-512-331	Compact flash card	512 MB Compact flash memory card	Sandisk
SGL00060065	GPS Receiver	Millennium Standard OEM3, 12-ch	NovAtel
SLF-099	HDD - IDE 2.5"	2GB IDE Flashdrive	Simpletech
XE8YV-A00648	Monitor LCD 8"	Model 800YV TFT LCD Monitor	Xenarc Technologies
XE8YV-A00685	Monitor LCD 8"	Model 800YV TFT LCD Monitor	Xenarc Technologies
2078	Aircraft Sat. Phone Antenna	L1 GPS-Iridium, P/N S67-1575-109, weight 6.0 oz	Sensor Systems
4294	Audio Controller	SatTalk 2, model SST-500, 10-32 VDC, 100 mA	Icarus Instruments Inc.
4359	Audio Controller	SatTalk 2, model SST-500, 10-32 VDC, 100 mA	Icarus Instruments Inc.
2078	Aircraft Sat. Phone Antenna	L1 GPS-Iridium, P/N S67-1575-109, weight 6.0 oz	Sensor Systems
4294	Audio Controller	SatTalk 2, model SST-500, 10-32 VDC, 100 mA	Icarus Instruments Inc.
4359	Audio Controller	SatTalk 2, model SST-500, 10-32 VDC, 100 mA	Icarus Instruments Inc.
7025	DGPS Antenna	P/N AT1665-OW-TNCF-000-RG-38-NM	AeroAntenna Technology Inc.
DCC00284ADD0	INMARSAT Transceiver	Transceiver D+, P/N DMR200 CTR-1472, PC104+ MPEG-4 encoder, 4 inputs, - 40/+85C	
170400250	MPEG-4 Encoder		
24-48VDC-002	AirGrav Voltage Converter	Middle & Outer Gimbal Booster	SGL

**Geoscience British Columbia  
Aero-Grav Heli-borne Survey - 2008**

300003000324200	Sat Phone (6253) 8816-4147-6253	Motorola MS1-20, Satellite Series 9505	Motorola
420066	Miniterminal	model ST/2000	
619429	Video Camera	Model TNC4604X, Colour CCD TV Camera, 12VDC	Elmo
7025	DGPS Antenna	P/N AT1665-OW-TNCF-000-RG-38-NM	
8353202728	Digital camera	Canon, Power Shot SD110, Digital Elph	Canon
BAK071904055817	Keyboard	model 860-DP-PS/2, with HulaPoint mouse	
G-DAC-04	AirGrav Data Acquisition Computer		SGL
GEER-08	AirGrav Control Computer		SGL
GRV G2-7	Gravimeter System	Airborne Gravimeter Platform	SGL
MON-01	Monitor LCD 6.4"	model LS64PA30A	
S025966340013	Monitor LCD 6.4"	model LS64PA30A	
STL0507SV10376	Monitor LCD 6.4"	model SV-640-OEM	
G-DAC-04	AirGrav Data Acquisition Computer		SGL
GEER-08	AirGrav Control Computer		SGL
GEER-08	AirGrav Control Computer		SGL
G-DAC-04	AirGrav Data Acquisition Computer		SGL
170400250	MPEG-4 Encoder	CTR-1472, PC104+ MPEG-4 encoder, 4 inputs, -40/+85C	
24-48VDC-002	AirGrav Voltage Converter	Middle & Outer Gimbal Booster	SGL
300003000324200	Sat Phone (6253) 8816-4147-6253	Motorola MS1-20, Satellite Series 9505	Motorola
420066	Miniterminal	model ST/2000	
619429	Video Camera	Model TNC4604X, Colour CCD TV Camera, 12VDC	Elmo
7025	DGPS Antenna	P/N AT1665-OW-TNCF-000-RG-38-NM	
8353202728	Digital camera	Canon, Power Shot SD110, Digital Elph	Canon
BAK071904055817	Keyboard	model 860-DP-PS/2, with HulaPoint mouse	
GEER-08	AirGrav Control Computer		SGL
GRV G2-7	Gravimeter System	Airborne Gravimeter Platform	SGL
MON-01	Monitor LCD 6.4"	model LS64PA30A	
S025966340013	Monitor LCD 6.4"	model LS64PA30A	
STL0507SV10376	Monitor LCD 6.4"	model SV-640-OEM	





**APPENDIX V**





## GEOPHYSICAL SURVEY AIRCRAFT

# Eurocopter AS 350 B3

Registration: C-GSGH  
Serial #: 3748

The AS 350 B3 is a modern high performance light helicopter powered by a turbomeca Arriel 2B turbine engine. It has been outfitted for low level airborne geophysical surveys. Sensors are carried either internally or externally in towed "birds" on a cable. Its endurance is between two and four hours depending on the survey configuration. Its performance and effectiveness has been proven on numerous projects in Canada, Central America, and Africa.



### **SANDER GEOPHYSICS**

260 Hunt Club Road, Ottawa, Ontario K1V 1C1 Canada

Phone: 613-521-9626 Fax: 613-521-0215 E-mail: [info@sgl.com](mailto:info@sgl.com) Website: [www.sgl.com](http://www.sgl.com)

**EXPLORATION**

**RESEARCH**

**INTERPRETATION**

## EUROCOPTER AS 350 B3 SPECIFICATIONS

- Crew Capacity:** • pilot and 1 operator
- General:** • Fuselage comprising of the cabin and 3 luggage holds, cargo tie-down net and access doors. Tail boom with stabilizer, extended anti-torque rotor and fin. High skid landing gear capable of taking handling wheels.
- Systems:** • dual flight controls, 3 main rotor and 1 tail rotor hydraulic servo units  
 • 1 rotor with 3 composite-material blades around a Starflex head  
 • 1 anti-torque rotor with 2 composite-material blades  
 • cargo hook with electric and manual releases
- Power Plant:** • 1 turbomeca Arriel 2B turbine engine rated at 847 shp for take-off and 790 shp for maximum continuous use

**Dimensions:**

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

**Weights:**

Empty .....	3,022 lb .....	1,371 kg
Maximum gross weight .....	4,961 lb .....	2,250 kg
Useful load .....	1,939 lb .....	879 kg
External load gross weight .....	6,173 lb .....	2,800 kg
Maximum external load .....	3,086 lb .....	1,400 kg

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

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

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

## PROVISIONS FOR GEOPHYSICAL SURVEYING

- **VHF communication radios**
- **Iridium satellite telephone**
- **GPS/VOR/ILS navigation equipment**
- **Video camera mount** with downward looking opening
- **Radar altimeter**, 0-750 m
- **Electrical power capacity**, 5.6 kW at 28 VDC; up to 2.8 kW available for equipment
- **Two instrument racks**, standard 48 cm (19 inch) width
- **Provision to mount Inertial Navigation System**
- **Survey GPS antenna mounted on tail fin (clear of rotor) plus data link for real-time corrections**
- **Provision to mount gamma-ray spectrometer** with up to 42 litres (2,560 in<sup>3</sup>) of detector crystals
- **Towed "birds" available:** single magnetometer; dual magnetometer vertical gradient with 1.85 m separation; VLF coils



**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 Web Page: www.sgl.com

Week 1

SURVEY DETAILS							
Survey Name		Quest West		Client Name		Geoscience BC	
Survey Location		British Columbia, CAN		Contact Name		Lyn Anglin	
Project Code		Geosci08.BC		Contact Phone		1 (604) 662-4147 ext 23	
Total Size		25,499.0 km		Client Address		410 - 890 W. Pender St	
Line Spacing		2,000 m by 20,000 m		Vancouver, BC V6C 1J9 Canada			
Aircraft	C-GSGH	Type	GRAV	Email	sglbc@sgl.com		
SURVEY PRODUCTION SUMMARY							
Production km this Week		633.7	km	Total km Flown to Date		633.7	km
Total Remaining		24865.3	km	Total km Reflown this Week		0.0	km
% Complete		2.5	%	Total Flight Time this Week		5.8	hrs
Average km/Day this Week		90.5	km/day	Average km/Flt. Time this Week		109.3	km/hr
WEEKLY PRODUCTION							
Date	Day	Flight No.	Flight Time	No. of Lines Flown	No. Reflight Lines Flown	Production (km)	Reflown (km)
<b>TOTALS</b>			<b>5.8</b>	<b>1.0</b>	<b>0.0</b>	<b>633.7</b>	<b>0.0</b>
<b>5-May</b>	<b>Monday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
<b>Geomag:</b>	Some final packing was done at Prince George, driving with geophysics equipment over to Smithers						
<b>Weather:</b>	on Sunday, leaving behind AME tools and SGL van. Locate office and accommodation at Smithers.						
<b>Remarks:</b>	See Interior Helicopters, take over shed as ground station base, start setting up, rent Toyota Matrix.						
<b>6-May</b>	<b>Tuesday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
<b>Geomag:</b>	n/a						
<b>Weather:</b>	n/a						
<b>Remarks:</b>	Survey preparation. Return Uhaul truck, setting up ground station, antennas, power backup. Dave Money (AME) arrives in Prince George.						
<b>7-May</b>	<b>Wednesday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
<b>Geomag:</b>	n/a						
<b>Weather:</b>	n/a						
<b>Remarks:</b>	Setup outback, start ground station, get some office supplies. Some safety pin missing at SGH. Hao, Owen and Brian arrive at Prince George.						
<b>8-May</b>	<b>Thursday</b>	<b>1</b>	<b>2.3</b>	<b>1.0</b>	<b>0.0</b>	<b>187.0</b>	<b>0.0</b>
<b>Geomag:</b>	n/a						
<b>Weather:</b>	Partially cloudy.						
<b>Remarks:</b>	SGH (Brian and Owen) flies over using partially line 4018 in production. Used first ground station day to locate positions. Van arrives with Dave (AME) and Hao (system specialist). Crew complete at Smithers.						
<b>9-May</b>	<b>Friday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
<b>Geomag:</b>	n/a						
<b>Weather:</b>	n/a						
<b>Remarks:</b>	Concern about fence too close to GPS antennas. Decided to move antennas onto rooftop of hangar. Gravity value successfully transferred from Prince George.						
<b>10-May</b>	<b>Saturday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
<b>Geomag:</b>	n/a						
<b>Weather:</b>	Marginal.						
<b>Remarks:</b>	Statkin test done, result good. Poor weather conditions in the afternoon, no flight.						
<b>11-May</b>	<b>Sunday</b>	<b>2</b>	<b>3.5</b>	<b>0.0</b>	<b>0.0</b>	<b>446.7</b>	<b>0.0</b>
<b>Geomag:</b>	n/a						
<b>Weather:</b>	Poor, cloudy.						
<b>Remarks:</b>	Flight in the afternoon only.						
<b>Comments:</b>	<b>Successful start of survey. Production limited due to weather and some work on ground station setup.</b>						

Signed: Lutz Wendorff

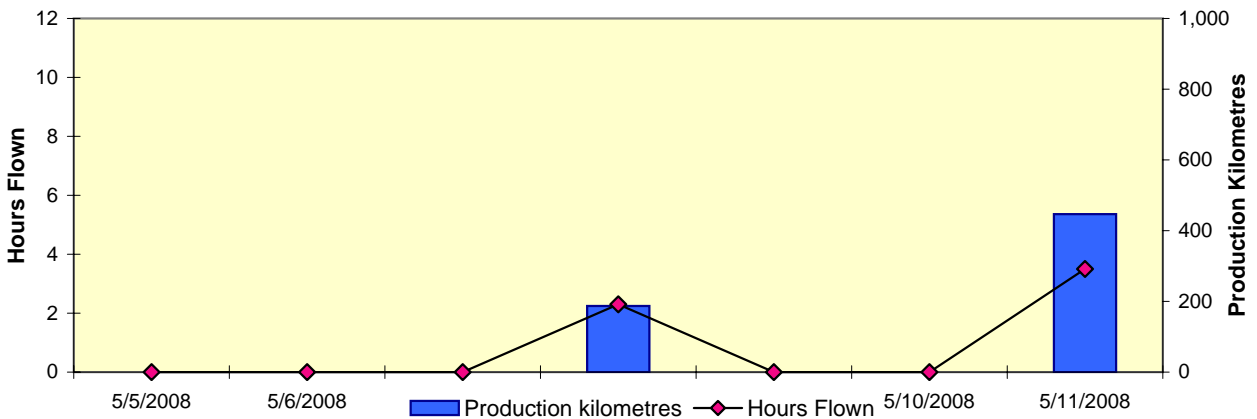
Week Complete?

