

Zeehan, Tasmania Helicopter Magnetic Geophysical Survey

Acquisition and Processing Report

for

Allegiance Mining NL

Prepared by : S. Murphy

L. Stenning

Authorised for release by :

.....

Survey flown: January 2004

by



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FAS JOB # 1634

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1. SURVEY OPERATIONS AND LOGISTICS

1.1 Introduction

Between the 13th of January 2004 and the 25th of January 2004 Fugro Airborne Surveys Pty. Ltd. undertook an airborne helicopter magnetic survey for Allegiance Mining NL, over three areas near Zeehan, Tasmania. The survey areas are known as Zeehan, Renison East and Heazlewood. Total coverage of the survey areas amounted to 2828 line kilometres over 17 flights. The survey was flown using a Bell 206 Jetranger Helicopter, registration VH-JWF owned and operated by Heli Aust Pty Ltd. This report summarises the procedures, details and equipment used by Fugro in the acquisition, verification and processing of the airborne geophysical data.

1.2 Survey Base

The survey was based at Zeehan, Tasmania. The survey aircraft was operated from the Zeehan airport with the aircraft fuel available on site. The Heazlewood area used an area at Savage River for mid-day refuelling due to the extended distance of the area to Zeehan. Otherwise, all survey operations and the post-flight data verification were performed from the Heemskirk Motel in Zeehan.

1.3 Flying Summary

The terrain over the survey areas was mostly rugged with strong winds and frequent rain prevailing. The survey was flown in 17 flights with 2 standby days due to excessively strong winds and rain.

1.4 Survey Personnel

The following personnel were involved in this project:

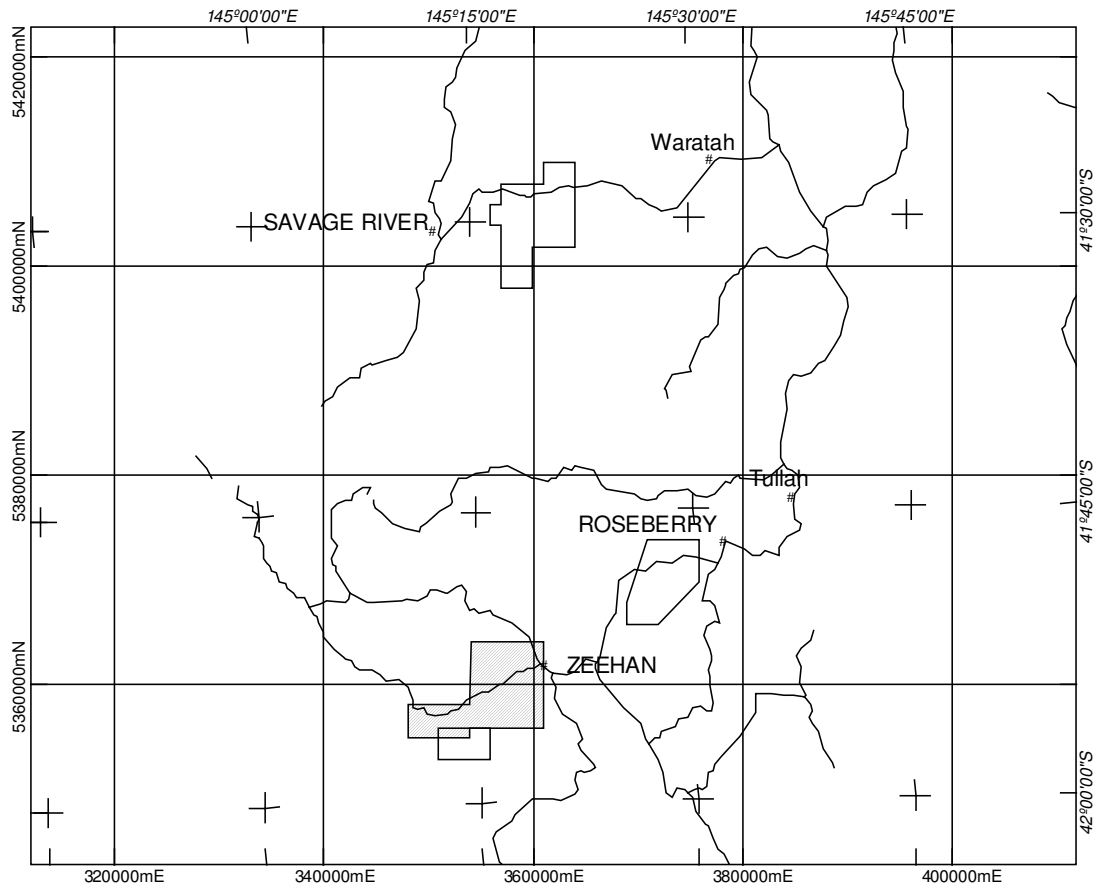
Project Supervision - Acquisition	Rod Pullin
- Processing	Andrea Tovey
On-site Crew Leader	Zoltan Beldi
Pilots	Tony Feller
Data Processing (Field)	Zoltan Beldi
Data Processing (Perth)	Sheryl Murphy

1.5 Safety

Safety meetings were held with all personnel involved with the survey prior to the commencement of operations and weekly thereafter. A safety assessment was conducted before any flight and at the conclusion of each days survey operations. There were no contentious issues but minor problems with the engine of the helicopter were addressed and resolved with safety as the prime concern.

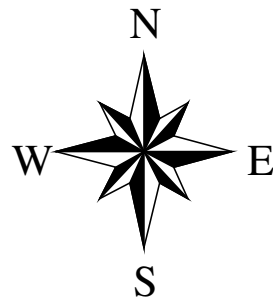
A safety debrief was also held at the conclusion of the job with the consensus that there had been no infringement of any safety standards held by Fugro, Allegiance Mining or Heli-Aust.

1.6 Area Map



ALLEGIANCE MINING NL
ZEEHAN, TASMANIA
AIRBORNE MAGNETIC SURVEY

DATUM : AGD66
PROJECTION : AMG
ZONE : 55



1.7 Survey Equipment

Aircraft Model	Bell B206 B3 Jetranger Helicopter
Aircraft Registration	VH-JWF
Aircraft Magnetometer	Geometrics G822A Cesium Vapour
Magnetic Compensator	RMS Instruments Automatic Aeromagnetic Digital Compensator (AADC)
Base station magnetometer	Geometrics G856 proton precession
Altimeter	Collins ALT 50B radio altimeter
Barometer	Setra 121
Navigation system	Fugro Omnistar Ashtech G12 GPS receiver
Data acquisition system	FUGRO (DAS) digital acquisition system

2. SURVEY SPECIFICATIONS AND PARAMETERS

2.1 Area Co-ordinates

The survey areas were located within UTM Zone 55, Central Meridian = 147
(Note - Co-ordinates in GDA94 Zone 55)

Zeehan

356000E	5353000N
356000E	5356000N
351000E	5356000N
351000E	5353000N

Renison East

371000E	5374000N
376000E	5374000N
376000E	5370000N
372000E	5366000N
369000E	5366000N
369000E	5368000N

Heazlewood

364000E	5402000N
364000E	5410000N
361000E	5410000N
361000E	5408000N
357000E	5408000N
357000E	5406000N
356000E	5406000N
356000E	5404000N
357000E	5404000N
357000E	5398000N
360000E	5398000N
360000E	5402000N

2.2 Survey Area Parameters

Job Number	1634
Survey Company	Fugro Airborne Surveys Pty Ltd
Date Flown	13 th – 25 th January 2004
Client	Allegiance Mining NL
Area Name	Zeehan, Tasmania (Zeehan, Renison East, Heazlewood)

The Project Area was flown using the following parameters:

Area	Flight Line Spacing	Flight Line Direction	Tie Line Spacing	Tie Line Direction	Mean Terrain Clearance	Line Kilometres
Zeehan	50 metres	North-South	500 metres	East-West	50 metres	370 km
Renison East	50 metres	East-West	500 metres	North-South	50 metres	1003 km
Heazlewood	50 metres	East-West	500 metres	North-South	50 metres	1455 km

2.3 Data Sample Intervals

Nominal data sample intervals.

Magnetometer	-	2.5 – 3.0 m (@10 Hz)
Radar altimeter	-	2.5 – 3.0 m (@10 Hz)
Temperature	-	2.5 – 3.0 m (@10 Hz)
Pressure	-	2.5 – 3.0 m (@10 Hz)
GPS	-	25 - 30 m (@ 1 Hz)
Magnetic base station (g856)	-	5 s

2.4 Survey Tolerances

As specified in the contract the following tolerances were used:

Traverse line separation	-	+/- 25m of nominated line spacing over 1 km or more.
Total magnetometer system noise	-	More than a 0.25 nT noise envelope.
Magnetic diurnal variation	-	More than a 1.0 nT noise envelope or 5 nT in 5 minutes (non-linear).

3. AIRCRAFT EQUIPMENT AND SPECIFICATIONS

3.1 Aircraft

Manufacturer	-	Bell
Model	-	206 B3 JetRanger Helicopter
Registration	-	VH-JWF
Ownership	-	Heli Aust Pty Ltd

3.2 Navigation System

The GPS receiver was connected to the acquisition system that integrates the acquisition and navigation in one console. A flight plan with area boundaries including the start and end of the line co-ordinates was loaded into memory via a pre recorded flight plan. Steering information was provided to the pilot via a proprietary guidance display that allowed the pilot to maintain accurate tracking while still maintaining a safe lookout.

3.3 Aircraft Magnetometers

The survey was flown using a Geometrics G822A ultra-high sensitivity Caesium Vapour Magnetometer sensor system with the sensor mounted in a boom attached below the helicopter. The sensor provides a Larmor signal that is processed by high precision counters embedded within the automatic compensator described below, to provide an operating range of 20,000 to 100,000 nT.

Magnetometer specifications:

Nominal Sensitivity	0.001 nT
Still Air RMS Noise	0.05 nT
Digital Recording Resolution	0.001 nT
Magnetic Gradient Tolerance	>20,000 nT / metre
Sample Time	0.1 sec.
Sample Distance	2.5 – 3.0 metres (approx.)