1

PERSONNEL ON SITE THIS WEEK					
Name	Arrival this Week	Departure this Week	On Site?	# of Days on Site this Week	# of Days on Site to Date
Lutz Wendorff			ON SITE	7	10
Leila Ertolahti			ON SITE	7	10
David Money	6-May		ON SITE	6	6
Hao Liu	8-May		ON SITE	4	4
Brian Simms	8-May		ON SITE	4	4
Owen Peterson	8-May		ON SITE	4	4
Richard Barrette				0	0
Max Buneta				0	0
Simon Worswick				0	0
Brian Simms				0	0
Jay Archer				0	0

HSE Statistics	This Week	Project Totals
SGL Person Hours	240.0	240.0
Inductions	0	0
Near Miss	0	0
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case (RWC)	0	0
Lost Time Injuries (LTI)	0	0

**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 Web Page: www.sgl.com

Week 2

SURVEY DETAILS							
Survey Name		Quest West		Client Name		Geoscience BC	
Survey Location		British Columbia, CAN		Contact Name		Lyn Anglin	
Project Code		Geosci08.BC		Contact Phone		1 (604) 662-4147 ext 23	
Total Size		25,499.0 km		Client Address		410 - 890 W. Pender St	
Line Spacing		2,000 m by 20,000 m		Vancouver, BC V6C 1J9 Canada			
Aircraft	C-GSGH	Type	GRAV	Email	sglbc@sgl.com		
SURVEY PRODUCTION SUMMARY							
Production km this Week		1776.4 km		Total km Flown to Date		2410.2 km	
Total Remaining		23088.8 km		Total km Reflown this Week		0.0 km	
% Complete		9.5 %		Total Flight Time this Week		9.2 hrs	
Average km/Day this Week		253.8 km/day		Average km/Flt. Time this Week		193.1 km/hr	
WEEKLY PRODUCTION							
Date	Day	Flight No.	Flight Time	No. of Lines Flown	No. Reflight Lines Flown	Production (km)	Reflown (km)
<b>TOTALS</b>			<b>9.2</b>	<b>16.0</b>	<b>0.0</b>	<b>1,776.4</b>	<b>0.0</b>
<b>12-May</b>	<b>Monday</b>	<b>3</b>	<b>3.9</b>	<b>8.0</b>	<b>0.0</b>	<b>902.7</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Scattered clouds.						
Remarks:	Production flight.						
<b>13-May</b>	<b>Tuesday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Low overcast.						
Remarks:	No production due to weather.						
<b>14-May</b>	<b>Wednesday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Low overcast.						
Remarks:	No production due to weather.						
<b>15-May</b>	<b>Thursday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Poor in the morning, clearing in the afternoon.						
Remarks:	No production due to weather. GPS card awaiting replacement.						
<b>16-May</b>	<b>Friday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Sunny.						
Remarks:	No production. Waiting for replacement GPS card.						
<b>17-May</b>	<b>Saturday</b>	<b>4</b>	<b>3.4</b>	<b>4.0</b>	<b>0.0</b>	<b>427.3</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Sunny.						
Remarks:	GPS card replaced, production flight.						
<b>18-May</b>	<b>Sunday</b>	<b>5</b>	<b>1.9</b>	<b>4.0</b>	<b>0.0</b>	<b>446.4</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Sunny.						
Remarks:	Production flight.						
Comments:	Weather and a faulty GPS card limited the number of production flights this week.						

Signed: L. Wendorff

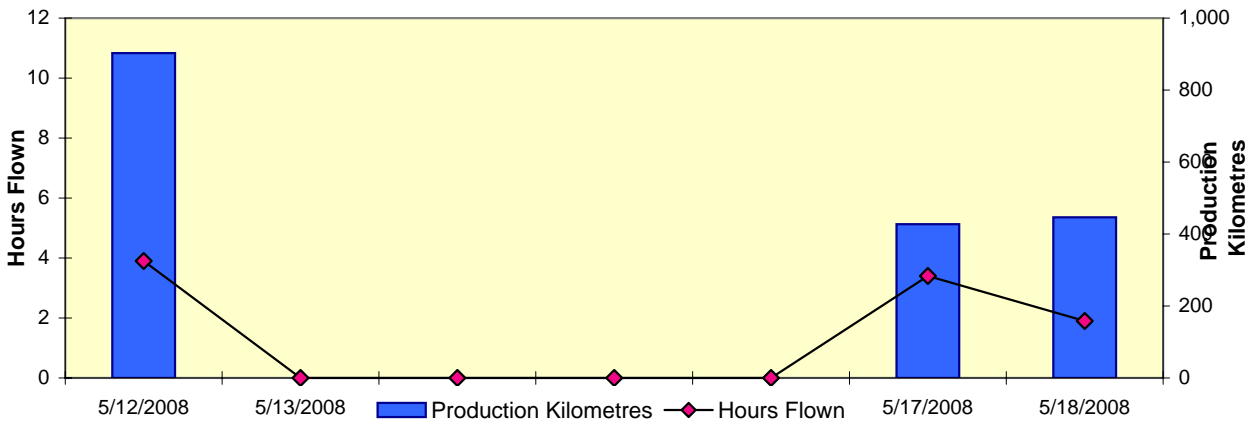
Week Complete?

1

PERSONNEL ON SITE THIS WEEK					
Name	Arrival this Week	Departure this Week	On Site?	# of Days on Site this Week	# of Days on Site to Date
Lutz Wendorff			ON SITE	7	17
Leila Ertolahti			ON SITE	7	17
David Money		12-May	ON SITE	1	7
Hao Liu			ON SITE	7	11
Brian Simms			ON SITE	7	11
Owen Peterson			ON SITE	7	11
Richard Barrette				0	0
Max Buneta				0	0
Simon Worswick				0	0
Brian Simms				0	0
Jay Archer				0	0

HSE Statistics	This Week	Project Totals
SGL Person Hours	270.0	510.0
Inductions	0	0
Near Miss	0	0
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case (RWC)	0	0
Lost Time Injuries (LTI)	0	0

**WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN**





# SANDER GEOPHYSICS AIRBORNE GEOPHYSICAL SURVEY

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Week 3

SURVEY DETAILS							
Survey Name		Quest West		Client Name		Geoscience BC	
Survey Location		British Columbia, CAN		Contact Name		Lyn Anglin	
Project Code		Geosci08.BC		Contact Phone		1 (604) 662-4147 ext 23	
Total Size		25,499.0 km		Client Address		410 - 890 W. Pender St	
Line Spacing		2,000 m by 20,000 m		Vancouver, BC V6C 1J9 Canada			
Aircraft	C-GSGH	Type	GRAV	Email	sglbc@sgl.com		
SURVEY PRODUCTION SUMMARY							
Production km this Week		3506.6 km		Total km Flown to Date		5916.8 km	
Total Remaining		19582.2 km		Total km Reflown this Week		62.9 km	
% Complete		23.2 %		Total Flight Time this Week		32.8 hrs	
Average km/Day this Week		500.9 km/day		Average km/Flt. Time this Week		106.9 km/hr	
WEEKLY PRODUCTION							
Date	Day	Flight No.	Flight Time	No. of Lines Flown	No. Reflight Lines Flown	Production (km)	Reflown (km)
<b>TOTALS</b>			<b>32.8</b>	<b>28.0</b>	<b>0.0</b>	<b>3,506.6</b>	<b>62.9</b>
<b>19-May</b>	<b>Monday</b>	<b>6</b>	<b>2.4</b>	<b>3.0</b>	<b>0.0</b>	<b>149.6</b>	<b>35.6</b>
Geomag:	n/a						
Weather:	Cloud cover, incoming rain.						
Remarks:	A short accidental reflight. Gravimeter acquisition computer crashed, early return. No other flight due to weather.						
<b>20-May</b>	<b>Tuesday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:							
Remarks:	Data acquisition computer failed. Replacement on its way.						
<b>21-May</b>	<b>Wednesday</b>	<b>7</b>	<b>1.9</b>	<b>1.0</b>	<b>0.0</b>	<b>104.4</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Low cloud in the morning, partly cloudy in the afternoon.						
Remarks:	Acquisition computer crashed. CPU card replaced.						
<b>22-May</b>	<b>Thursday</b>	<b>8</b>	<b>5.8</b>	<b>6.0</b>	<b>0.0</b>	<b>683.8</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Sunny, some clouds.						
Remarks:	Production flight.						
<b>23-May</b>	<b>Friday</b>	<b>9</b>	<b>7.1</b>	<b>10.0</b>	<b>0.0</b>	<b>796.6</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Low cloud in the morning, partly cloudy in the afternoon.						
Remarks:	Gravimeter acquisition computer replaced, production flight.						
<b>24-May</b>	<b>Saturday</b>	<b>10</b>	<b>6.9</b>	<b>8.0</b>	<b>0.0</b>	<b>857.3</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Sunny, some clouds.						
Remarks:	Production flight.						
<b>25-May</b>	<b>Sunday</b>	<b>11</b>	<b>8.7</b>	<b>0.0</b>	<b>0.0</b>	<b>914.9</b>	<b>27.3</b>
Geomag:	n/a						
Weather:	Sunny, some clouds.						
Remarks:	Production flight. Short reflight accidentally.						
Comments:	Problems with the gravity data acquisition computer reduced productivity. The cause could not be found and the computer was replaced with good productivity since.						

Signed: L. Wendorff, Crew Chief

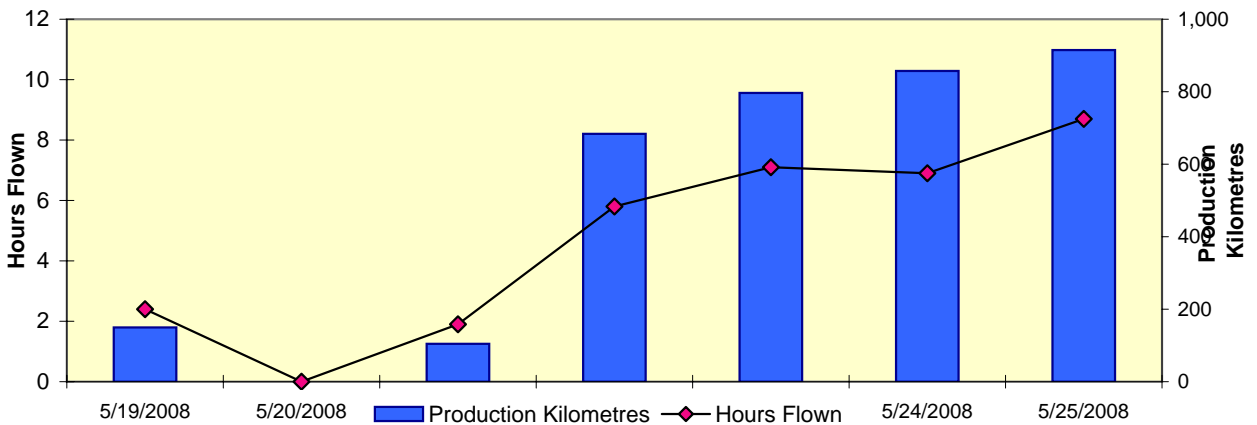
Week Complete?

1

PERSONNEL ON SITE THIS WEEK					
Name	Arrival this Week	Departure this Week	On Site?	# of Days on Site this Week	# of Days on Site to Date
Lutz Wendorff			ON SITE	7	24
Leila Ertolahti			ON SITE	7	24
David Money				0	7
Hao Liu			ON SITE	7	18
Brian Simms			ON SITE	7	18
Owen Peterson			ON SITE	7	18
Richard Barrette				0	0
Max Buneta				0	0
Simon Worswick				0	0
Brian Simms				0	0
Jay Archer				0	0

HSE Statistics	This Week	Project Totals
SGL Person Hours	262.5	772.5
Inductions	0	0
Near Miss	0	0
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case (RWC)	0	0
Lost Time Injuries (LTI)	0	0

**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 Web Page: www.sgl.com

Week 4

SURVEY DETAILS							
Survey Name		Quest West		Client Name		Geoscience BC	
Survey Location		British Columbia, CAN		Contact Name		Lyn Anglin	
Project Code		Geosci08.BC		Contact Phone		1 (604) 662-4147 ext 23	
Total Size		25,499.0 km		Client Address		410 - 890 W. Pender St	
Line Spacing		2,000 m by 20,000 m		Vancouver, BC V6C 1J9 Canada			
Aircraft	C-GSGH	Type	GRAV	Email	sglbc@sgl.com		
SURVEY PRODUCTION SUMMARY							
Production km this Week		3675.8 km		Total km Flown to Date		9592.6 km	
Total Remaining		15906.4 km		Total km Reflown this Week		0.0 km	
% Complete		37.6 %		Total Flight Time this Week		30.2 hrs	
Average km/Day this Week		525.1 km/day		Average km/Ft. Time this Week		121.7 km/hr	
WEEKLY PRODUCTION							
Date	Day	Flight No.	Flight Time	No. of Lines Flown	No. Reflight Lines Flown	Production (km)	Reflown (km)
<b>TOTALS</b>			<b>30.2</b>	<b>0.0</b>	<b>0.0</b>	<b>3,675.8</b>	<b>0.0</b>
<b>26-May</b>	<b>Monday</b>	<b>12</b>	<b>6.3</b>	<b>0.0</b>	<b>0.0</b>	<b>769.4</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Partly cloudy.						
Remarks:	Production flight.						
<b>27-May</b>	<b>Tuesday</b>	<b>13</b>	<b>3.6</b>	<b>0.0</b>	<b>0.0</b>	<b>411.9</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Partly cloudy.						
Remarks:	Production flight.						
<b>28-May</b>	<b>Wednesday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Low overcast and rain.						
Remarks:	No flight due to weather.						
<b>29-May</b>	<b>Thursday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Low overcast and rain.						
Remarks:	No flight due to weather.						
<b>30-May</b>	<b>Friday</b>	<b>14</b>	<b>7.5</b>	<b>0.0</b>	<b>0.0</b>	<b>957.4</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Low cloud in the morning, partly cloudy.						
Remarks:	Production flight.						
<b>31-May</b>	<b>Saturday</b>	<b>15/16</b>	<b>5.8</b>	<b>0.0</b>	<b>0.0</b>	<b>664.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Sunny, some clouds.						
Remarks:	Production flight.						
<b>1-Jun</b>	<b>Sunday</b>	<b>17</b>	<b>7.0</b>	<b>0.0</b>	<b>0.0</b>	<b>873.2</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Sunny.						
Remarks:	Production flight.						
Comments:	Weather hampered production mid-week. Brian Simms departed and Richard Barrette arrived Smithers Monday May 26. Hao Liu departed Smithers Tuesday May 27. Max Buneta arrived in Smithers Sunday June 1st.						

Signed: Lutz Wendorff, Crew Chief

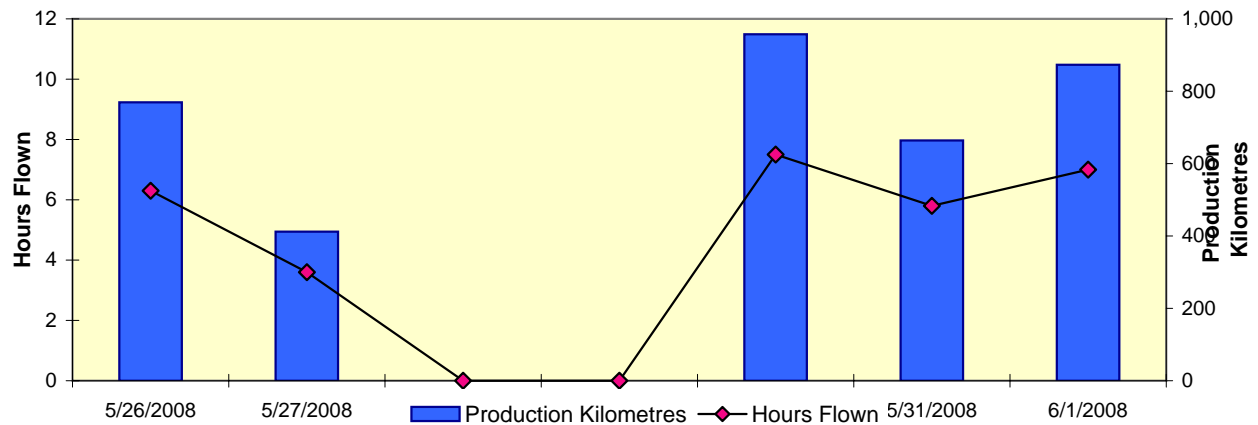
Week Complete?

1

PERSONNEL ON SITE THIS WEEK					
Name	Arrival this Week	Departure this Week	On Site?	# of Days on Site this Week	# of Days on Site to Date
Lutz Wendorff			ON SITE	7	31
Leila Ertolahti			ON SITE	7	31
David Money				0	7
Hao Liu		27-May	ON SITE	2	20
Brian Simms		26-May	ON SITE	1	19
Owen Peterson			ON SITE	7	25
Richard Barrette	26-May		ON SITE	7	7
Max Buneta	1-Jun		ON SITE	1	1
Simon Worswick				0	0
Brian Simms				0	0
Jay Archer				0	0

HSE Statistics	This Week	Project Totals
SGL Person Hours	240.0	1012.5
Inductions	0	0
Near Miss	0	0
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case (RWC)	0	0
Lost Time Injuries (LTI)	0	0

**WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN**





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

Week 5

SURVEY DETAILS							
Survey Name		Quest West		Client Name		Geoscience BC	
Survey Location		British Columbia, CAN		Contact Name		Lyn Anglin	
Project Code		Geosci08.BC		Contact Phone		1 (604) 662-4147 ext 23	
Total Size		25,499.0 km		Client Address		410 - 890 W. Pender St	
Line Spacing		2,000 m by 20,000 m		Vancouver, BC V6C 1J9 Canada			
Aircraft	C-GSGH	Type	GRAV	Email	sglbc@sgl.com		
SURVEY PRODUCTION SUMMARY							
Production km this Week		3271.3 km		Total km Flown to Date		12863.9 km	
Total Remaining		12635.1 km		Total km Reflown this Week		0.0 km	
% Complete		50.4 %		Total Flight Time this Week		27.4 hrs	
Average km/Day this Week		467.3 km/day		Average km/Flt. Time this Week		119.4 km/hr	
WEEKLY PRODUCTION							
Date	Day	Flight No.	Flight Time	No. of Lines Flown	No. Reflight Lines Flown	Production km	Reflown km
<b>TOTALS</b>			<b>27.4</b>	<b>28.0</b>	<b>0.0</b>	<b>3,271.3</b>	<b>0.0</b>
<b>2-Jun</b>	<b>Monday</b>	<b>18</b>	<b>6.9</b>	<b>7.0</b>	<b>0.0</b>	<b>845.6</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Partly cloudy.						
Remarks:	Production flight.						
<b>3-Jun</b>	<b>Tuesday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	n/a						
Remarks:	No flight due to weather.						
<b>4-Jun</b>	<b>Wednesday</b>	<b>19</b>	<b>7.0</b>	<b>8.0</b>	<b>0.0</b>	<b>894.2</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Partly cloudy.						
Remarks:	Production flight. Partial power failure in ground station hut in previous night.						
<b>5-Jun</b>	<b>Thursday</b>	<b>20</b>	<b>0.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Cloudy and precipitation at many places.						
Remarks:	Flight aborted due to weather.						
<b>6-Jun</b>	<b>Friday</b>	<b>21</b>	<b>5.5</b>	<b>5.0</b>	<b>0.0</b>	<b>630.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Partly cloudy.						
Remarks:	Some power glitch over night at SGH. Start of production flight delayed.						
<b>7-Jun</b>	<b>Saturday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Low cloud cover.						
Remarks:	No flight due to weather. Power failure over night from outback.						
<b>8-Jun</b>	<b>Sunday</b>	<b>22</b>	<b>7.2</b>	<b>8.0</b>	<b>0.0</b>	<b>901.4</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Cloudy.						
Remarks:	Production flight.						
Comments:	<p>Leila Ertolahti departed Tuesday June 3.            Weather reduced productivity.            Some power problems at outback (a camper accessed same power source at hangar and tripped fuse and connection at outback outlet was not secured).</p>						

Signed: Lutz Wendorff

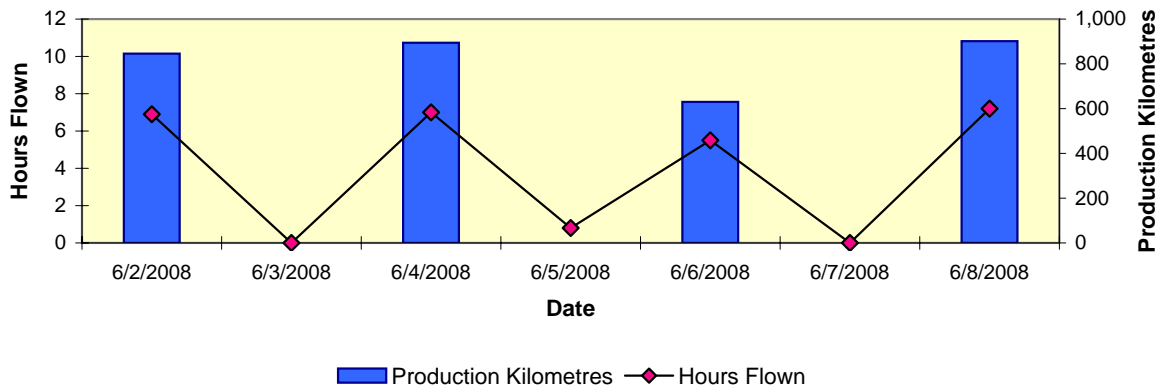
Week Complete?

1

PERSONNEL ON SITE THIS WEEK					
Name	Arrival this Week	Departure this Week	On Site?	# of Days on Site this Week	# of Days on Site to Date
Lutz Wendorff			ON SITE	7	38
Leila Ertolahti		3-Jun	ON SITE	2	33
David Money				0	7
Hao Liu				0	20
Brian Simms				0	19
Owen Peterson			ON SITE	7	32
Richard Barrette			ON SITE	7	14
Max Buneta			ON SITE	7	8
Simon Worswick	3-Jun		ON SITE	6	6
Brian Simms				0	0
Jay Archer				0	0

HSE Statistics	This Week	Project Totals
SGL Person Hours	270.0	1282.5
Inductions	0	0
Near Miss	0	0
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case (RWC)	0	0
Lost Time Injuries (LTI)	0	0

**WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN**







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Week 6

SURVEY DETAILS							
Survey Name		Quest West		Client Name		Geoscience BC	
Survey Location		British Columbia, CAN		Contact Name		Lyn Anglin	
Project Code		Geosci08.BC		Contact Phone		1 (604) 662-4147 ext 23	
Total Size		25,499.0 km		Client Address		410 - 890 W. Pender St	
Line Spacing		2,000 m by 20,000 m		Vancouver, BC V6C 1J9 Canada			
Aircraft	C-GSGH	Type	GRAV	Email	sglbc@sgl.com		
SURVEY PRODUCTION SUMMARY							
Production km this Week		2547.9 km		Total km Flown to Date		15411.7 km	
Total Remaining		10087.3 km		Total km Reflown this Week		0.0 km	
% Complete		60.4 %		Total Flight Time this Week		22.6 hrs	
Average km/Day this Week		364.0 km/day		Average km/Ft. Time this Week		112.7 km/hr	
WEEKLY PRODUCTION							
Date	Day	Flight No.	Flight Time	No. of Lines Flown	No. Reflight Lines Flown	Production km	Reflown km
<b>TOTALS</b>			<b>22.6</b>	<b>42.0</b>	<b>0.0</b>	<b>2,547.9</b>	<b>0.0</b>
9-Jun	Monday	0	0.0	0.0	0.0	0.0	0.0
Geomag:		n/a					
Weather:		Low cloud cover.					
Remarks:		No flight due to weather.					
10-Jun	Tuesday	23	7.4	23.0	0.0	825.6	0.0
Geomag:		n/a					
Weather:		Partially cloudy with precipitation.					
Remarks:		Lake areas flown with floats attached.					
11-Jun	Wednesday	24	7.2	13.0	0.0	835.7	0.0
Geomag:		n/a					
Weather:		Partially cloudy.					
Remarks:		More lake areas flown with floats attached.					
12-Jun	Thursday	0	0.0	0.0	0.0	0.0	0.0
Geomag:		n/a					
Weather:		Low cloud cover and precipitation.					
Remarks:		No flight due to weather.					
13-Jun	Friday	0	0.0	0.0	0.0	0.0	0.0
Geomag:		n/a					
Weather:		Low cloud cover and precipitation.					
Remarks:		No flight due to weather.					
14-Jun	Saturday	25	7.0	6.0	0.0	886.5	0.0
Geomag:		n/a					
Weather:							
Remarks:							
15-Jun	Sunday		1.0	0.0	0.0	0.0	0.0
Geomag:		n/a					
Weather:		Low cloud cover.					
Remarks:		No production due to weather. Training flight done.					
Comments:		Bad weather reduced the productivity considerably. Larger lake areas were flown with floats attached to the helicopter. AME Simon Worswick left on Saturday. Lutz will leave coming Tuesday, Max Buneta takes over as party chief. Jay Archer arrived on Sunday to support Max as geophysicist. Brian Simms arrived on Sunday and will be captain pilot. Richard Barrette will leave on Monday.					