3.4 Automatic Compensator

The magnetometer sensor was coupled to a RMS Instruments Automatic Aeromagnetic Digital Compensator (AADC) to produce real time compensation for the effects of the aircraft's motion, changes in attitude and heading. The AADC interference coefficients were calculated from compensation flights carried out before the survey commenced. The AADC output data, with a resolution and sensitivity of 0.001 nT at a sampling rate of ten (10) times per second, were recorded digitally. The noise envelope for compensated magnetometer readings was less than 0.1 nT

3.5 Radar Altimeter

A Collins ALT 50B Radio Altimeter system was used to measure ground clearance. The radio altimeter indicator provides an absolute altitude display from 0 - 750 metres (0 - 2,500 feet) with a sensitivity of 4 mV/ft. Radar altimeter data were digitally recorded every 0.1 seconds.

Specifications

Range:	-	0 - 2500 feet
Accuracy:	-	1%
Resolution:	-	4 mV/foot

3.6 Barometric Altimeter

The output of the Setra 121 pressure transducer is used for calculating the barometric altitude of the aircraft. In conjunction with the area QNH pressure and ambient temperature, the barometric altitude may be calculated.

Specifications

Range:	-	sea level to 18,000 feet
Accuracy:	-	5 feet

Resolution: - 0.6 mV/foot

3.7 Flight Data Recording

All data recorded in the data acquisition system was stored in a digital format on a Flash memory disk drive located in the DAS. At the conclusion of the flight, these data were transferred to the field processing computers for verification and archiving.

3.8 Flight Following

An integral part of the Safety Management System provides for the installation of a Flight Following System that transmits a position via satellite at pre determined intervals. The Fugro EagleStar Flight Following System is fitted to the aircraft and for this survey, position information was transmitted every 4 minutes to FUGRO's premises in Perth. This information can be monitored by accessing the FUGRO web page where the updated flight path is displayed. In the event that positional information from the aircraft is lost for a period exceeding 12 minutes or three consecutive transmissions, an alarm is raised and a SMS text message sent to nominated contacts and the Emergency Response plan implemented.

4. GROUND DATA ACQUISITION EQUIPMENT AND SPECIFICATIONS

4.1 Magnetic Base Station

Two Geometrics G856 proton precession base station magnetometers were used to measure the daily variations of the Earth's magnetic field. The base stations were established in an area of low gradient, away from cultural influences. The base stations were run continuously throughout the survey flying period with a sampling interval of 5 seconds and a sensitivity of 0.1 nT. The base station at the Heemskirk Motel was monitored in real time and the helicopter was recalled if the variations persistently exceeded the specified limits. The base station data were analysed after each days production flying to determine if any data had been acquired during periods of out-of-specification diurnal variation. For this survey the base stations were set up at the Zeehan airstrip, and at the Heemskirk Motel.

4.2 GPS Base Station

A GPS base logging station was set up at the survey base on top of the roof of the eastern side of room 40 at the Heemskirk Motel, Zeehan.

The GPS base system comprised a GPS receiver, a logging computer, an antenna and a UPS system to avoid down time if power fails or fluctuates. Data were logged using GrafNav software and displayed in real time on the screen.

Logged base data were processed in conjunction with the airborne GPS data to calculate the post-processed differential position of the aircraft.

Specifications

Ashtech GG-24 Receiver

Model	-	Ashtech GG-24 Receiver
Receiver	-	12 Channel GPS code and carrier
Position Accuracy	-	Differential mode <40 cm

The GPS base station position was calculated by logging data continuously at the base position over a period of 24 hours. These data were then statistically averaged to obtain the position of the base station.

The calculated GPS base position was (in WGS 84):

41° 53' 33.74808" S, 145° 20' 41.83844" E, 163.949 m.

5. EQUIPMENT CALIBRATIONS AND DATA ACQUISITION CHECKS

5.1 Survey Calibrations

A series of calibrations were performed as follows:

5.1.1 Real Time Magnetic Compensation

The helicopter magnetic installation was calibrated to allow real time automatic magnetic compensation for the effects of aircraft manoeuvre during operations. The procedure to acquire the coefficients for this correction was computed after installation using the standard manoeuvres of pitch, roll and yaw in the four Cardinal directions and checked against the survey line direction, if different to the Cardinal directions. The FOM was computed for both the raw and compensated data and the high pass residual data to determine the ratio of raw/compensated data.

5.1.2 Parallax

Parallax error is caused by the physical difference in distance between the various sensors, the electronic delay and software timing in the acquisition system. Hence all variables are subjected to a displacement from the GPS co-ordinates. If these variables are processed without a position offset a parallax error will occur.

A prominent Survey Marker on top of Mt. Zeehan was selected as a precision reference and the helicopter recorded position data whilst hovering over the marker for two minutes. The results of the precision test are tabulated in Appendix V of this report.

5.1.3 Daily Calibrations

A set of daily calibrations were performed each survey day as follows:

- Magnetic base station time check
- Test Line

5.1.3.1 Magnetic Base Station Time Check

Prior to each days survey all magnetic base stations were time checked and synchronised with the time on the aircraft survey system GPS receiver. The temporal drift over a typical survey day of approximately 12 hours, was determined to be on the order of 1 second or less for all mag base stations.

5.1.3.2 Test Line

A test line was flown in the same direction and altitude and over the same terrain each day pre- and post- flight to verify that magnetometer and barometric altimeter baselines were within cited tolerances. The test line location was:

364895E, 5364059N to 362959E, 5361670N

Along the rail track adjacent to the Zeehan airstrip running NE/SW.

6. DATA VERIFICATION AND FIELD PROCESSING

Data verification and processing was conducted at the office in Zeehan throughout the survey. At the conclusion of each days survey, all magnetic, altimeter, position and diurnal data were down-loaded for verification. All raw and edited aircraft data were archived daily.

6.1 Magnetic Diurnal Data

Diurnal data recorded from both base stations were down-loaded from the magnetometer's memory to the field processing computer. The data were then checked for spikes and erroneous readings. If invalid diurnal data occurred whilst survey data were being acquired, the affected section was re-flown. The diurnal data were also checked to see that variations in diurnal readings during the survey did not exceed the specified tolerances. If this occurred, the affected survey line was re-flown. The diurnal data were merged with the aircraft data and used in the verification of the magnetic data.

6.2 Altimeter Data

Radar altimeter, barometric altimeter and GPS height data from the aircraft were transferred to the field processing computer.

6.2.1 Radar Altimeter Data

The radar altimeter data were verified to check that specified height parameters were maintained. The radar altimeter data were used in the production of topographic maps.

6.2.2 GPS Height Data

The aircraft's height above the ellipsoid each second was determined by differentially post-processing the synchronised raw GPS data from the aircraft and GPS base station. The GPS height of the aircraft was verified to check for consistency. The GPS height data were used in the production of topographic maps.

6.2.3 Barometric Altimeter Data

The aircraft barometric pressure data were also recorded. The barometric height of the aircraft was verified to check for GPS height repeatability.

6.2.4 Topographical Data

After verification, parallax corrections were applied and the radar altimeter height was subtracted from the GPS height to give the elevation of the terrain above the WGS84 ellipsoid. It was not considered necessary to make any further corrections as this data is for verification purposes only.

6.2.5 Gridding and Inspection

The topographic data were gridded and displayed as enhanced images for verification.

6.3 Flight Path Data

The corrected flight path data from the aircraft and the GPS base station were transferred to the field-processing computer. The flight path was plotted daily to ensure it was within specifications and then merged with the rest of the aircraft and diurnal data. All position data were recorded with reference to the WGS84 datum. There were no instances of excessive flight path deviations.

6.4 Magnetic Data

The real-time compensated and uncompensated magnetic data from the aircraft recorded every 0.1 second were transferred to the field-processing computer. The raw, unedited magnetic data were checked to identify noise and spikes. Single reading spikes were manually edited and if the noise exceeded the specified tolerances the part of the line affected was re-flown. After the edited magnetic data was merged with the digital flight path the following sequence of processing operations were carried out to allow inspection and verification of the data:

6.4.1 Diurnal Correction

The synchronised digital diurnal data collected by the base station was subtracted from the corresponding airborne magnetic readings to calculate a difference. The resultant difference was then subtracted from the base value to produce diurnally corrected magnetic data.

6.4.2 Parallax Correction

The diurnally corrected magnetic data were corrected for system parallax using the calculated value.

6.4.3 Preliminary Gridding and Inspection

The magnetic data were gridded and displayed as enhanced images for verification.

6.5 Post Flight Verification Plots

A daily verification of all acquired data in the form of digital maps in GeoSoft format were provided to the client's representative. These maps consisted of:

- Flight path plots with colour indications for height and cross-line error tolerances.
- Magnetic stacked profiles of TMI, 1st difference, 4th difference to indicate noise levels.
- Magnetic diurnal and GPS base station plots.
- Statistical summary of line data in comparison with specifications.

7. FINAL DATA PROCESSING

7.1 Aircraft Location

The aircraft's location each second was determined by differentially post-processing the synchronised GPS data recorded on both the aircraft and GPS base station. These data were recorded with reference to the WGS84 datum.

Prior to being merged with the magnetic and topographic processing stream data, system parallax as calculated was applied.

7.2 Magnetic Data Processing

Data collected by each of the raw data sources was checked for spikes and noise by complex procedures. These procedures are summarised below:

- a) Apply any spike corrections to the raw magnetic variables.
- b) Interpolate undefined magnetic values.
- c) Co-ordinate the data with post-processed GPS data.
- d) Filter diurnal values and subtract them from individual compensated magnetic readings. A diurnal base value of 62008 nT was then added.
- e) Apply parallax correction.
- f) Correct for regional effects of the earth's magnetic field by calculating the IGRF value at each fiducial using IGRF model 2000 and secular variation model. A base value of 62065 nT was added back.
- g) A height correction was applied to approximately correct for flying height variation over topographic highs.
- h) Using the tie lines (flown at 90 degrees to the traverse lines) a set of miss-tie values were determined. These miss-tie values reflected the differences in the magnetic value between the tie lines and the traverse lines over the same geographical point. Using a least squares fit algorithm, which also takes into account the statistical variation inherent in DGPS positioning, a series of corrections were applied to the traverse line data. These allowed the data to be levelled to the same base value.
- i) Following this, a Fugro proprietary micro-levelling process was applied in order to more subtly level the data. This process removes sub-gamma pulls evident only under image enhancement algorithms.

7.3 Digital Elevation Model

Data collected by each of the raw data sources was checked for spikes and then processed as follows:

- a) Apply any spike corrections to the raw radar altimeter data.
- b) Interpolate undefined values.
- c) Co-ordinate the data with post-processed GPS data.
- d) Apply parallax correction.
- e) Subtract the aircraft's height above ground from the aircraft's height above the WGS84 ellipsoid and correct for radar altimeter/GPS sensor separation.
- f) Using the tie lines (flown at 90 degrees to the traverse lines) a set of miss-tie values were determined. These miss-tie values reflected the differences in the computed topographic height between the tie lines and the traverse lines over the same geographical point. Using a least squares fit algorithm, which also takes into account the statistical variation inherent in DGPS positioning, a series of corrections were applied to the traverse line data.
- g) Following this, a Fugro proprietary micro-levelling process was applied in order to more subtly level the data.
- h) The data were then corrected to Australian Height Datum using AUSLIG 1998 N-values

7.4 Reprocessing of Old Data

An additional area known as Trial Harbour flown in 1998 by UTS has been grid merged with the Zeehan area. The survey is 1677 line kilometres. Survey specifications and data formats for this area can be found in Appendix IV.

7.5 Gridding

The final levelled magnetic and digital elevation data were gridded using a cubic spline method and delivered in AGD66, TMAMG55. A grid cell size of 1/5 line spacing (10 meters) was used. Grids were made of Total Magnetic Intensity (TMI), Total Magnetic Intensity Reduced to the Pole, 1st Vertical Derivative of TMI, 2nd Vertical Derivative of TMI, Analytic Signal of TMI and Digital Elevation Model in ERMapper format for each of the areas.

The accuracy of the elevation calculation is directly dependent on the accuracy of the two input parameters, radar altitude and GPS altitude. The radar altitude value may be erroneous in areas of heavy tree cover, where the altimeter reflects the distance to the tree canopy rather than the ground. The GPS altitude value is primarily dependent on the number of available satellites. Although post-processing of GPS data will yield X and Y accuracies in the order of 1-2 metres, the accuracy of the altitude value is usually much less, sometimes in the ± 5 metre range. Further inaccuracies may be introduced during the interpolation and gridding process.

Because of the inherent inaccuracies of this method, no guarantee is made or implied that the information displayed is a true representation of the height above sea level. Although this product may be of some use as a general reference, **THIS PRODUCT MUST NOT BE USED FOR NAVIGATION PURPOSES.**

APPENDIX I – Weekly Operations Reports

Week Commencing: **Monday 12-Jan-04**

Job Number: 1634

Total km: 2880.0

Aircraft: VH-JWF

Base: Zeehan Tas

Country: Australia

Area Name: West tas

Operators:

Data Proc: Z.Beldi

Crew Leader: Z.Beldi

Accom: Heemskirk Motel

Pilots: Tony Feller

Techs: Z.Beldi

Client: Allegiance Mining NL

Contact #: 0417 215773

Date	Flight Number	Crew		Time		M/R	Oil		Fuel	This Flight		To Date		Standby (0, 0.5, 1)	Comments
		Pit(s)	Op	T/O	Land	Hrs	L	R	Added	Prod	Refly	Prod	Refly		
Monday 12-Jan-04	0														Weather: Remarks: Z.Beldi on site. Heli and Tony feller on site. Commenced setup Safety Meeting: Startup safety meeting held
Julian 12-Jan-00															
Day 1					Hours Today	0.0				0.0	0.0	0.0	0.0		
Tuesday 13-Jan-04	1	TF	ZB	16:00	17:25	1.4				nil					Weather: Rain showers, windy and cold Remarks: All calibration requirements completed. Safety Meeting: Review of procedures and recc flight over Zehhan area.
Julian 13															
Day 2					Hours Today	1.4				0.0	0.0	0.0	0.0		
Wednesday 14-Jan-04	2	TF				0.9				32.0					Weather: rain showers/strong winds all day Remarks: Some problems with DGPS receiver and AADC Safety Meeting: Review of procedures and use of 2nd heli based at zeehan.
Julian 14	3	TF				1.1				89.0					
Day 3	4	TF				3.1				223.0					
Thursday 15-Jan-04	5	TF				0.7				42.0					Weather: Low Cloud and rain in AM. Improved from 1200 onwards Remarks: Helicopter engine suffering compressor stalls. Engineers in Stanley to investigate. Safety Meeting:
Julian 15	6	TF				2.4				183.0					
Day 4	7	TF				3.1				124.0					
Friday 16-Jan-04	8	TF				3.4				233.0					Weather: Remarks: Heli went to Stanley in AM for compressor stall rectification. Basemag out of spec in AM and early PM Safety Meeting:
Julian 16															
Day 5					Hours Today	3.4				233.0	0.0	926.0	0.0		
Saturday 17-Jan-04										0.0					Weather: Heavy rain overnite and early morning. Showers remainder Remarks: Helicopter in Hobart undergoing an engine change to fix comp stalls Safety Meeting:
Julian 17															
Day 6					Hours Today	0.0				0.0	0.0	926.0	0.0		
Sunday 18-Jan-04										0.0	0.0				Weather: Heavy rain overnite and early morning. Showers remainder Remarks: Helicopter in Hobart undergoing an engine change to fix comp stalls Safety Meeting:
Julian 18															
Day 7					Hours Today	0.0				0.0	0.0	926.0	0.0		
Total Job Hours		16.1	Weekly Totals			16.1	0	0	0	926.0	0.0			0.0	
			Total Aircraft Hours				Ltrs/Hr		0			Total Standby		0.0	
			Hours to Next Periodic				Running Avg			132.3 km/day		% Complete		32.2 %	
			Anticipated Hours Next week							57.5 km/hr		km Remaining		1954.0 km	

Week Commencing: **Monday 19-Jan-04**

Job Number: 1634

Total km: 2880

Aircraft: VH-JWF

Base: Zeehan Tas

Country: Australia

Area Name: West tas

Operators: 0

Data Proc: Z.Beldi

Crew Leader: Z.Beldi

Accom: Heemskirk Motel

Pilots: Tony Feller

Techs: Z.Beldi

Client: Allegiance Mining NL

Contact #: 0417 215773

Date	Flight Number	Crew		Time		M/R	Oil		Fuel	This Flight		To Date		Standby (0, 0.5, 1)	Comments
		Pit(s)	Op	T/O	Land	Hrs	L	R	Added	Prod	Refly	Prod	Refly		
Monday 19-Jan-04	9	TF		9:00	12:30	3.5				266.0					Weather: Clear skies !! And windy (15-20knots) Remarks: New engine appears to have eliminated compressor stalls Safety Meeting:
	10	TF		13:30	16:30	3.0				200.0					
Julian 19															
Day 8				Hours Today		6.5				466.0	0.0	1392.0	0.0		
Tuesday 20-Jan-04	11	TF		8:30	8:45	0.2				0.0				1.0	Very windy and gusty > 50 knots Remarks: Safety Meeting:
Julian 20															
Day 9				Hours Today		0.2				0.0	0.0	1392.0	0.0		
Wednesday 21-Jan-04	12	TF		8:30	11:25	2.9				150.0				0.5	Weather: Cloudy and foggy in AM. Strong winds and rain in PM Remarks: Safety Meeting:
Julian 21															
Day 10				Hours Today		2.9				150.0	0.0	1542.0	0.0		
Thursday 22-Jan-04											0.0			0.5	Weather: Strong winds and rain in AM. Clearing in late PM Remarks: Fuel control unit changed and aircraft test flown awaiting satisfactory conditions. Safety Meeting:
Julian 22											0.0				
Day 11				Hours Today		0.0				0.0	0.0	1542.0	0.0		
Friday 23-Jan-04	13	TF		10:45	14:05	3.3				245.0					Weather: Rain showers in AM. Clear and sunny in PM Remarks: Safety Meeting: Discussion with pilot of hell operating from same airstrip
Julian 23	14	TF		14:50	18:30	3.7				284.0					
Day 12				Hours Today		7.0				529.0	0.0	2071.0	0.0		
Saturday 24-Jan-04	15	TF				6.0				439.0	28.0				Weather: Rain and Low cloud all morning. Cloud lifted early PM. Remarks: Diurnal mag field out of spec 4lines reflown. Safety Meeting:
Julian 24															
Day 13				Hours Today		6.0				439.0	28.0	2510.0	28.0		
Sunday 25-Jan-04	16	TF		9:55	13:05	3.2									Weather: Fog in valleys in early AM, otherwise fine weather. Remarks: Main basemag at airfield stopped due battery problem Use Motel basemag between 12:35 and 14:07 Safety Meeting:
Julian 25	17	TF		13:25	15:35	2.2									
Day 14				Hours Today		5.4				318.0	0.0	2828.0			
Total Job Hours		44.2	Weekly Totals			28.1	0	0	0	1902.0	28.0			2.0	
			Total Aircraft Hours				Ltrs/Hr		0			Total Standby		2.0	
			Hours to Next Periodic				Running Avg			271.7 km/day		% Complete		100.0 %	
			Anticipated Hours Next week							67.8 km/hr		km Remaining		0.0 km	

APPENDIX II – Final Located Data Formats

Headers for final data files

MAGNETIC DATA - Zeehan

```

COMM ALLEGIANCE MINING NL - Zeehan, TAS (Zeehan area)
COMM .
COMM Job number: 1634
COMM Company: ALLEGIANCE MINING NL
COMM Flown and compiled: JANUARY 2004
COMM Survey company: FUGRO AIRBORNE SURVEYS PTY LTD
COMM Survey name: Zeehan (Zeehan area - 1 of 3 areas)
COMM Country: Australia
COMM State: TAS
COMM Located data creation date: 16 February 2004
COMM Zeehan Area boundary:
COMM (GDA94 MGA55)
COMM 356000 5353000
COMM 356000 5356000
COMM 351000 5356000
COMM 351000 5353000
COMM .
COMM SURVEY SPECIFICATIONS
COMM .
COMM AIRCRAFT - Bell B206 B3 Jetranger Helicopter
COMM .
COMM MAGNETOMETER - Geometrics G822A Cesium Vapour
COMM RESOLUTION - 0.001 nanotesla
COMM CYCLE RATE - 0.1 second
COMM MEAN SAMPLE INTERVAL - 2.5 to 3.0 metres
COMM .
COMM BASE MAGNETOMETER - Geometrics G856 Proton Precession
COMM SAMPLE RATE - 5 seconds
COMM .
COMM RADAR ALTIMETER - Collins ALT 50B radio altimeter
COMM GPS RECEIVER - Ashtech G-12
COMM .
COMM DATA ACQUISITION - Fugro DAS
COMM .
COMM FLIGHT LINE SPACING - 50 metres
COMM FLIGHT LINE DIRECTION - 000 - 180 degrees
COMM TIE LINE SPACING - 500 metres
COMM TIE LINE DIRECTION - 090 - 270 degrees
COMM .
COMM TRAVERSE LINE NUMBERS 1 to 102
COMM TIE LINE NUMBERS 901 to 907
COMM .
COMM NOMINAL SURVEY HEIGHT - 50 metres
COMM .
COMM NAVIGATION - GPS navigation system
COMM .
COMM FLIGHT PATH RECOVERY - Post-flight differentially corrected GPS
COMM .
COMM DATA PROCESSING
COMM .
COMM GEODETIC INFORMATION
COMM DATUM: AGD66
COMM PROJECTION: TMAMG
COMM ZONE: 55
COMM Central meridian: 147 deg.
COMM .
COMM MAGNETICS
COMM Parallax correction applied.