Signed: Lutz Wendorff

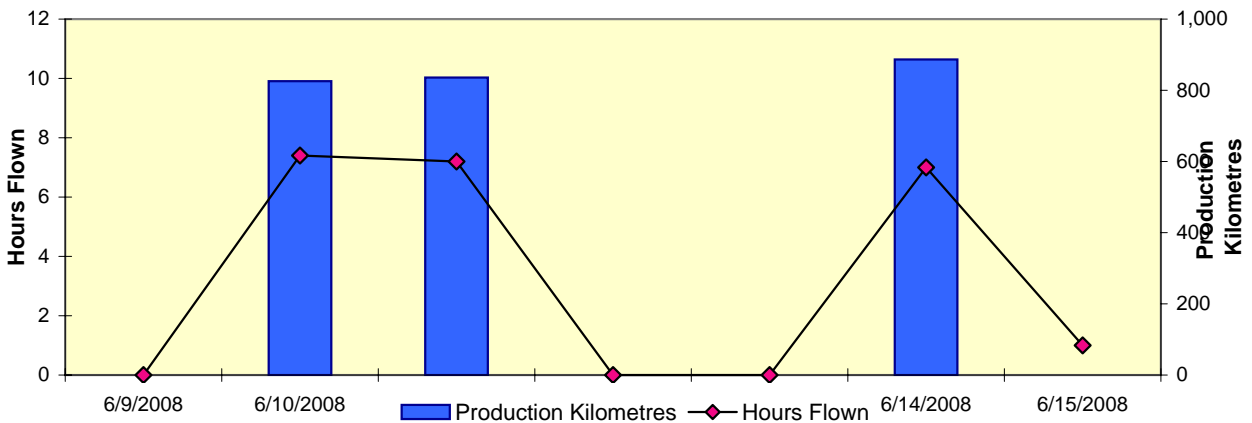
Week Complete?

1

PERSONNEL ON SITE THIS WEEK					
Name	Arrival this Week	Departure this Week	On Site?	# of Days on Site this Week	# of Days on Site to Date
Lutz Wendorff			ON SITE	7	45
Leila Ertolahti				0	33
David Money				0	7
Hao Liu				0	20
Brian Simms				0	19
Owen Peterson			ON SITE	7	39
Richard Barrette			ON SITE	7	21
Max Buneta			ON SITE	7	15
Simon Worswick		14-Jun	ON SITE	6	12
Brian Simms	15-Jun		ON SITE	1	1
Jay Archer	15-Jun		ON SITE	1	1

HSE Statistics	This Week	Project Totals
SGL Person Hours	270.0	1552.5
Inductions	0	0
Near Miss	0	0
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case (RWC)	0	0
Lost Time Injuries (LTI)	0	0

**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 Web Page: www.sgl.com

Week 7

SURVEY DETAILS							
Survey Name		Quest West		Client Name		Geoscience BC	
Survey Location		British Columbia, CAN		Contact Name		Lyn Anglin	
Project Code		Geosci08.BC		Contact Phone		1 (604) 662-4147 ext 23	
Total Size		25,499.0 km		Client Address		410 - 890 W. Pender St	
Line Spacing		2,000 m by 20,000 m		Vancouver, BC V6C 1J9 Canada			
Aircraft	C-GSGH	Type	GRAV	Email	sglbc@sgl.com		
SURVEY PRODUCTION SUMMARY							
Production km this Week		4986.8 km		Total km Flown to Date		20398.6 km	
Total Remaining		5100.4 km		Total km Reflown this Week		0.0 km	
% Complete		80.0 %		Total Flight Time this Week		44.6 hrs	
Average km/Day this Week		712.4 km/day		Average km/Flt. Time this Week		111.8 km/hr	
WEEKLY PRODUCTION							
Date	Day	Flight No.	Flight Time	No. of Lines Flown	No. Reflight Lines Flown	Production km	Reflown km
<b>TOTALS</b>			<b>44.6</b>	<b>63.0</b>	<b>0.0</b>	<b>4,986.8</b>	<b>0.0</b>
16-Jun	Monday	26	6.1	7.0	0.0	698.6	0.0
Geomag:	n/a						
Weather:	Low overcast with precipitation, partly cloudy in SE of survey area						
Remarks:	Production flight in S and SE part of block. An extension to the survey along the western edge has been approved (Block 3).						
17-Jun	Tuesday	27	6.8	9.0	0.0	706.3	0.0
Geomag:	n/a						
Weather:	Overcast with precipitation						
Remarks:	Production flight in S and SE part of block.						
18-Jun	Wednesday	28	7.4	8.0	0.0	868.7	0.0
Geomag:	n/a						
Weather:	Partly cloudy						
Remarks:	Production flight in S and SE part of block.						
19-Jun	Thursday	29	6.4	14.0	0.0	658.5	0.0
Geomag:	n/a						
Weather:	Clear morning, changing to overcast with precipitation towards the evening.						
Remarks:	Production flight flown in the western part of the survey area.						
20-Jun	Friday	30	7.0	11.0	0.0	776.6	0.0
Geomag:	n/a						
Weather:	High overcast, some precipitation in afternoon						
Remarks:	Production flight in the NE part of the survey area.						
21-Jun	Saturday	31	3.7	5.0	0.0	456.9	0.0
Geomag:	n/a						
Weather:	Low overcast with rain at times						
Remarks:	Production flight in the E part of the survey area						
22-Jun	Sunday	32	7.2	9.0	0.0	821.2	0.0
Geomag:	n/a						
Weather:	Partly cloudy in the morning, slowly clearing throughout the day						
Remarks:	Production flight in the E part of the survey area						
Comments:	The total survey size has been updated to reflect the new survey extension (an increase from 23,117km to 25,499km). Very good production this week, with most of the flying being done in the east.						

Signed: Max Buneta

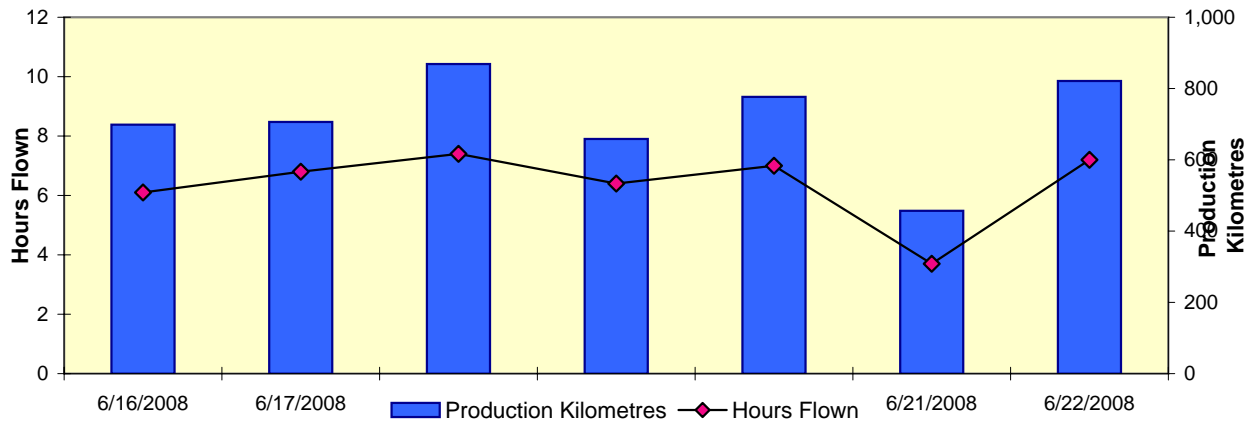
Week Complete?

1

PERSONNEL ON SITE THIS WEEK					
Name	Arrival this Week	Departure this Week	On Site?	# of Days on Site this Week	# of Days on Site to Date
Lutz Wendorff		17-Jun	ON SITE	2	47
Leila Ertolahti				0	33
David Money				0	7
Hao Liu				0	20
Brian Simms				0	19
Owen Peterson			ON SITE	7	46
Richard Barrette		16-Jun	ON SITE	1	22
Max Buneta			ON SITE	7	22
Simon Worswick				0	12
Brian Simms			ON SITE	7	8
Jay Archer			ON SITE	7	8

HSE Statistics	This Week	Project Totals
SGL Person Hours	232.5	1785.0
Inductions	0	0
Near Miss	0	0
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case (RWC)	0	0
Lost Time Injuries (LTI)	0	0

**WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN**





# SANDER GEOPHYSICS AIRBORNE GEOPHYSICAL SURVEY

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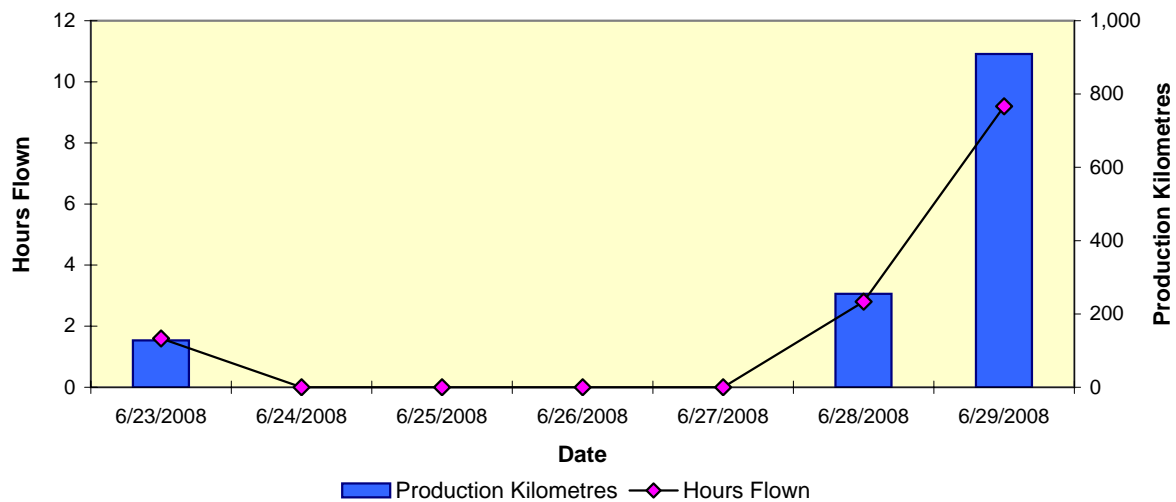
Week 8