```

COMM Diurnal correction applied, base value 62008 nanoteslas.
 COMM IGRF model 2000 removed, base value 62065 nanoteslas.
 COMM Levelled using tie line information.
 COMM Micro-Levelling applied.
 COMM .

```

DEFN 1 ST=RECD,RT=PROJ; RT: A4
DEFN 2 ST=RECD,RT=PROJ; PROJNAME: A40: NAME=projection name, POSC projection name
DEFN 3 ST=RECD,RT=PROJ; ELLPSNAM: A10: NAME=ellipsoid name, POSC compliant ellipsoid
name
DEFN 4 ST=RECD,RT=PROJ; MAJ_AXIS: D8.0: UNIT=m, NAME=major_axis, Major axis in units
relevant to the ellipsoid definition
DEFN 5 ST=RECD,RT=PROJ; ECCENT: D11.8: NAME=eccentricity, 1/f inverse of flattening
DEFN 6 ST=RECD,RT=PROJ; PRIMEMER: D2.0: UNIT=deg, NAME=prime_meridian,Location of
prime meridian relative to Greenwich
DEFN 7 ST=RECD,RT=PROJ; PROJMETH: A24: NAME=projection_method, eg.Transverse Mercator,
Lambert etc
DEFN 8 ST=RECD,RT=PROJ; PARAM1: D2.0: NAME=Proj_par1
DEFN 9 ST=RECD,RT=PROJ; PARAM2: D4.0: NAME=Proj_par2
DEFN 10 ST=RECD,RT=PROJ; PARAM3: D7.4: NAME=Proj_par3
DEFN 11 ST=RECD,RT=PROJ; PARAM4: D7.0: NAME=Proj_par4
DEFN 12 ST=RECD,RT=PROJ; PARAM5: D9.0: NAME=Proj_par5
DEFN 1 ST=RECD,RT=TRNS; RT: A4
DEFN 2 ST=RECD,RT=TRNS; DTMTRNSFM: A25: NAME=Datum_transform
DEFN 3 ST=RECD,RT=TRNS; TRNSFRM1: D9.3: NAME=Trnsfrm_par1
DEFN 4 ST=RECD,RT=TRNS; TRNSFRM2: D8.3: NAME=Trnsfrm_par2
DEFN 5 ST=RECD,RT=TRNS; TRNSFRM3: D7.2: NAME=Trnsfrm_par3
DEFN 6 ST=RECD,RT=TRNS; TRNSFRM4: D6.3: NAME=Trnsfrm_par4
DEFN 7 ST=RECD,RT=TRNS; TRNSFRM5: D6.3: NAME=Trnsfrm_par5
DEFN 8 ST=RECD,RT=TRNS; TRNSFRM6: D6.3: NAME=Trnsfrm_par6
DEFN 9 ST=RECD,RT=TRNS; TRNSFRM7: D7.3: NAME=Trnsfrm_par7
DEFN ST=RECD,RT=COMM;RT:A4;COMMENTS:A76
DEFN 0 ST=RECD,RT=;RT:A4;FLTLIN:I8:NAME=line number
DEFN 1 ST=RECD,RT=;FIDUCIAL:F7.0:NULL=-9999.:NAME=fiducial number
DEFN 2 ST=RECD,RT=;FLIGHT:F3.0:NULL=-.:NAME=flight number
DEFN 3 ST=RECD,RT=;DAY:F3.0:NULL=-.:NAME=julian day
DEFN 4 ST=RECD,RT=;TIME:F8.1:NULL=-9999.9:UNIT=seconds:NAME=local time
DEFN 5 ST=RECD,RT=;LATITUDE:F12.7:NULL=-99.9999999:UNIT=dega:NAME=latitude (GDA94)
DEFN 6 ST=RECD,RT=;LONGITUDE:F12.7:NULL=-99.9999999:UNIT=dega:NAME=longitude (GDA94)
DEFN 7 ST=RECD,RT=;EASTGDA94:F10.2:NULL=-99999.99:UNIT=m:NAME=easting (GDA94)
DEFN 8 ST=RECD,RT=;NORTHGDA94:F11.2:NULL=-99999.99:UNIT=m:NAME=northing (GDA94)
DEFN 7 ST=RECD,RT=;EASTAGD66:F10.2:NULL=-99999.99:UNIT=m:NAME=easting (ADG66)
DEFN 8 ST=RECD,RT=;NORTHAGD66:F11.2:NULL=-99999.99:UNIT=m:NAME=northing (AGD66)
DEFN 9 ST=RECD,RT=;RAWMAG:F10.3:NULL=-9999.999:UNIT=nT:NAME=raw magnetics
DEFN 10 ST=RECD,RT=;COMPMAG:F10.3:NULL=-9999.999:UNIT=nT:NAME=compensated magnetics
DEFN 11 ST=RECD,RT=;BASEMAG:F10.3:NULL=-9999.999:UNIT=nT:NAME=base magnetics
DEFN 12 ST=RECD,RT=;FINMAG:F10.3:NULL=-9999.999:UNIT=nT:NAME=final magnetics
DEFN 13 ST=RECD,RT=;RADALT:F6.1:NULL=-99.9:UNIT=m:NAME=radar altimeter;END DEFN

```

DIGITAL ELEVATION DATA – Zeehan

```

COMM ALLEGIANCE MINING NL - Zeehan, TAS (Zeehan area)
COMM .
COMM Job number: 1634
COMM Company: ALLEGIANCE MINING NL
COMM Flown and compiled: JANUARY 2004
COMM Survey company: FUGRO AIRBORNE SURVEYS PTY LTD
COMM Survey name: Zeehan (Zeehan area - 1 of 3 areas)
COMM Country: Australia
COMM State: TAS
COMM Located data creation date: 16 February 2004
COMM Zeehan Area boundary:
COMM (GDA94 MGA55)
COMM 356000 5353000
COMM 356000 5356000
COMM 351000 5356000
COMM 351000 5353000
COMM .
COMM SURVEY SPECIFICATIONS
COMM .

```

COMM AIRCRAFT - Bell B206 B3 Jetranger Helicopter
 COMM .
 COMM RADAR ALTIMETER - Collins ALT 50B radio altimeter
 COMM GPS RECEIVER - Ashtech G-12
 COMM .
 COMM DATA ACQUISITION - Fugro DAS
 COMM .
 COMM FLIGHT LINE SPACING - 50 metres
 COMM FLIGHT LINE DIRECTION - 000 - 180 degrees
 COMM TIE LINE SPACING - 500 metres
 COMM TIE LINE DIRECTION - 090 - 270 degrees
 COMM .
 COMM TRAVERSE LINE NUMBERS 1 to 102
 COMM TIE LINE NUMBERS 901 to 907
 COMM .
 COMM NOMINAL SURVEY HEIGHT - 50 metres
 COMM .
 COMM NAVIGATION - GPS navigation system
 COMM .
 COMM FLIGHT PATH RECOVERY - Post-flight differentially corrected GPS
 COMM .
 COMM DATA PROCESSING
 COMM .
 COMM GEODETIC INFORMATION
 COMM DATUM: AGD66
 COMM PROJECTION: TMAMG
 COMM ZONE: 55
 COMM Central meridian: 147 deg.
 COMM .
 COMM DIGITAL ELEVATION MODEL
 COMM Parallax correction applied.
 COMM DTM = GPSALT - RADALT
 COMM Levelled using tie line information.
 COMM Micro-Levelling applied.
 COMM DTM adjusted to the Australian Height Datum to produce the final DEM.
 COMM .

DEFN 1 ST=RECD,RT=PROJ; RT: A4
 DEFN 2 ST=RECD,RT=PROJ; PROJNAME: A40: NAME=projection name, POSC projection name
 DEFN 3 ST=RECD,RT=PROJ; ELLPSNAM: A10: NAME=ellipsoid name, POSC compliant ellipsoid name
 DEFN 4 ST=RECD,RT=PROJ; MAJ_AXIS: D8.0: UNIT=m, NAME=major_axis, Major axis in units relevant to the ellipsoid definition
 DEFN 5 ST=RECD,RT=PROJ; ECCENT: D11.8: NAME=eccentricity, 1/f inverse of flattening
 DEFN 6 ST=RECD,RT=PROJ; PRIMEMER: D2.0: UNIT=deg, NAME=prime_meridian, Location of prime meridian relative to Greenwich
 DEFN 7 ST=RECD,RT=PROJ; PROJ METH: A24: NAME=projection_method, eg.Transverse Mercator, Lambert etc
 DEFN 8 ST=RECD,RT=PROJ; PARAM1: D2.0: NAME=Proj_par1
 DEFN 9 ST=RECD,RT=PROJ; PARAM2: D4.0: NAME=Proj_par2
 DEFN 10 ST=RECD,RT=PROJ; PARAM3: D7.4: NAME=Proj_par3
 DEFN 11 ST=RECD,RT=PROJ; PARAM4: D7.0: NAME=Proj_par4
 DEFN 12 ST=RECD,RT=PROJ; PARAM5: D9.0: NAME=Proj_par5
 DEFN 1 ST=RECD,RT=TRNS; RT: A4
 DEFN 2 ST=RECD,RT=TRNS; DTMTNRSFM: A25: NAME=Datum_transform
 DEFN 3 ST=RECD,RT=TRNS; TRNSFRM1: D9.3: NAME=Trnsfrm_par1
 DEFN 4 ST=RECD,RT=TRNS; TRNSFRM2: D8.3: NAME=Trnsfrm_par2
 DEFN 5 ST=RECD,RT=TRNS; TRNSFRM3: D7.2: NAME=Trnsfrm_par3
 DEFN 6 ST=RECD,RT=TRNS; TRNSFRM4: D6.3: NAME=Trnsfrm_par4
 DEFN 7 ST=RECD,RT=TRNS; TRNSFRM5: D6.3: NAME=Trnsfrm_par5
 DEFN 8 ST=RECD,RT=TRNS; TRNSFRM6: D6.3: NAME=Trnsfrm_par6
 DEFN 9 ST=RECD,RT=TRNS; TRNSFRM7: D7.3: NAME=Trnsfrm_par7
 DEFN ST=RECD,RT=COMM;RT:A4;COMMENTS:A76
 DEFN 0 ST=RECD,RT=;RT:A4;FLTLINE:I8:NAME=line number
 DEFN 1 ST=RECD,RT=;FIDUCIAL:F7.0:NULL=-9999.:NAME=fiducial number
 DEFN 2 ST=RECD,RT=;FLIGHT:F3.0:NULL=-.:NAME=flight number
 DEFN 3 ST=RECD,RT=;DAY:F3.0:NULL=-.:NAME=julian day
 DEFN 4 ST=RECD,RT=;TIME:F8.1:NULL=-9999.9:UNIT=seconds:NAME=local time
 DEFN 5 ST=RECD,RT=;LATITUDE:F12.7:NULL=-99.9999999:UNIT=dega:NAME=latitude (GDA94)
 DEFN 6 ST=RECD,RT=;LONGITUDE:F12.7:NULL=-99.9999999:UNIT=dega:NAME=longitude (GDA94)
 DEFN 7 ST=RECD,RT=;EASTGDA94:F10.2:NULL=-99999.99:UNIT=m:NAME=easting (GDA94)

```

DEFN 8 ST=RECD,RT=;NORTHGDA94:F11.2:NULL=-999999.99:UNIT=m:NAME=northing (GDA94)
DEFN 7 ST=RECD,RT=;EASTING:F10.2:NULL=-99999.99:UNIT=m:NAME=easting (AGD66)
DEFN 8 ST=RECD,RT=;NORTHING:F11.2:NULL=-999999.99:UNIT=m:NAME=northing (AGD66)
DEFN 9 ST=RECD,RT=;RADALT:F6.1:NULL=-99.9:UNIT=m:NAME=radar altimeter
DEFN 10 ST=RECD,RT=;GPSALT:F7.2:NULL=-99.99:UNIT=m:NAME=GPS altimeter
DEFN 11 ST=RECD,RT=;FINDEM:F7.2:NULL=-99.99:UNIT=m:NAME=final digital elevation
model;END DEFN

```

MAGNETIC DATA - Renison East

```

COMM ALLEGIANCE MINING NL - Zeehan, TAS (Renison East area)
COMM .
COMM Job number: 1634
COMM Company: ALLEGIANCE MINING NL
COMM Flown and compiled: JANUARY 2004
COMM Survey company: FUGRO AIRBORNE SURVEYS PTY LTD
COMM Survey name: Zeehan (Renison East area 2 of 3 areas)
COMM Country: Australia
COMM State: TAS
COMM Located data creation date: 16 February 2004
COMM Renison East Area boundary:
COMM (GDA94 MGA55)
COMM 371000 5374000
COMM 376000 5374000
COMM 376000 5370000
COMM 372000 5366000
COMM 369000 5366000
COMM 369000 5368000
COMM .
COMM SURVEY SPECIFICATIONS
COMM .
COMM AIRCRAFT - Bell B206 B3 Jetranger Helicopter
COMM .
COMM MAGNETOMETER - Geometrics G822A Cesium Vapour
COMM RESOLUTION - 0.001 nanotesla
COMM CYCLE RATE - 0.1 second
COMM MEAN SAMPLE INTERVAL - 2.5 to 3.0 metres
COMM .
COMM BASE MAGNETOMETER - Geometrics G856 Proton Precession
COMM SAMPLE RATE - 5 seconds
COMM .
COMM RADAR ALTIMETER - Collins ALT 50B radio altimeter
COMM GPS RECEIVER - Ashtech G-12
COMM .
COMM DATA ACQUISITION - Fugro DAS
COMM .
COMM FLIGHT LINE SPACING - 50 metres
COMM FLIGHT LINE DIRECTION - 090 - 270 degrees
COMM TIE LINE SPACING - 500 metres (901 to 9015)
COMM TIE LINE DIRECTION - 000 - 180 degrees (901 to 9015)
COMM TIE LINE DIRECTION - approx. 045 - 225 degrees (9016 to 9017)
COMM .
COMM TRAVERSE LINE NUMBERS 1 to 163
COMM TIE LINE NUMBERS 901 to 9017
COMM .
COMM NOMINAL SURVEY HEIGHT - 50 metres
COMM .
COMM NAVIGATION - GPS navigation system
COMM .
COMM FLIGHT PATH RECOVERY - Post-flight differentially corrected GPS
COMM .
COMM DATA PROCESSING
COMM .
COMM GEODETIC INFORMATION
COMM DATUM: AGD66
COMM PROJECTION: TMAMG
COMM ZONE: 55

```

```

COMM Central meridian: 147 deg.
COMM .
COMM MAGNETICS
COMM Parallax correction applied.
COMM Diurnal correction applied, base value 62000 nanoteslas.
COMM IGRF model 2000 removed, base value 61972 nanoteslas.
COMM Levelled using tie line information.
COMM Micro-Levelling applied.
COMM .

DEFN 1 ST=RECD,RT=PROJ; RT: A4
DEFN 2 ST=RECD,RT=PROJ; PROJNAME: A40: NAME=projection name, POSC projection name
DEFN 3 ST=RECD,RT=PROJ; ELLPSNAM: A10: NAME=ellipsoid name, POSC compliant ellipsoid
name
DEFN 4 ST=RECD,RT=PROJ; MAJ_AXIS: D8.0: UNIT=m, NAME=major_axis, Major axis in units
relevant to the ellipsoid definition
DEFN 5 ST=RECD,RT=PROJ; ECCENT: D11.8: NAME=eccentricity, 1/f inverse of flattening
DEFN 6 ST=RECD,RT=PROJ; PRIMEMER: D2.0: UNIT=deg, NAME=prime_meridian, Location of
prime meridian relative to Greenwich
DEFN 7 ST=RECD,RT=PROJ; PROJ METH: A24: NAME=projection_method, eg.Transverse Mercator,
Lambert etc
DEFN 8 ST=RECD,RT=PROJ; PARAM1: D2.0: NAME=Proj_par1
DEFN 9 ST=RECD,RT=PROJ; PARAM2: D4.0: NAME=Proj_par2
DEFN 10 ST=RECD,RT=PROJ; PARAM3: D7.4: NAME=Proj_par3
DEFN 11 ST=RECD,RT=PROJ; PARAM4: D7.0: NAME=Proj_par4
DEFN 12 ST=RECD,RT=PROJ; PARAM5: D9.0: NAME=Proj_par5
DEFN 1 ST=RECD,RT=TRNS; RT: A4
DEFN 2 ST=RECD,RT=TRNS; DTMTRNSFM: A25: NAME=Datum_transform
DEFN 3 ST=RECD,RT=TRNS; TRNSFRM1: D9.3: NAME=Trnsfrm_par1
DEFN 4 ST=RECD,RT=TRNS; TRNSFRM2: D8.3: NAME=Trnsfrm_par2
DEFN 5 ST=RECD,RT=TRNS; TRNSFRM3: D7.2: NAME=Trnsfrm_par3
DEFN 6 ST=RECD,RT=TRNS; TRNSFRM4: D6.3: NAME=Trnsfrm_par4
DEFN 7 ST=RECD,RT=TRNS; TRNSFRM5: D6.3: NAME=Trnsfrm_par5
DEFN 8 ST=RECD,RT=TRNS; TRNSFRM6: D6.3: NAME=Trnsfrm_par6
DEFN 9 ST=RECD,RT=TRNS; TRNSFRM7: D7.3: NAME=Trnsfrm_par7
DEFN ST=RECD,RT=COMM;RT:A4;COMMENTS:A76
DEFN 0 ST=RECD,RT=;RT:A4;FLTLINE:I8:NAME=line number
DEFN 1 ST=RECD,RT=;FIDUCIAL:F7.0:NULL=-9999.:NAME=fiducial number
DEFN 2 ST=RECD,RT=;FLIGHT:F3.0:NULL=-.:NAME=flight number
DEFN 3 ST=RECD,RT=;DAY:F3.0:NULL=-.:NAME=julian day
DEFN 4 ST=RECD,RT=;TIME:F8.1:NULL=-9999.9:UNIT=seconds:NAME=local time
DEFN 5 ST=RECD,RT=;LATITUDE:F12.7:NULL=-99.9999999:UNIT=dega:NAME=latitude (GDA94)
DEFN 6 ST=RECD,RT=;LONGITUDE:F12.7:NULL=-99.9999999:UNIT=dega:NAME=longitude (GDA94)
DEFN 7 ST=RECD,RT=;EASTGDA94:F10.2:NULL=-99999.99:UNIT=m:NAME=easting (GDA94)
DEFN 8 ST=RECD,RT=;NORTHGDA94:F11.2:NULL=-999999.99:UNIT=m:NAME=northing (GDA94)
DEFN 7 ST=RECD,RT=;EASTAGD66:F10.2:NULL=-99999.99:UNIT=m:NAME=easting (AGD66)
DEFN 8 ST=RECD,RT=;NORTHAGD66:F11.2:NULL=-999999.99:UNIT=m:NAME=northing (AGD66)
DEFN 9 ST=RECD,RT=;RAWMAG:F10.3:NULL=-9999.999:UNIT=nT:NAME=raw magnetics
DEFN 10 ST=RECD,RT=;COMPMAG:F10.3:NULL=-9999.999:UNIT=nT:NAME=compensated magnetics
DEFN 11 ST=RECD,RT=;BASEMAG:F10.3:NULL=-9999.999:UNIT=nT:NAME=base magnetics
DEFN 12 ST=RECD,RT=;FINMAG:F10.3:NULL=-9999.999:UNIT=nT:NAME=final magnetics
DEFN 13 ST=RECD,RT=;RADALT:F6.1:NULL=-99.9:UNIT=m:NAME=radar altimeter;END DEFN