SURVEY DETAILS							
Survey Name		Quest West		Client Name		Geoscience BC	
Survey Location		British Columbia, CAN		Contact Name		Lyn Anglin	
Project Code		Geosci08.BC		Contact Phone		1 (604) 662-4147 ext 23	
Total Size		25,499.0 km		Client Address		410 - 890 W. Pender St	
Line Spacing		2,000 m by 20,000 m		Vancouver, BC V6C 1J9 Canada			
Aircraft	C-GSGH	Type	GRAV	Email	sglbc@sgl.com		
SURVEY PRODUCTION SUMMARY							
Production km this Week		1292.2 km		Total km Flown to Date		21690.8 km	
Total Remaining		3808.2 km		Total km Reflown this Week		0.0 km	
% Complete		85.1 %		Total Flight Time this Week		13.6 hrs	
Average km/Day this Week		184.6 km/day		Average km/Flt. Time this Week		95.0 km/hr	
WEEKLY PRODUCTION							
Date	Day	Flight No.	Flight Time	No. of Lines Flown	No. Reflight Lines Flown	Production km	Reflown km
<b>TOTALS</b>			<b>13.6</b>	<b>29.0</b>	<b>0.0</b>	<b>1,292.2</b>	<b>0.0</b>
<b>23-Jun</b>	<b>Monday</b>	<b>33</b>	<b>1.6</b>	<b>2.0</b>	<b>0.0</b>	<b>127.7</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	High overcast in morning, turning to heavy low overcast later in the day.						
Remarks:	Short production flight performed in NE. Aircraft had to return early due to weather.						
<b>24-Jun</b>	<b>Tuesday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Low overcast and rain						
Remarks:	No flight due to weather.						
<b>25-Jun</b>	<b>Wednesday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Low overcast and rain						
Remarks:	Oil sample analysis and regular instrument checks indicate a potential problem with the helicopter's powertrain. Helicopter momentarily grounded. Head office informed.						
<b>26-Jun</b>	<b>Thursday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Low overcast and rain						
Remarks:	Simon Worswick (maintenance engineer) arrives.						
<b>27-Jun</b>	<b>Friday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Overcast, rain in afternoon						
Remarks:	Maintenance checks performed on the helicopter, and it is cleared to resume flying.						
<b>28-Jun</b>	<b>Saturday</b>	<b>34</b>	<b>2.8</b>	<b>4.0</b>	<b>0.0</b>	<b>255.1</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Low overcast in the morning, slowly clearing towards the afternoon						
Remarks:	Production flight performed to the north.						
<b>29-Jun</b>	<b>Sunday</b>	<b>35</b>	<b>9.2</b>	<b>23.0</b>	<b>0.0</b>	<b>909.4</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Clear skies						
Remarks:	Production flight in the west						
Comments:	A maintenance issue arose with the helicopter that required an immediate inspection. The helicopter was grounded for three days as a result. Poor weather would have prevented the crew from flying during this period anyways. We returned to production by the weekend, with the maintenance issue resolved on Friday and weather clearing by Saturday afternoon.						

PERSONNEL ON SITE THIS WEEK					
Name	Arrival this Week	Departure this Week	On Site?	# of Days on Site this Week	# of Days on Site to Date
Lutz Wendorff				0	47
Leila Ertolahti				0	33
David Money				0	7
Hao Liu				0	20
Brian Simms				0	19
Owen Peterson			ON SITE	7	53
Richard Barrette				0	22
Max Buneta			ON SITE	7	29
Simon Worswick				0	12
Brian Simms			ON SITE	7	15
Jay Archer			ON SITE	7	15
Simon Worswick	26-Jun		ON SITE	4	4

HSE Statistics	This Week	Project Totals
SGL Person Hours	240.0	2025.0
Inductions	0	0
Near Miss	0	0
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case (RWC)	0	0
Lost Time Injuries (LTI)	0	0

**WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN**





# SANDER GEOPHYSICS AIRBORNE GEOPHYSICAL SURVEY

60 Hunt Club Road, Ottawa, ON K1V 1C1 Canada Tel: +1 (613) 521-9626 Fax: +1 (613) 521-0215 Web Page: www.sgl.com

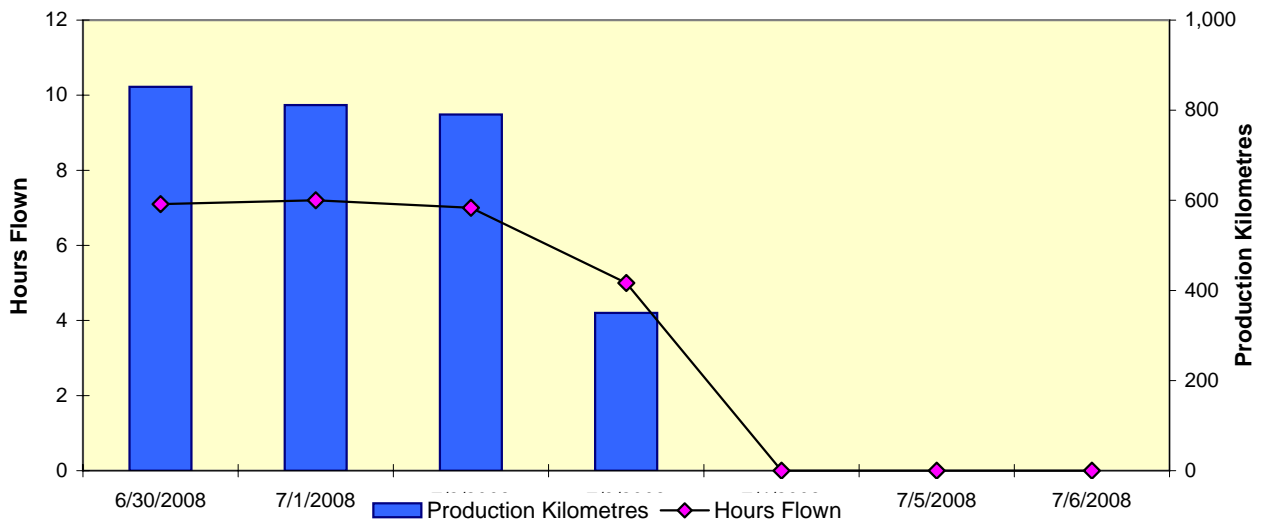
Week 9

SURVEY DETAILS							
Survey Name		Quest West		Client Name		Geoscience BC	
Survey Location		British Columbia, CAN		Contact Name		Lyn Anglin	
Project Code		Geosci08.BC		Contact Phone		1 (604) 662-4147 ext 23	
Total Size		25,499.0 km		Client Address		410 - 890 W. Pender St	
Line Spacing		2,000 m by 20,000 m		Vancouver, BC V6C 1J9 Canada			
Aircraft	C-GSGH	Type	GRAV	Email	sglbc@sgl.com		
SURVEY PRODUCTION SUMMARY							
Production km this Week		2804.1 km		Total km Flown to Date		24494.9 km	
Total Remaining		1004.1 km		Total km Reflown this Week		80.3 km	
% Complete		96.1 %		Total Flight Time this Week		26.3 hrs	
Average km/Day this Week		400.6 km/day		Average km/Flt. Time this Week		106.6 km/hr	
WEEKLY PRODUCTION							
Date	Day	Flight No.	Flight Time	No. of Lines Flown	No. Reflight Lines Flown	Production km	Reflown km
<b>TOTALS</b>			<b>26.3</b>	<b>27.0</b>	<b>2.0</b>	<b>2,804.1</b>	<b>80.3</b>
<b>30-Jun</b>	<b>Monday</b>	<b>36</b>	<b>7.1</b>	<b>7.0</b>	<b>0.0</b>	<b>852.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Clear and warm.						
Remarks:	Production flight in the west						
<b>1-Jul</b>	<b>Tuesday</b>	<b>37</b>	<b>7.2</b>	<b>8.0</b>	<b>0.0</b>	<b>811.6</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Clear and warm, thunderstorms in the evening.						
Remarks:	Production flight in the southwest.						
<b>2-Jul</b>	<b>Wednesday</b>	<b>38</b>	<b>7.0</b>	<b>8.0</b>	<b>0.0</b>	<b>790.5</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Clear and warm, cumulus buildup and rain in the evening						
Remarks:	Production flight in the southwest.						
<b>3-Jul</b>	<b>Thursday</b>	<b>39</b>	<b>5.0</b>	<b>4.0</b>	<b>2.0</b>	<b>350.0</b>	<b>80.3</b>
Geomag:	n/a						
Weather:	High overcast, changing to low overcast and rain towards the afternoon						
Remarks:	Production flight in the southwest, and two reflight line segments in the east.						
<b>4-Jul</b>	<b>Friday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Low overcast and rain						
Remarks:	No production due to unfavorable weather conditions. Maintenance performed on the helicopter						
<b>5-Jul</b>	<b>Saturday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Low overcast and rain						
Remarks:	No production due to unfavorable weather conditions.						
<b>6-Jul</b>	<b>Sunday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Low overcast and rain						
Remarks:	No production due to unfavorable weather conditions. Simon Worswick departs.						
Comments:	Production was hampered by poor weather for the second half of the week. All helicopter maintenance work has been completed, and Simon Worswick has returned to Ottawa.						

PERSONNEL ON SITE THIS WEEK					
Name	Arrival this Week	Departure this Week	On Site?	# of Days on Site this Week	# of Days on Site to Date
Lutz Wendorff				0	47
Leila Ertolahti				0	33
David Money				0	7
Hao Liu				0	20
Brian Simms				0	19
Owen Peterson			ON SITE	7	60
Richard Barrette				0	22
Max Buneta			ON SITE	7	36
Simon Worswick				0	12
Brian Simms			ON SITE	7	22
Jay Archer			ON SITE	7	22
Simon Worswick		6-Jul	ON SITE	7	11

HSE Statistics	This Week	Project Totals
SGL Person Hours	262.5	2287.5
Inductions	0	0
Near Miss	0	0
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case (RWC)	0	0
Lost Time Injuries (LTI)	0	0

**WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN**







# SANDER GEOPHYSICS AIRBORNE GEOPHYSICAL SURVEY

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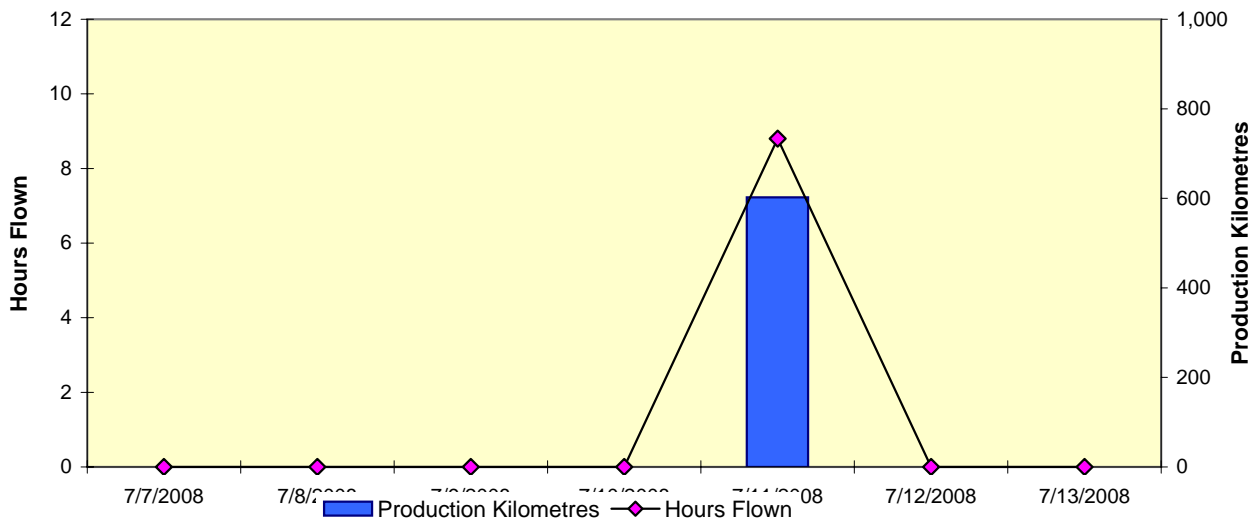
Week 10