```

DIGITAL ELEVATION DATA - Renison East

```

COMM ALLEGIANCE MINING NL - Zeehan, TAS (Renison East area)
COMM .
COMM Job number: 1634
COMM Company: ALLEGIANCE MINING NL
COMM Flown and compiled: JANUARY 2004
COMM Survey company: FUGRO AIRBORNE SURVEYS PTY LTD
COMM Survey name: Zeehan (Renison East 2 of 3 areas)
COMM Country: Australia
COMM State: TAS
COMM Located data creation date: 16 February 2004
COMM Renison East Area boundary:
COMM (GDA94 MGA55)
COMM 371000 5374000
COMM 376000 5374000
COMM 376000 5370000

```

```

COMM 372000 5366000
COMM 369000 5366000
COMM 369000 5368000
COMM .
COMM SURVEY SPECIFICATIONS
COMM .
COMM AIRCRAFT          - Bell B206 B3 Jetranger Helicopter
COMM .
COMM RADAR ALTIMETER   - Collins ALT 50B radio altimeter
COMM GPS RECEIVER      - Ashtech G-12
COMM .
COMM DATA ACQUISITION - Fugro DAS
COMM .
COMM FLIGHT LINE SPACING - 50 metres
COMM FLIGHT LINE DIRECTION - 090 - 270 degrees
COMM TIE    LINE SPACING - 500 metres (901 to 9015)
COMM TIE    LINE DIRECTION - 000 - 180 degrees (901 to 9015)
COMM TIE    LINE DIRECTION - approx. 045 - 225 degrees (9016 to 9017)
COMM .
COMM TRAVERSE LINE NUMBERS 1 to 163
COMM TIE LINE NUMBERS      901 to 9017
COMM .
COMM NOMINAL SURVEY HEIGHT - 50 metres
COMM .
COMM NAVIGATION           - GPS navigation system
COMM .
COMM FLIGHT PATH RECOVERY - Post-flight differentially corrected GPS
COMM .
COMM DATA PROCESSING
COMM .
COMM GEODETIC INFORMATION
COMM DATUM: AGD66
COMM PROJECTION: TMAMG
COMM ZONE: 55
COMM Central meridian: 147 deg.
COMM .
COMM DIGITAL ELEVATION MODEL
COMM Parallax correction applied.
COMM Radar Altimeter filtered slightly before the DTM was created
COMM DTM = GPSALT - filtered RADALT
COMM Levelled using tie line information.
COMM Micro-Levelling applied.
COMM DTM adjusted to the Australian Height Datum to produce the final DEM.
COMM .

```

```

DEFN 1 ST=RECD,RT=PROJ; RT: A4
DEFN 2 ST=RECD,RT=PROJ; PROJNAME: A40: NAME=projection name, POSC projection name
DEFN 3 ST=RECD,RT=PROJ; ELLPSNAM: A10: NAME=ellipsoid name, POSC compliant ellipsoid
name
DEFN 4 ST=RECD,RT=PROJ; MAJ_AXIS: D8.0: UNIT=m, NAME=major_axis, Major axis in units
relevant to the ellipsoid definition
DEFN 5 ST=RECD,RT=PROJ; ECCENT: D11.8: NAME=eccentricity, 1/f inverse of flattening
DEFN 6 ST=RECD,RT=PROJ; PRIMEMER: D2.0: UNIT=deg, NAME=prime_meridian, Location of
prime meridian relative to Greenwich
DEFN 7 ST=RECD,RT=PROJ; PROJ METH: A24: NAME=projection_method, eg.Transverse Mercator,
Lambert etc
DEFN 8 ST=RECD,RT=PROJ; PARAM1: D2.0: NAME=Proj_par1
DEFN 9 ST=RECD,RT=PROJ; PARAM2: D4.0: NAME=Proj_par2
DEFN 10 ST=RECD,RT=PROJ; PARAM3: D7.4: NAME=Proj_par3
DEFN 11 ST=RECD,RT=PROJ; PARAM4: D7.0: NAME=Proj_par4
DEFN 12 ST=RECD,RT=PROJ; PARAM5: D9.0: NAME=Proj_par5
DEFN 1 ST=RECD,RT=TRNS; RT: A4
DEFN 2 ST=RECD,RT=TRNS; DTMTRNSFM: A25: NAME=Datum_transform
DEFN 3 ST=RECD,RT=TRNS; TRNSFRM1: D9.3: NAME=Trnsfrm_par1
DEFN 4 ST=RECD,RT=TRNS; TRNSFRM2: D8.3: NAME=Trnsfrm_par2
DEFN 5 ST=RECD,RT=TRNS; TRNSFRM3: D7.2: NAME=Trnsfrm_par3
DEFN 6 ST=RECD,RT=TRNS; TRNSFRM4: D6.3: NAME=Trnsfrm_par4
DEFN 7 ST=RECD,RT=TRNS; TRNSFRM5: D6.3: NAME=Trnsfrm_par5
DEFN 8 ST=RECD,RT=TRNS; TRNSFRM6: D6.3: NAME=Trnsfrm_par6
DEFN 9 ST=RECD,RT=TRNS; TRNSFRM7: D7.3: NAME=Trnsfrm_par7

```

```

DEFN  ST=RECD,RT=COMM;RT:A4;COMMENTS:A76
DEFN  0 ST=RECD,RT=;RT:A4;FTLINE:I8:NAME=line number
DEFN  1 ST=RECD,RT=;FIDUCIAL:F7.0:NULL=-9999.:NAME=fiducial number
DEFN  2 ST=RECD,RT=;FLIGHT:F3.0:NULL=-.:NAME=flight number
DEFN  3 ST=RECD,RT=;DAY:F3.0:NULL=-.:NAME=julian day
DEFN  4 ST=RECD,RT=;TIME:F8.1:NULL=-9999.9:UNIT=seconds:NAME=local time
DEFN  5 ST=RECD,RT=;LATITUDE:F12.7:NULL=-99.9999999:UNIT=deg:NAME=latitude (GDA94)
DEFN  6 ST=RECD,RT=;LONGITUDE:F12.7:NULL=-99.9999999:UNIT=deg:NAME=longitude (GDA94)
DEFN  7 ST=RECD,RT=;EASTGDA94:F10.2:NULL=-99999.99:UNIT=m:NAME=easting (GDA94)
DEFN  8 ST=RECD,RT=;NORTHGDA94:F11.2:NULL=-999999.99:UNIT=m:NAME=northing (GDA94)
DEFN  7 ST=RECD,RT=;EASTAGD66:F10.2:NULL=-99999.99:UNIT=m:NAME=easting (AGD66)
DEFN  8 ST=RECD,RT=;NORTHAGD66:F11.2:NULL=-999999.99:UNIT=m:NAME=northing (AGD66)
DEFN  9 ST=RECD,RT=;RADALT:F6.1:NULL=-99.9:UNIT=m:NAME=radar altimeter
DEFN 10 ST=RECD,RT=;GPSALT:F7.2:NULL=-99.99:UNIT=m:NAME=GPS altimeter
DEFN 11 ST=RECD,RT=;FINDEM:F7.2:NULL=-99.99:UNIT=m:NAME=final digital elevation
model;END DEFN

```

MAGNETIC DATA – Heazlewood

```

COMM ALLEGIANCE MINING NL - Zeehan, TAS (Heazlewood area)
COMM .
COMM Job number:                1634
COMM Company:                   ALLEGIANCE MINING NL
COMM Flown and compiled:        JANUARY 2004
COMM Survey company:            FUGRO AIRBORNE SURVEYS PTY LTD
COMM Survey name:               Zeehan (Heazlewood 1 of 3 areas)
COMM Country:                   Australia
COMM State:                     TAS
COMM Located data creation date: 16 February 2004
COMM Heazlewood Area boundary:
COMM (GDA94 MGA55)
COMM 364000 5402000
COMM 364000 5410000
COMM 361000 5410000
COMM 361000 5408000
COMM 357000 5408000
COMM 357000 5406000
COMM 356000 5406000
COMM 356000 5404000
COMM 357000 5404000
COMM 357000 5398000
COMM 360000 5398000
COMM 360000 5402000
COMM .
COMM SURVEY SPECIFICATIONS
COMM .
COMM AIRCRAFT                   - Bell B206 B3 Jetranger Helicopter
COMM .
COMM MAGNETOMETER               - Geometrics G822A Cesium Vapour
COMM RESOLUTION                 - 0.001 nanotesla
COMM CYCLE RATE                 - 0.1 second
COMM MEAN SAMPLE INTERVAL      - 2.5 to 3.0 metres
COMM .
COMM BASE MAGNETOMETER          - Geometrics G856 Proton Precession
COMM SAMPLE RATE                - 5 seconds
COMM .
COMM RADAR ALTIMETER            - Collins ALT 50B radio altimeter
COMM GPS RECEIVER               - Ashtech G-12
COMM .
COMM DATA ACQUISITION          - Fugro DAS
COMM .
COMM FLIGHT LINE SPACING        - 50 metres
COMM FLIGHT LINE DIRECTION      - 090 - 270 degrees
COMM TIE LINE SPACING           - 500 metres
COMM TIE LINE DIRECTION         - 000 - 180 degrees
COMM .
COMM TRAVERSE LINE NUMBERS      1 to 242
COMM TIE LINE NUMBERS           901 to 9017
COMM .

```


COMM NOMINAL SURVEY HEIGHT - 50 metres
COMM .
COMM NAVIGATION - GPS navigation system
COMM .
COMM FLIGHT PATH RECOVERY - Post-flight differentially corrected GPS
COMM .
COMM DATA PROCESSING
COMM .
COMM GEODETIC INFORMATION
COMM DATUM: AGD66
COMM PROJECTION: TMAMG
COMM ZONE: 55
COMM Central meridian: 147 deg.
COMM .
COMM MAGNETICS
COMM Parallax correction applied.
COMM Diurnal correction applied, base value 62002 nanoteslas.
COMM IGRF model 2000 removed, base value 61852 nanoteslas.
COMM Levelled using tie line information.
COMM Micro-Levelling applied.
COMM .

DEFN 1 ST=RECD,RT=PROJ; RT: A4
DEFN 2 ST=RECD,RT=PROJ; PROJNAME: A40: NAME=projection name, POSC projection name
DEFN 3 ST=RECD,RT=PROJ; ELLPSNAM: A10: NAME=ellipsoid name, POSC compliant ellipsoid name
DEFN 4 ST=RECD,RT=PROJ; MAJ_AXIS: D8.0: UNIT=m, NAME=major_axis, Major axis in units relevant to the ellipsoid definition
DEFN 5 ST=RECD,RT=PROJ; ECCENT: D11.8: NAME=eccentricity, 1/f inverse of flattening
DEFN 6 ST=RECD,RT=PROJ; PRIMEMER: D2.0: UNIT=deg, NAME=prime_meridian, Location of prime meridian relative to Greenwich
DEFN 7 ST=RECD,RT=PROJ; PROJMETH: A24: NAME=projection_method, eg.Transverse Mercator, Lambert etc
DEFN 8 ST=RECD,RT=PROJ; PARAM1: D2.0: NAME=Proj_par1
DEFN 9 ST=RECD,RT=PROJ; PARAM2: D4.0: NAME=Proj_par2
DEFN 10 ST=RECD,RT=PROJ; PARAM3: D7.4: NAME=Proj_par3
DEFN 11 ST=RECD,RT=PROJ; PARAM4: D7.0: NAME=Proj_par4
DEFN 12 ST=RECD,RT=PROJ; PARAM5: D9.0: NAME=Proj_par5
DEFN 1 ST=RECD,RT=TRNS; RT: A4
DEFN 2 ST=RECD,RT=TRNS; DTMTRNSFM: A25: NAME=Datum_transform
DEFN 3 ST=RECD,RT=TRNS; TRNSFRM1: D9.3: NAME=Trnsfrm_par1
DEFN 4 ST=RECD,RT=TRNS; TRNSFRM2: D8.3: NAME=Trnsfrm_par2
DEFN 5 ST=RECD,RT=TRNS; TRNSFRM3: D7.2: NAME=Trnsfrm_par3
DEFN 6 ST=RECD,RT=TRNS; TRNSFRM4: D6.3: NAME=Trnsfrm_par4
DEFN 7 ST=RECD,RT=TRNS; TRNSFRM5: D6.3: NAME=Trnsfrm_par5
DEFN 8 ST=RECD,RT=TRNS; TRNSFRM6: D6.3: NAME=Trnsfrm_par6
DEFN 9 ST=RECD,RT=TRNS; TRNSFRM7: D7.3: NAME=Trnsfrm_par7
DEFN ST=RECD,RT=COMM;RT:A4;COMMENTS:A76
DEFN 0 ST=RECD,RT=;RT:A4;FLTLINE:I8:NAME=line number
DEFN 1 ST=RECD,RT=;FIDUCIAL:F7.0:NULL=-9999.:NAME=fiducial number
DEFN 2 ST=RECD,RT=;FLIGHT:F3.0:NULL=-.:NAME=flight number
DEFN 3 ST=RECD,RT=;DAY:F3.0:NULL=-.:NAME=julian day
DEFN 4 ST=RECD,RT=;TIME:F8.1:NULL=-9999.9:UNIT=seconds:NAME=local time
DEFN 5 ST=RECD,RT=;LATITUDE:F12.7:NULL=-99.9999999:UNIT=dega:NAME=latitude (GDA94)
DEFN 6 ST=RECD,RT=;LONGITUDE:F12.7:NULL=-99.9999999:UNIT=dega:NAME=longitude (GDA94)
DEFN 7 ST=RECD,RT=;EASTGDA94:F10.2:NULL=-99999.99:UNIT=m:NAME=easting (GDA94)
DEFN 8 ST=RECD,RT=;NORTHGDA94:F11.2:NULL=-999999.99:UNIT=m:NAME=northing (GDA94)
DEFN 7 ST=RECD,RT=;EASTAGD66:F10.2:NULL=-99999.99:UNIT=m:NAME=easting (AGD66)
DEFN 8 ST=RECD,RT=;NORTHAGD66:F11.2:NULL=-999999.99:UNIT=m:NAME=northing (AGD66)
DEFN 9 ST=RECD,RT=;RAWMAG:F10.3:NULL=-9999.999:UNIT=nT:NAME=raw magnetics
DEFN 10 ST=RECD,RT=;COMPMAG:F10.3:NULL=-9999.999:UNIT=nT:NAME=compensated magnetics
DEFN 11 ST=RECD,RT=;BASEMAG:F10.3:NULL=-9999.999:UNIT=nT:NAME=base magnetics
DEFN 12 ST=RECD,RT=;FINMAG:F10.3:NULL=-9999.999:UNIT=nT:NAME=final magnetics
DEFN 13 ST=RECD,RT=;RADALT:F6.1:NULL=-99.9:UNIT=m:NAME=radar altimeter;END DEFN

DIGITAL ELEVATION DATA - Heazlewood

COMM ALLEGIANCE MINING NL - Zeehan, TAS (Heazlewood area)
COMM .
COMM Job number: 1634

COMM Company: ALLEGIANCE MINING NL
 COMM Flown and compiled: JANUARY 2004
 COMM Survey company: FUGRO AIRBORNE SURVEYS PTY LTD
 COMM Survey name: Zeehan (Heazlewood area – one of 3 areas)
 COMM Country: Australia
 COMM State: TAS
 COMM Located data creation date: 16 February 2004
 COMM Heazlewood Area boundary:
 COMM (GDA94 MGA55)
 COMM 364000 5402000
 COMM 364000 5410000
 COMM 361000 5410000
 COMM 361000 5408000
 COMM 357000 5408000
 COMM 357000 5406000
 COMM 356000 5406000
 COMM 356000 5404000
 COMM 357000 5404000
 COMM 357000 5398000
 COMM 360000 5398000
 COMM 360000 5402000
 COMM .
 COMM SURVEY SPECIFICATIONS
 COMM .
 COMM AIRCRAFT - Bell B206 B3 Jetranger Helicopter
 COMM .
 COMM RADAR ALTIMETER - Collins ALT 50B radio altimeter
 COMM GPS RECEIVER - Ashtech G-12
 COMM .
 COMM DATA ACQUISITION - Fugro DAS
 COMM .
 COMM FLIGHT LINE SPACING - 50 metres
 COMM FLIGHT LINE DIRECTION - 090 - 270 degrees
 COMM TIE LINE SPACING - 500 metres
 COMM TIE LINE DIRECTION - 000 - 180 degrees
 COMM .
 COMM TRAVERSE LINE NUMBERS 1 to 242
 COMM TIE LINE NUMBERS 901 to 9017
 COMM .
 COMM NOMINAL SURVEY HEIGHT - 50 metres
 COMM .
 COMM NAVIGATION - GPS navigation system
 COMM .
 COMM FLIGHT PATH RECOVERY - Post-flight differentially corrected GPS
 COMM .
 COMM DATA PROCESSING
 COMM .
 COMM GEODETIC INFORMATION
 COMM DATUM: AGD66
 COMM PROJECTION: TMAMG
 COMM ZONE: 55
 COMM Central meridian: 147 deg.
 COMM .
 COMM DIGITAL ELEVATION MODEL
 COMM Parallax correction applied.
 COMM Radar Altimeter filtered slightly before the DTM was created
 COMM DTM = GPSALT - filtered RADALT
 COMM Levelled using tie line information.
 COMM Micro-Levelling applied.
 COMM DTM adjusted to the Australian Height Datum to produce the final DEM.
 COMM .

DEFN 1 ST=RECD,RT=PROJ; RT: A4
 DEFN 2 ST=RECD,RT=PROJ; PROJNAME: A40: NAME=projection name, POSC projection name
 DEFN 3 ST=RECD,RT=PROJ; ELLPSNAM: A10: NAME=ellipsoid name, POSC compliant ellipsoid name

```
DEFN 4 ST=RECD,RT=PROJ; MAJ_AXIS: D8.0: UNIT=m, NAME=major_axis, Major axis in units
relevant to the ellipsoid definition
DEFN 5 ST=RECD,RT=PROJ; ECCENT: D11.8: NAME=eccentricity, 1/f inverse of flattening
DEFN 6 ST=RECD,RT=PROJ; PRIMEMER: D2.0: UNIT=deg, NAME=prime_meridian, Location of
prime meridian relative to Greenwich
DEFN 7 ST=RECD,RT=PROJ; PROJMETH: A24: NAME=projection_method, eg.Transverse Mercator,
Lambert etc
DEFN 8 ST=RECD,RT=PROJ; PARAM1: D2.0: NAME=Proj_par1
DEFN 9 ST=RECD,RT=PROJ; PARAM2: D4.0: NAME=Proj_par2
DEFN 10 ST=RECD,RT=PROJ; PARAM3: D7.4: NAME=Proj_par3
DEFN 11 ST=RECD,RT=PROJ; PARAM4: D7.0: NAME=Proj_par4
DEFN 12 ST=RECD,RT=PROJ; PARAM5: D9.0: NAME=Proj_par5
DEFN 1 ST=RECD,RT=TRNS; RT: A4
DEFN 2 ST=RECD,RT=TRNS; DTMTNRSFM: A25: NAME=Datum_transform
DEFN 3 ST=RECD,RT=TRNS; TRNSFRM1: D9.3: NAME=Trnsfrm_par1
DEFN 4 ST=RECD,RT=TRNS; TRNSFRM2: D8.3: NAME=Trnsfrm_par2
DEFN 5 ST=RECD,RT=TRNS; TRNSFRM3: D7.2: NAME=Trnsfrm_par3
DEFN 6 ST=RECD,RT=TRNS; TRNSFRM4: D6.3: NAME=Trnsfrm_par4
DEFN 7 ST=RECD,RT=TRNS; TRNSFRM5: D6.3: NAME=Trnsfrm_par5
DEFN 8 ST=RECD,RT=TRNS; TRNSFRM6: D6.3: NAME=Trnsfrm_par6
DEFN 9 ST=RECD,RT=TRNS; TRNSFRM7: D7.3: NAME=Trnsfrm_par7
DEFN ST=RECD,RT=COMM;RT:A4;COMMENTS:A76
DEFN 0 ST=RECD,RT=;RT:A4;FLTLINE:I8:NAME=line number
DEFN 1 ST=RECD,RT=;FIDUCIAL:F7.0:NULL=-9999.:NAME=fiducial number
DEFN 2 ST=RECD,RT=;FLIGHT:F3.0:NULL=-.:NAME=flight number
DEFN 3 ST=RECD,RT=;DAY:F3.0:NULL=-.:NAME=julian day
DEFN 4 ST=RECD,RT=;TIME:F8.1:NULL=-9999.9:UNIT=seconds:NAME=local time
DEFN 5 ST=RECD,RT=;LATITUDE:F12.7:NULL=-99.9999999:UNIT=dega:NAME=latitude (GDA94)
DEFN 6 ST=RECD,RT=;LONGITUDE:F12.7:NULL=-99.9999999:UNIT=dega:NAME=longitude (GDA94)
DEFN 7 ST=RECD,RT=;EASTGDA94:F10.2:NULL=-99999.99:UNIT=m:NAME=easting (GDA94)
DEFN 8 ST=RECD,RT=;NORTHGDA94:F11.2:NULL=-999999.99:UNIT=m:NAME=northing (GDA94)
DEFN 7 ST=RECD,RT=;EASTAGD66:F10.2:NULL=-99999.99:UNIT=m:NAME=easting (AGD66)
DEFN 8 ST=RECD,RT=;NORTHAGD66:F11.2:NULL=-999999.99:UNIT=m:NAME=northing (AGD66)
DEFN 9 ST=RECD,RT=;RADALT:F6.1:NULL=-99.9:UNIT=m:NAME=radar altimeter
DEFN 10 ST=RECD,RT=;GPSALT:F7.2:NULL=-99.99:UNIT=m:NAME=GPS altimeter
DEFN 11 ST=RECD,RT=;FINDEM:F7.2:NULL=-99.99:UNIT=m:NAME=final digital elevation
model;END DEFN
```