SURVEY DETAILS							
Survey Name		Quest West		Client Name		Geoscience BC	
Survey Location		British Columbia, CAN		Contact Name		Lyn Anglin	
Project Code		Geosci08.BC		Contact Phone		1 (604) 662-4147 ext 23	
Total Size		25,499.0 km		Client Address		410 - 890 W. Pender St	
Line Spacing		2,000 m by 20,000 m		Vancouver, BC V6C 1J9 Canada			
Aircraft	C-GSGH	Type	GRAV	Email	sglbc@sgl.com		
SURVEY PRODUCTION SUMMARY							
Production km this Week		602.3 km		Total km Flown to Date		25097.2 km	
Total Remaining		401.8 km		Total km Reflown this Week		0.0 km	
% Complete		98.4 %		Total Flight Time this Week		8.8 hrs	
Average km/Day this Week		86.0 km/day		Average km/Flt. Time this Week		68.4 km/hr	
WEEKLY PRODUCTION							
Date	Day	Flight No.	Flight Time	No. of Lines Flown	No. Reflight Lines Flown	Production km	Reflown km
<b>TOTALS</b>			<b>8.8</b>	<b>16.0</b>	<b>0.0</b>	<b>602.3</b>	<b>0.0</b>
7-Jul	Monday	0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a						
Weather:	Low overcast and rain						
Remarks:							
8-Jul	Tuesday	0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a						
Weather:	Low overcast and rain						
Remarks:							
9-Jul	Wednesday	0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a						
Weather:	Low overcast and rain						
Remarks:							
10-Jul	Thursday	0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a						
Weather:	Low overcast, slowly clearing towards the evening						
Remarks:							
11-Jul	Friday	40	8.8	16.0	0.0	602.3	0.0
Geomag:	n/a						
Weather:	Partly cloudy in the morning, changing to high overcast towards the evening						
Remarks:	Production flight in SW part of the block.						
12-Jul	Saturday	0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a						
Weather:	Overcast and rain.						
Remarks:							
13-Jul	Sunday	0	0.0	0.0	0.0	0.0	0.0
Geomag:	n/a						
Weather:	Overcast and rain.						
Remarks:							
Comments:	Unfavorable weather conditions hampered production this week. One flight was performed in the SW part of the block. All of the remaining survey lines are situated in steep, mountainous terrain to the southwest. Cloud cover in this region can be a problem, even when weather would be acceptable for flying elsewhere.						

PERSONNEL ON SITE THIS WEEK					
Name	Arrival this Week	Departure this Week	On Site?	# of Days on Site this Week	# of Days on Site to Date
Lutz Wendorff				0	47
Leila Ertolahti				0	33
David Money				0	7
Hao Liu				0	20
Brian Simms				0	19
Owen Peterson			ON SITE	7	67
Richard Barrette				0	22
Max Buneta			ON SITE	7	43
Simon Worswick				0	12
Brian Simms			ON SITE	7	29
Jay Archer			ON SITE	7	29
Simon Worswick				0	11

HSE Statistics	This Week	Project Totals
SGL Person Hours	210.0	2497.5
Inductions	0	0
Near Miss	0	0
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case (RWC)	0	0
Lost Time Injuries (LTI)	0	0

**WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN**





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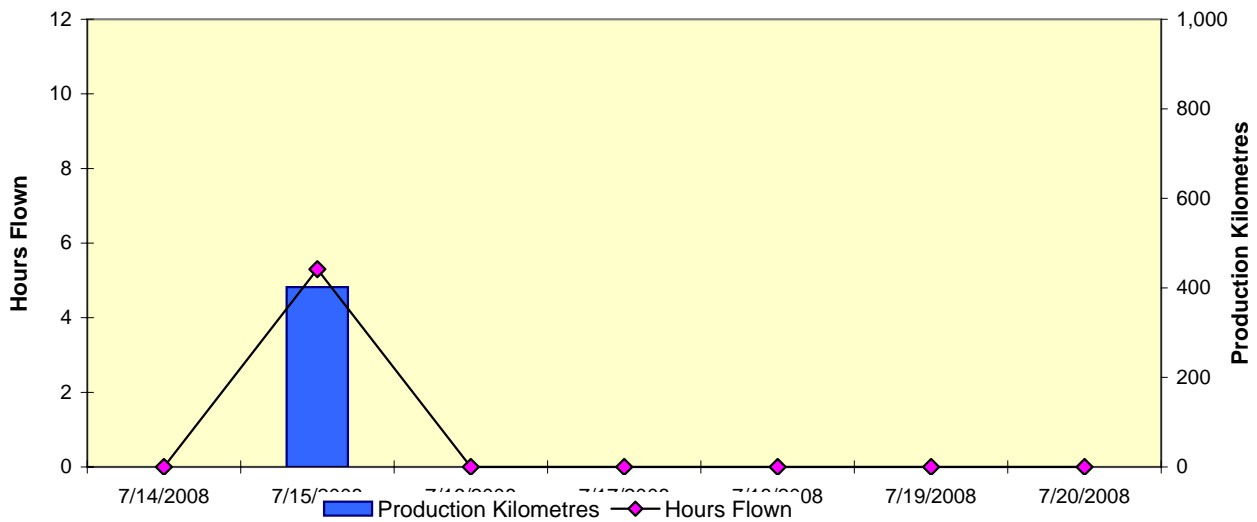
Week 11

SURVEY DETAILS							
Survey Name		Quest West		Client Name		Geoscience BC	
Survey Location		British Columbia, CAN		Contact Name		Lyn Anglin	
Project Code		Geosci08.BC		Contact Phone		1 (604) 662-4147 ext 23	
Total Size		25,499.0 km		Client Address		410 - 890 W. Pender St	
Line Spacing		2,000 m by 20,000 m		Vancouver, BC V6C 1J9 Canada			
Aircraft	C-GSGH	Type	GRAV	Email	sglbc@sgl.com		
SURVEY PRODUCTION SUMMARY							
Production km this Week		401.8 km		Total km Flown to Date		25499.0 km	
Total Remaining		0.0 km		Total km Reflown this Week		116.7 km	
% Complete		100.0 %		Total Flight Time this Week		5.3 hrs	
Average km/Day this Week		57.4 km/day		Average km/Flt. Time this Week		75.8 km/hr	
WEEKLY PRODUCTION							
Date	Day	Flight No.	Flight Time	No. of Lines Flown	No. Reflight Lines Flown	Production km	Reflown km
<b>TOTALS</b>			<b>5.3</b>	<b>8.0</b>	<b>1.0</b>	<b>401.8</b>	<b>116.7</b>
<b>14-Jul</b>	<b>Monday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Partly cloudy. Cloud cover over the remaining flight lines						
Remarks:							
<b>15-Jul</b>	<b>Tuesday</b>	<b>41</b>	<b>5.3</b>	<b>8.0</b>	<b>1.0</b>	<b>401.8</b>	<b>116.7</b>
Geomag:	n/a						
Weather:	Clearing throughout the day.						
Remarks:	A production flight was done in the afternoon/evening. All of the remaining lines are now complete.						
<b>16-Jul</b>	<b>Wednesday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Overcast and rain.						
Remarks:	The final data quality checks were performed.						
<b>17-Jul</b>	<b>Thursday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:	Overcast and rain in the morning, clearing towards the evening						
Remarks:	Data QC continues. Demobilization starts.						
<b>18-Jul</b>	<b>Friday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:							
Remarks:	Demobilization continues. Equipment shipped back to Ottawa. Helicopter departs for Ottawa with pilots Brian Simms and Owen Peterson.						
<b>19-Jul</b>	<b>Saturday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:							
Remarks:	Jay Archer departs Smithers.						
<b>20-Jul</b>	<b>Sunday</b>	<b>0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Geomag:	n/a						
Weather:							
Remarks:	Max Buneta departs Smithers.						
Comments:	The final flight was flown on Tuesday. The full dataset was closely scrutinized over the next two days, and the go ahead to demobilize given on Thursday evening. The Helicopter and pilots departed Smithers on Friday afternoon, and the geophysicists left over the weekend.						

PERSONNEL ON SITE THIS WEEK					
Name	Arrival this Week	Departure this Week	On Site?	# of Days on Site this Week	# of Days on Site to Date
Lutz Wendorff				0	47
Leila Ertolahti				0	33
David Money				0	7
Hao Liu				0	20
Brian Simms				0	19
Owen Peterson		18-Jul	ON SITE	5	72
Richard Barrette				0	22
Max Buneta		20-Jul	ON SITE	7	50
Simon Worswick				0	12
Brian Simms		18-Jul	ON SITE	5	34
Jay Archer		19-Jul	ON SITE	6	35
Simon Worswick				0	11

HSE Statistics	This Week	Project Totals
SGL Person Hours	172.5	2670.0
Inductions	0	0
Near Miss	0	0
First Aid Case (FAC)	0	0
Medical Treatment Case	0	0
Restricted Work Case (RWC)	0	0
Lost Time Injuries (LTI)	0	0

**WEEKLY PRODUCTION KILOMETRES AND HOURS FLOWN**





**APPENDIX VII**









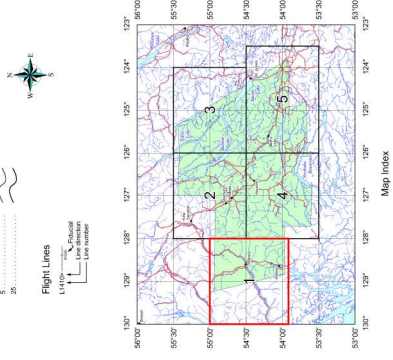


# High Resolution Airborne Gravity Survey

Quest West Project Area, British Columbia - 2008

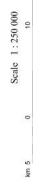
## MAP 1

**Terrain Corrected  
Bouguer Gravity (mGal)**



### Survey and Processing Specifications

Traverse Line Spacing: 2000 m  
 Contour Line Spacing: 1000 m  
 Aircraft Altitude: 200 m above terrain  
 Gravitational Sensor: Sander Geophysics' Affinity  
 Orientation: North  
 Orientation Sample Rate: 1 Hz  
 GPS Receiver: Novatel Meridian 17  
 Density used for Bouguer and Terrain Corrections: 2.67 g/cm<sup>3</sup>  
 GPS Ground Station: 1 (WGS84)  
 Datum: ITRF00  
 UTM Zone: 18N



**Terrain Corrected  
Bouguer Gravity (mGal)**  
MAP 1

High Resolution Airborne Gravity Survey  
Quest West Project Area, British Columbia - 2008



