APPENDIX III – List Of All Supplied Data

Final Located Data

- 0.1 second magnetics for each area
- 1.0 second dem for each area

Final located data is in ASEG-GDF ASCII format. Contents are shown in Appendix II.

Trial Harbour magnetic and DEM data flown by UTS in 1998 were also supplied. Formats and specifications are shown in Appendix IV.

Final Gridded Data

Final gridded data was produced in ERMapper format for the Zeehan, Renison East and Heazlewood areas.

- Total Magnetic Intensity (TMI)
- Total Magnetic Intensity Reduced to the Pole (TMIRTP)
- Total Magnetic Intensity First Vertical Derivative (TMI1VD)
- Total Magnetic Intensity Second Vertical Derivative (TMI2VD)
- Total Magnetic Intensity Analytic Signal (TMIAS)
- Digital Elevation Model (DEM)

Also delivered was Trial Harbour magnetic and DEM grids flown by UTS in 1998. A merge of these 1998 grids with the new Zeehan area grids were also delivered.

Hardcopy Products (2 copies of each supplied)

Plots of each of the new areas as well as the merged area were as follows:

The Renison East, Heazlewood and merged maps are at 1:25000 scale.

The Zeehan maps are at 1:10000 scale.

- Flight Path
- Non-linear colour magnetic image with a north east shade

APPENDIX IV – Trial Harbour Specifications and Formats

UTS GEOPHYSICS – GEOPHYSICAL SURVEY SPECIFICATIONS

CLIENT NAME: ALLEGIANCE MINING NL
 JOB NUMBER: A260

PROJECT AREA 1 – TRIAL HARBOUR PROJECT

LINE SPACING: 50m
 LINE DIRECTION: 000 – 180
 TIE LINE SPACING: 500m
 TIE LINE DIRECTION: 090 – 270
 SURVEY HEIGHT: 50m
 SURVEY FLOWN: APRIL 1998

AIRCRAFT TYPE: SQUIRREL AS-350B
 MAGNETOMETER: SCINTREX CESIUM VAPOUR CS2
 SAMPLE RATE: 0.1sec / 4-5m
 SPECTROMETER: N/A
 SAMPLE RATE: N/A
 DATA POSITIONING: REAL TIME DIFFERENTIAL GPS
 GPS TYPE: NOVATEL 951R, 12 CHANNEL
 RADAR ALTIMETER: KING KRA405
 DIURNAL MAGNETOMETER: SCINTREX ENVI-MAG
 SAMPLE RATE: 5 sec

UTS GEOPHYSICS

MAGNETIC SURVEY LOCATED DATA FORMAT – VERSION 9709

FIELD	FORMAT	DESCRIPTION	UNITS
1	I6	LINE NUMBER	
2	I5	FLIGHT/AREA NUMBER	AAFF (Area/Flight)
3	I8	DATE	YYMMDD
4	F11.1	TIME	sec
5	I8	FIDUCIAL NUMBER	
6	I3	UTM/AMG ZONE	
7	F10.2	EASTING (AMG84)	metres
8	F11.2	NORTHING (AMG84)	metres
9	F13.7	LATITUDE (WGS84)	degrees
10	F13.7	LONGITUDE (WGS84)	degrees
11	F7.1	RADAR ALTIMETER HEIGHT	metres
12	F7.1	GPS HEIGHT (WGS84)	metres
13	F7.1	TERRAIN HEIGHT (CORRECTED)	metres
14	F10.2	RAW MAGNETIC INTENSITY	nT
15	F10.2	DIURNAL CORRECTION	nT
16	F10.2	IGRF CORRECTION	nT
17	F10.2	LEVELLED, IGRF CORRECTED	nT

SAMPLE MAGNETIC LOCATED DATA FILE LISTING

100011	103	980422	44588.5	445890	55	360934.88	5355908.00	-41.9349219
145.3239281	480.3	783.2	295.9	62151.246		5.859	62174.957	2.057

100011	103	980422	44588.6	445891	55	360935.16	5355911.50	-41.9348904
145.3239323		479.6	782.9	296.5	62151.234		5.859 62174.945	2.145
100011	103	980422	44588.7	445892	55	360935.41	5355915.50	-41.9348545
145.3239363		478.7	782.7	297.2	62151.223		5.859 62174.930	2.241
100011	103	980422	44588.8	445893	55	360935.69	5355919.00	-41.9348230
145.3239405		475.5	782.5	300.2	62151.207		5.859 62174.914	2.343
100011	103	980422	44588.9	445894	55	360935.94	5355922.50	-41.9347915
145.3239443		472.2	782.3	303.4	62151.195		5.859 62174.902	2.448
100011	103	980422	44589.0	445895	55	360936.22	5355926.50	-41.9347556
145.3239486		472.9	782.1	302.5	62151.184		5.859 62174.887	2.555
100011	103	980422	44589.1	445896	55	360936.59	5355930.00	-41.9347241
145.3239539		473.1	781.9	302.1	62151.172		5.859 62174.875	2.664
100011	103	980422	44589.2	445897	55	360936.94	5355933.50	-41.9346927
145.3239590		470.1	781.6	304.9	62151.156		5.859 62174.859	2.772
100011	103	980422	44589.3	445898	55	360937.31	5355937.50	-41.9346567
145.3239644		469.5	781.4	305.3	62151.141		5.859 62174.840	2.880
100011	103	980422	44589.4	445899	55	360937.69	5355941.00	-41.9346253
145.3239698		469.2	781.2	305.5	62151.133		5.859 62174.828	2.986
100011	103	980422	44589.5	445900	55	360938.06	5355945.00	-41.9345893
145.3239752		469.5	781.0	304.9	62151.129		5.859 62174.812	3.091
100011	103	980422	44589.6	445901	55	360938.47	5355948.50	-41.9345579
145.3239810		469.4	780.7	304.8	62151.129		5.859 62174.797	3.194
100011	103	980422	44589.7	445902	55	360938.91	5355952.00	-41.9345265
145.3239871		467.9	780.4	306.1	62151.137		5.859 62174.785	3.295
100011	103	980422	44589.8	445903	55	360939.31	5355956.00	-41.9344905
145.3239929		467.9	780.1	305.8	62151.148		5.859 62174.770	3.395
100011	103	980422	44589.9	445904	55	360939.75	5355959.50	-41.9344591
145.3239990		468.6	779.8	304.8	62151.160		5.859 62174.754	3.493

MAGNETIC DATA PROCESSING DETAILS

The final magnetic data provided has been corrected and levelled using the following processes:

- * The diurnal magnetic base station data was applied to the survey data for removal of diurnal variations.
- * The regional magnetic gradient (IGRF) computed at the date of the survey was removed from the survey data.
- * System positional parallax was corrected.
- * The data was levelled using the survey tie line data.
- * The data was microlevelled to remove minor residual variations in profile intensities.

GRIDDED DATASET FORMATS

Gridding was performed using a bicubic spline algorithm. The following grid formats have been provided:

- * ERMapper format
- * Geosoft 2 byte integer format

COORDINATE SYSTEM INFORMATION

WGS84 - World Geodetic System 1984

Coordinate Type : Geographical

Semi Major Axis : 6378137

Flattening : 1/298.257223563

AMG84 - Australian Map Grid 1984

Coordinate Type : Universal Transverse Mercator Projection

Derived from the ANS66 spheroid

Semi Major Axis : 6378160

Flattening : 1/298.25

LINE NUMBER FORMATS

Six digit line numbers - ALLLLB

A : Area number
LLLL : Survey line number
0001-8999 = survey lines
9001-9999 = tie lines
B : Line attempt number, 0 = attempt 1

FILE NAMING FORMATS

Located and gridded data file names used - JJJJAABB.EEE

JJJJ : UTS Job number
AA : Area number if the survey is broken into blocks
BB : M = Magnetic data
: R = Radiometric data
: TC = Total count data
: K = Potassium data
: U = Uranium data
: Th = Thorium data
: DT = Digital terrain data
EEE : File name extension
: LDT = Located digital data file
: FMT = Located data format definition file
: ERS = Ermapper gridded data file
: GRD = Geosoft gridded data file

APPENDIX V – GPS Precision Test

Results of Hover Test over Mt. Zeehan Survey mark

Trig coords

Averaged Hover coords

Site Name	ZEEHAN MT	Helicopter
Zone	55	
Easting	360944.285	360944.4863
Northing	5357000.900	5357001.989
Ell. Height		
Hor. Datum	GDA94	
Hor. Class	TRA	
Hor. Order	3RD	
Target	BCN	
Height	701.48	700.8664
Ht. Datum	AHD79	
Ht. Class	TRG	
Ht. Order	4TH	
Status	EXISTING	