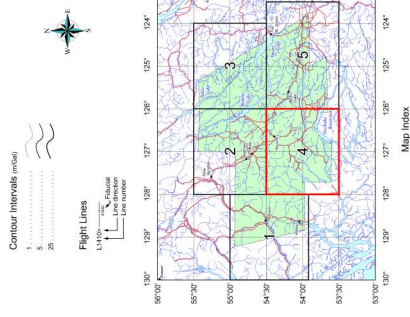


# High Resolution Airborne Gravity Survey

Quest West Project Area, British Columbia - 2008

## MAP 4

**Terrain Corrected  
Bouguer Gravity (mGal)**



### Survey and Processing Specifications

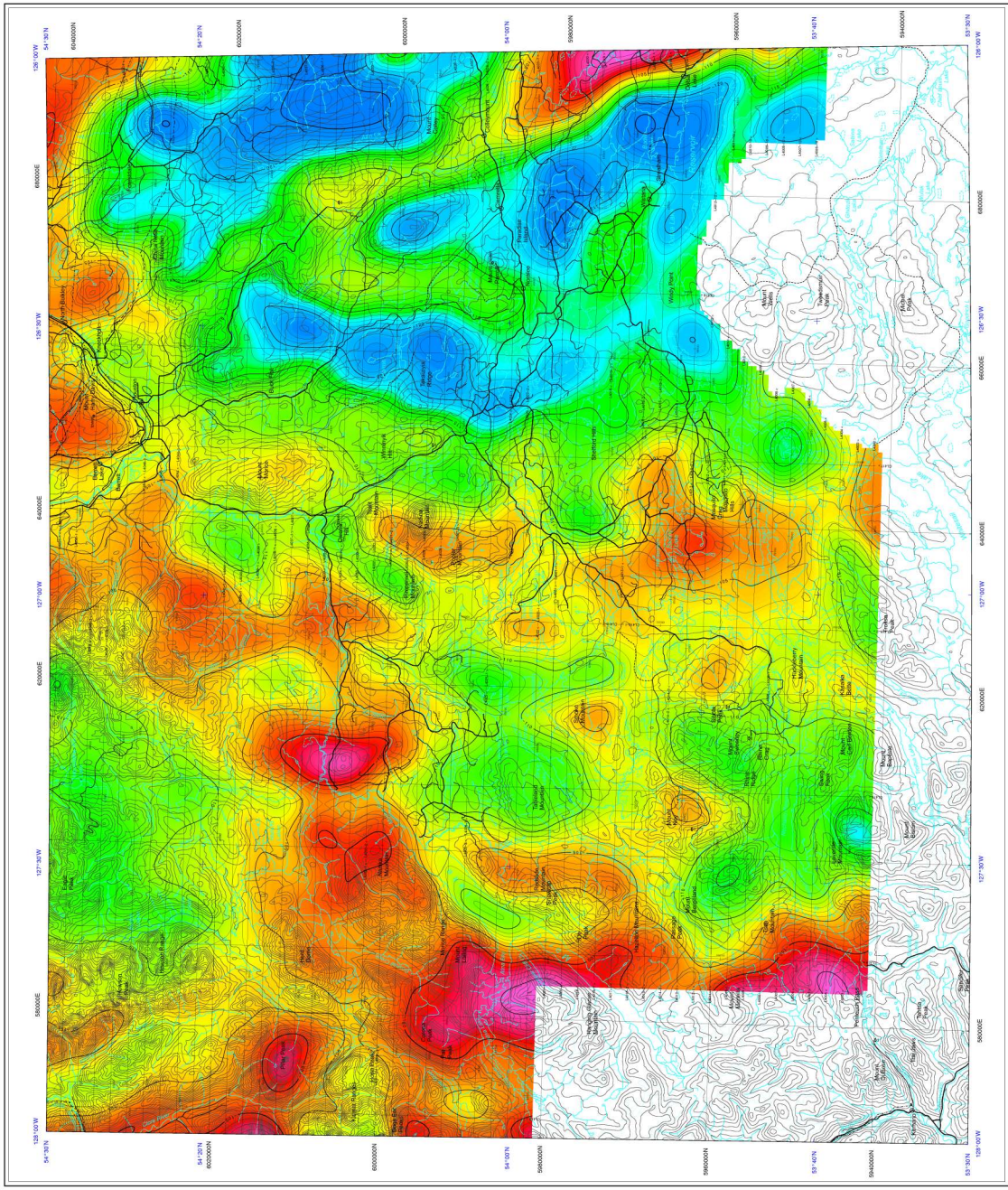
- Terrain File Spacing: 1000 m North-South, 500 m East-West
- Control Line Spacing: 1000 m North-South, 500 m East-West
- Normal Airborne: 1000 m North-South, 500 m East-West
- Normal Bouguer: 1000 m North-South, 500 m East-West
- Gravimeter Sensor: Spector Geophysical AB2000
- Gravimeter Sample Rate: 100 Hz
- GPS Receiver: Trimble R4
- Gravimeter Calibration: 12 January 2008, 123.54 mGal
- Gravity Units for Bouguer and Terrain Corrections: 10<sup>-3</sup> m/s<sup>2</sup> (1000 μGal)
- GPS Station Station 1 (WGS 84): 54 1028.1028 N, 127 1127.2128 W, 522.000 m
- Station Station 2 (WGS 84): 54 1028.1028 N, 127 1127.2128 W, 522.000 m
- Station Station 3 (WGS 84): 54 1028.1028 N, 127 1127.2128 W, 522.000 m
- Station Station 4 (WGS 84): 54 1028.1028 N, 127 1127.2128 W, 522.000 m
- Station Station 5 (WGS 84): 54 1028.1028 N, 127 1127.2128 W, 522.000 m
- Station Station 6 (WGS 84): 54 1028.1028 N, 127 1127.2128 W, 522.000 m
- Station Station 7 (WGS 84): 54 1028.1028 N, 127 1127.2128 W, 522.000 m
- Station Station 8 (WGS 84): 54 1028.1028 N, 127 1127.2128 W, 522.000 m
- Station Station 9 (WGS 84): 54 1028.1028 N, 127 1127.2128 W, 522.000 m
- Station Station 10 (WGS 84): 54 1028.1028 N, 127 1127.2128 W, 522.000 m



Scale: 1:250,000

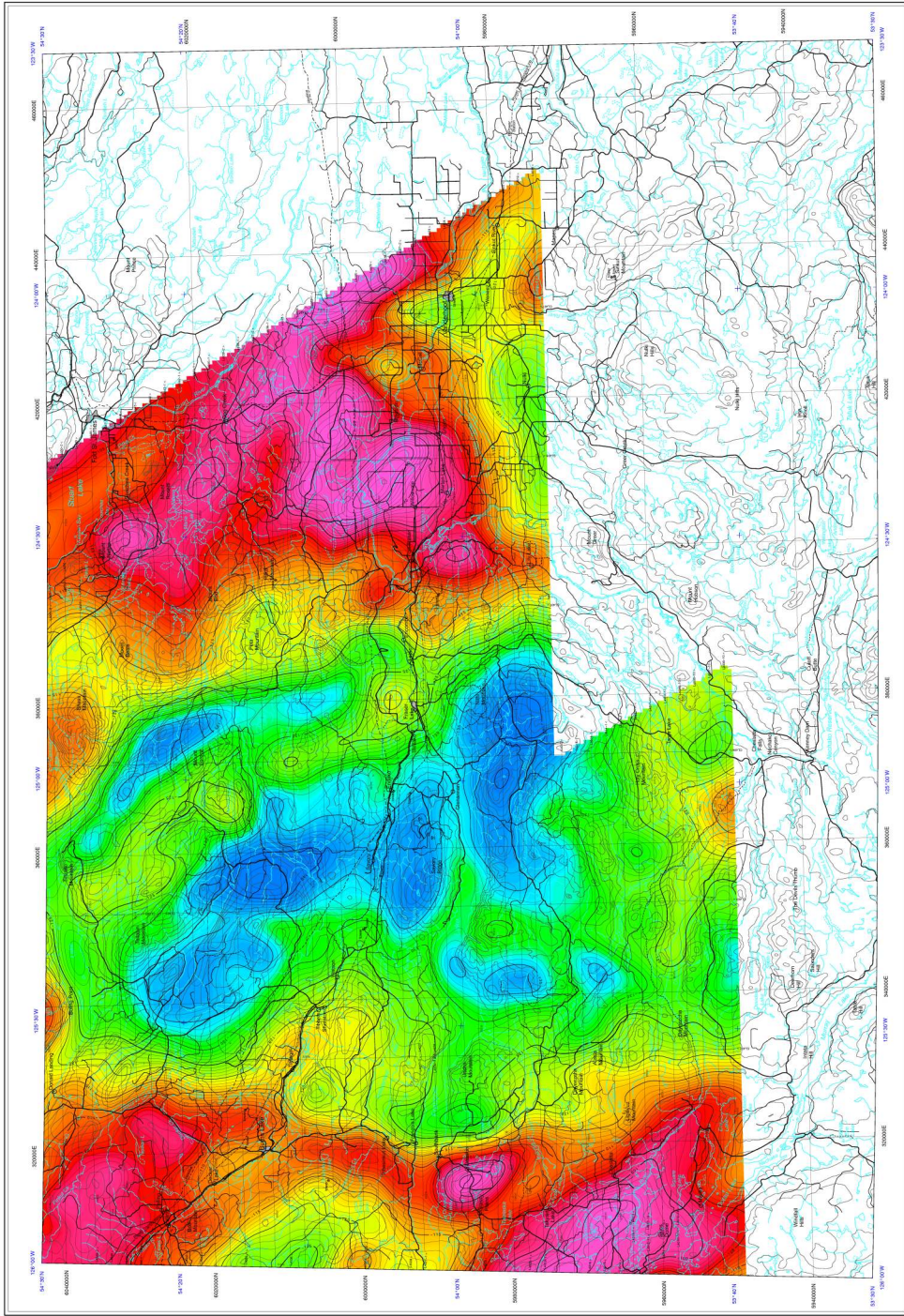
Terrain Corrected  
Bouguer Gravity (mGal)

MAP 4  
High Resolution Airborne Gravity Survey  
Quest West Project Area, British Columbia - 2008





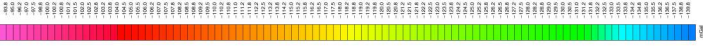




**High Resolution Airborne Gravity Survey**  
 Quest West Project Area, British Columbia - 2008

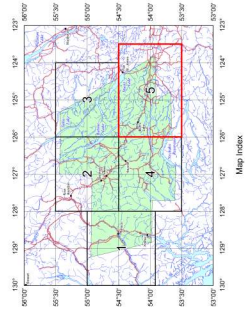
MAP 5

**Terrain Corrected  
 Bouguer Gravity (mGal)**



Contour Intervals (mGal)  
 1 5  
 25

Flight Lines  
 Actual  
 1:100,000  
 1:250,000



**Survey and Processing Specifications**

Navigation System: GPS  
 Processing Software: Sander Geophysics  
 Gravity Reduction: 9.80665 m/s<sup>2</sup>  
 Bouguer Correction: 2.648 m/s<sup>2</sup>  
 Terrain Correction: 0.1 m/s<sup>2</sup>  
 Final Gravity: 7.14935 m/s<sup>2</sup>  
 Datum: NAD 83  
 Projection: UTM  
 Zone: 18N  
 Units: mGal



Scale 1:250,000

Terrain Corrected  
 Bouguer Gravity (mGal)

MAP 5

High Resolution Airborne Gravity Survey  
 Quest West Project Area, British Columbia - 2008



























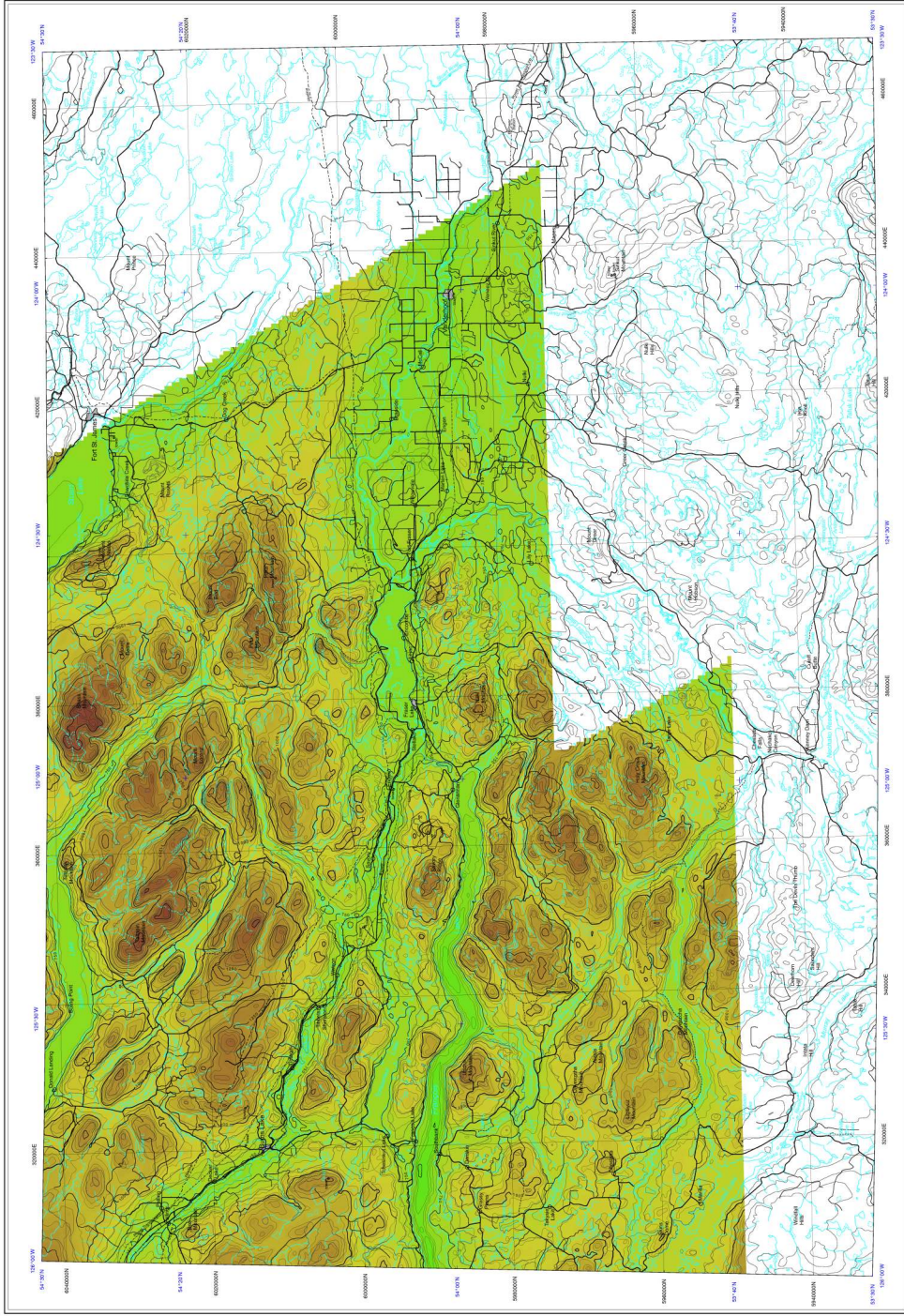










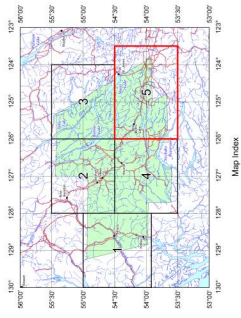


# High Resolution Airborne Gravity Survey

Quest West Project Area, British Columbia - 2008

## MAP 5

**Digital Elevation Model (m)**  
(above mean sea level)



### Survey and Processing Specifications

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# High Resolution Airborne Gravity Survey

Quest West Project Area, British Columbia - 2008

MAP 1

Free Air  
Corrected Gravity (mGal)















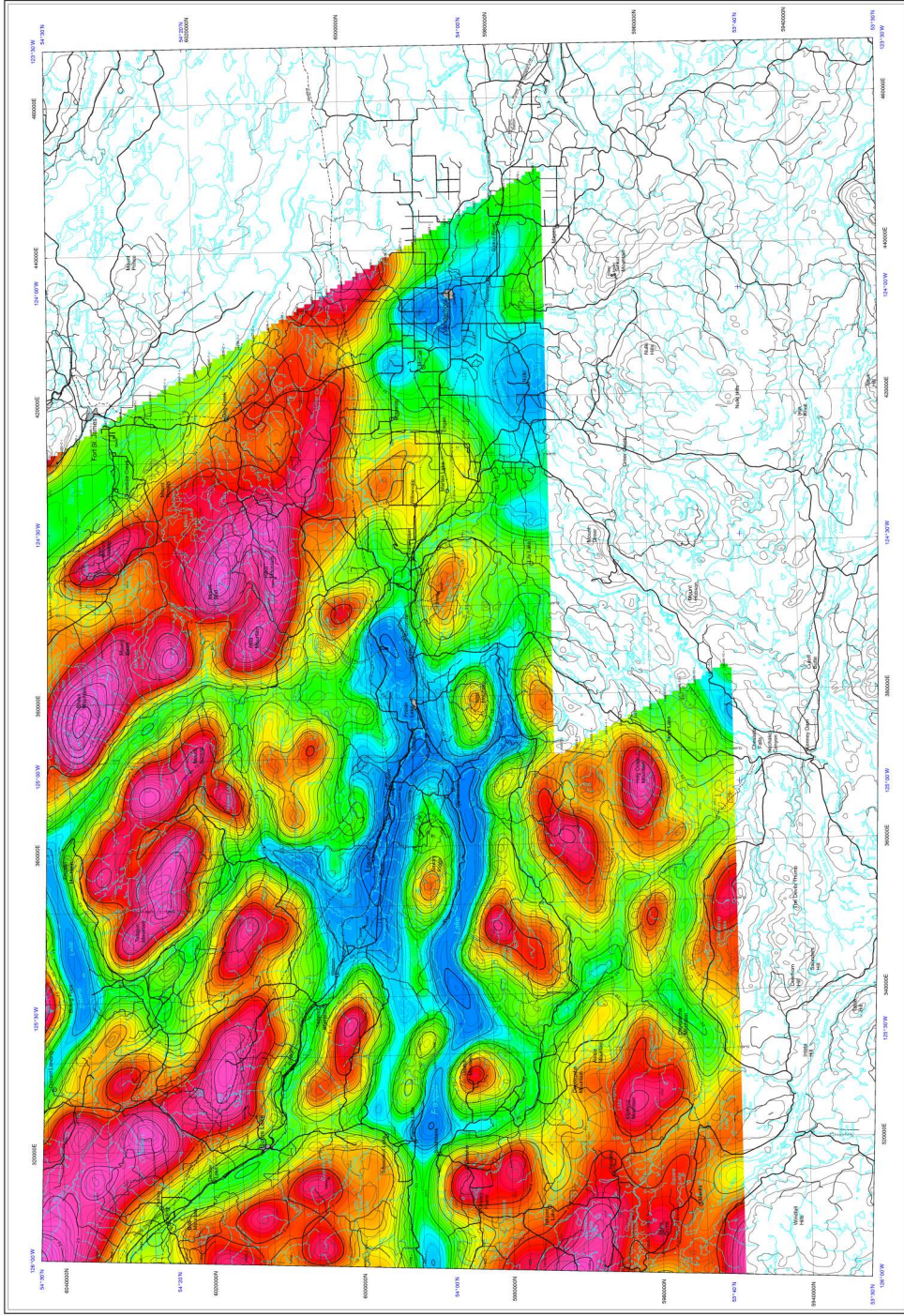










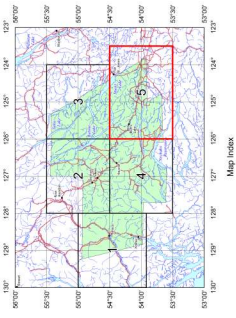


# High Resolution Airborne Gravity Survey

Quest West Project Area, British Columbia - 2008

MAP 5

Free Air  
Corrected Gravity (mGal)



### Survey and Processing Specifications

Instrument: Leica AS15  
 Platform: Airborne  
 Sensor: MicroStation  
 Data Format: ASCII  
 Data Source: Sander Geophysics  
 Date: 2008  
 Project: Quest West Project Area  
 Client: Sander Geophysics  
 Scale: 1:250,000  
 Projection: UTM  
 Datum: NAD 83  
 Units: Meters  
 Contour Interval: 10 mGal  
 Flight Line Spacing: 100 m  
 Ground Speed: 100 m/s  
 Altitude: 1000 m  
 Accuracy: ± 0.5 m  
 Date: 2008  
 Project: Quest West Project Area  
 Client: Sander Geophysics  
 Scale: 1:250,000  
 Projection: UTM  
 Datum: NAD 83  
 Units: Meters  
 Contour Interval: 10 mGal  
 Flight Line Spacing: 100 m  
 Ground Speed: 100 m/s  
 Altitude: 1000 m  
 Accuracy: ± 0.5 m



Free Air  
Corrected Gravity (mGal)

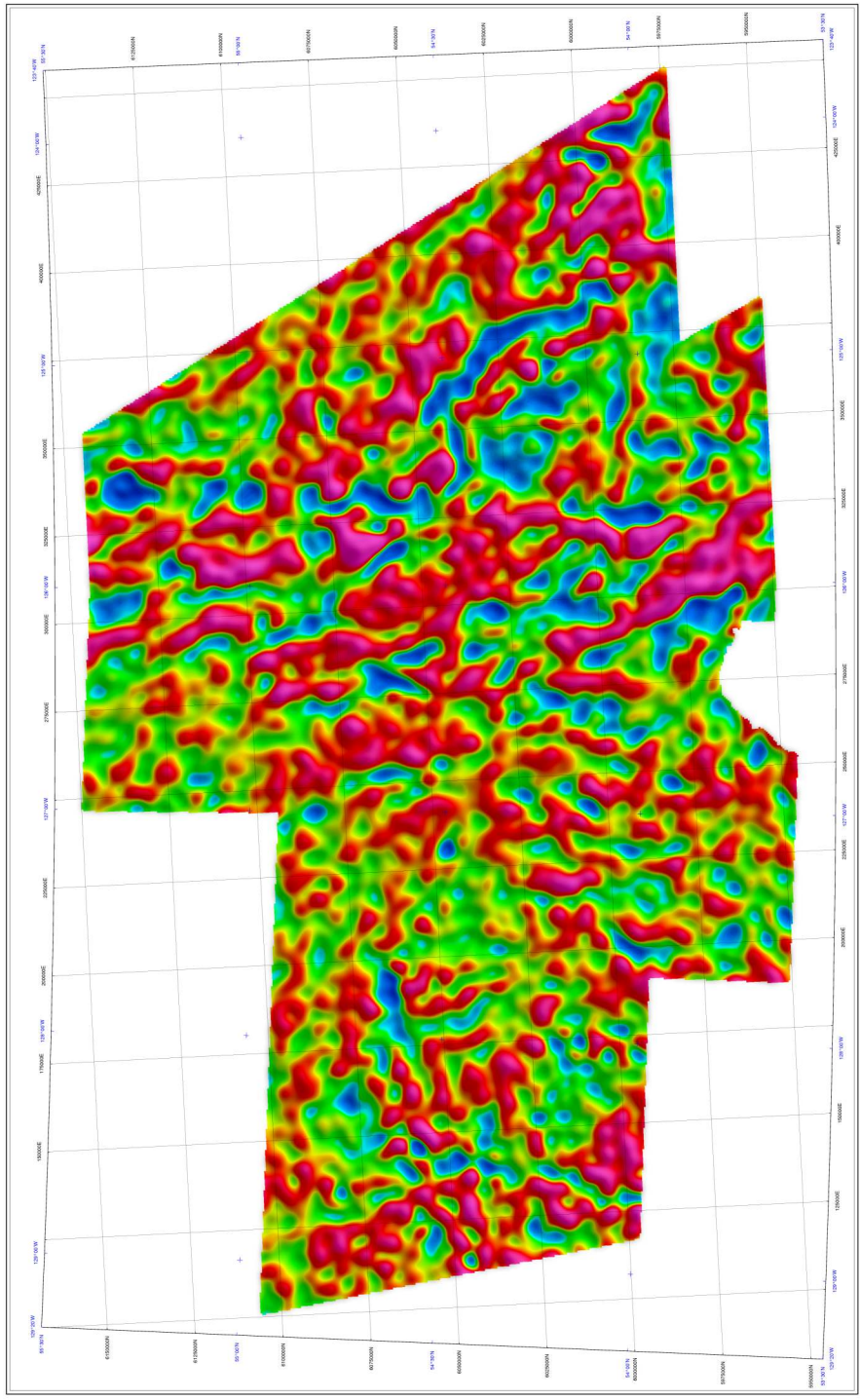
MAP 5

High Resolution Airborne Gravity Survey  
 Quest West Project Area, British Columbia - 2008

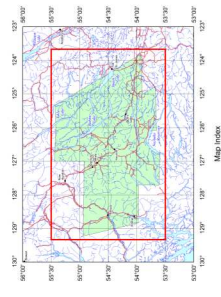








**Geoscience BC**  
**High Resolution Airborne Gravity Survey**  
 Quest West Project Area, British Columbia - 2008  
**First Vertical Derivative of the Terrain Corrected Bouguer Gravity with Shadow (BGR+Sh)**  
 Illumination: Inclination 75°, Declination 135°



**Survey and Processing Specifications**  
 Thomas Lee Survey, 4880 Valley Rd, 2008  
 Contract No. 2008-01, 2008-02, 2008-03, 2008-04, 2008-05, 2008-06, 2008-07, 2008-08, 2008-09, 2008-10, 2008-11, 2008-12  
 Project Name: Quest West Project Area  
 Client: Geoscience BC  
 Date: 2008-12-31  
 Scale: 1:500,000  
 Projection: UTM Zone 18N  
 Datum: NAD 83  
 Units: Meters  
 File Name: Quest West Project Area - BGR+Sh - 2008-12-31  
 File Path: G:\Projects\Quest West Project Area\BGR+Sh\Quest West Project Area - BGR+Sh - 2008-12-31  
 File Size: 1,000,000,000  
 File Format: GeoTIFF  
 File Extension: .tif  
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