

South West Tasmania Offshore Airborne Magnetic Survey

for

Geoscience Australia

Acquisition and Processing Report

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Authorised for release by :

Survey flown: January – March 2008

by



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FAS JOB# 1969

GA JOB# 1182

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1. INTRODUCTION

This report provides details of the SW Tasmania offshore airborne magnetic survey, carried out in Tasmania. The survey area consists of 26,525 line kilometres flown in one block over 44 flights. The survey was flown for the Commonwealth of Australia through Geoscience Australia (GA), and was undertaken by Fugro Airborne Surveys Pty Ltd.

2. SURVEY DETAILS

2.1 Project Identification

Area Name:	SW Tasmania Offshore, Tas
Contractor:	Fugro Airborne Surveys Pty Ltd
Geoscience Job No.:	1182
Fugro Job No.:	1969

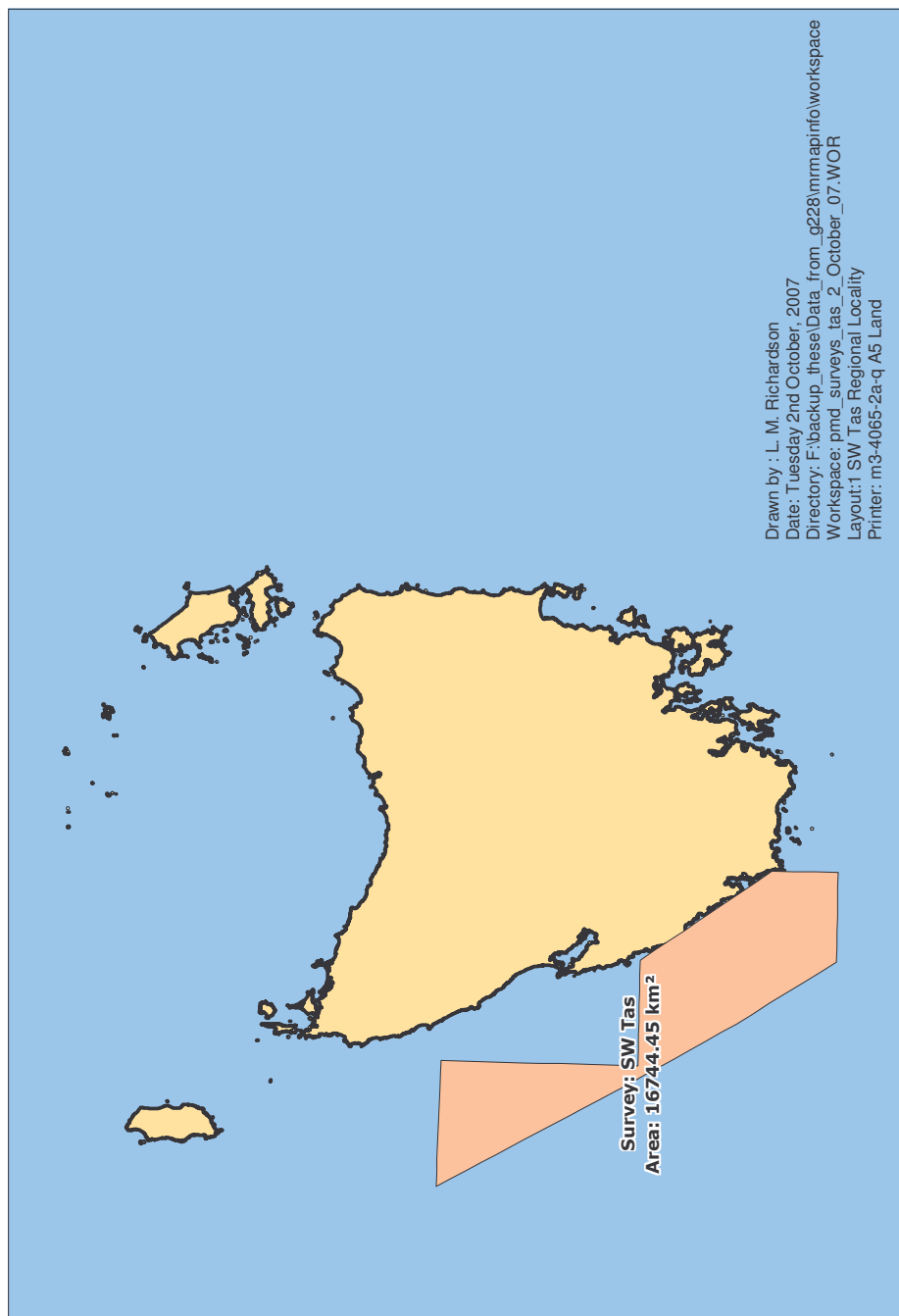
2.2 Survey Location

The survey location is shown in Figure 1.

Survey boundary co-ordinates for 800 m line spacing in GDA94 MGA Zone 55

	Longitude	Latitude
1	143.470357	-41.461370
2	144.489851	-41.491434
3	144.447548	-42.686205
4	145.304612	-42.698652
5	146.024920	-43.499011
6	146.018410	-43.899344
7	145.290469	-43.889645

Figure 1 SW Tasmania Offshore, Tas



2.3 Specifications and Tolerances

Fugro job number	1969
Geoscience Australia project number	1182
Line kilometres (including ties)	26,525 km
Traverse direction	090°-270°
Traverse spacing	800 m
Traverse line numbers	10001 – 10335
Tie-line direction	000°-180°
Tie-line spacing	4,000 m
Tie line numbers	19001 – 19055
Nominal Terrain Clearance	90 m

Sample Intervals:

Magnetics (aircraft)	10 Hz (approx. 7.0 m)
GPS positions	1 Hz
Radar altimeter	10 Hz
Temperature & pressure	1 Hz
Magnetics (base stations)	2 s

Contracted tolerances:

Flight or tie lines	must not exceed 20 m off course for 1 km or more
Position accuracy	5 m horizontal; 10 m height
Radar altimeter accuracy	0.3 m
Temperature accuracy	1 °C
Pressure accuracy	0.1%

Magnetic base stations:

Noise envelope	0.1 nT
Variation	5 nT in 5 minutes and less than 1 nT from any chord 1 minute long across the diurnal record

Aircraft magnetometer:

Non-geological noise envelope	0.1 nT
Variation with heading	+/- 1 nT
Total noise on unfiltered profiles	0.2 nT

Terrain clearance envelope	80 to 100 m
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3. PROJECT PERSONNEL

PROJECT SUPERVISION	Bart Anderson – Fugro: data acquisition Denis Cowey – Fugro: data processing
SURVEY PILOTS	Gary Underwood, Tim Masefield, Troy Wilhelmi, Kobus Terblanche
SURVEY OPERATORS	Gavin Jones (Crew Leader), Moses Mureithi, Matthew Price (Crew Leader)
FIELD PROCESSING	Mathew Price (crew leader), Gavin Jones (crew leader)
TECHNICIAN/ENGINEER	Adam Rae
DATA PROCESSING	Peter Chambers

4. ACQUISITION

4.1 Aircraft and Equipment

VH-WAM

Aircraft Model	Aerocommander Shrike 500S
Aircraft Registration	VH-WAM
Aircraft Magnetometer	Scintrex CS-2 Caesium vapour
Magnetic Compensator	Fugro FASDAS mag decoupler unit
Base station magnetometer	2 x Scintrex ENVI Mag magnetometer
Altimeter	Sperry Stars AA-200 radio altimeter
Barometer	Paroscientific Digibaro
Thermometer	Vaisala HMY 133 temperature & humidity sensor
Navigation system	Fugro Omnistar in VBS (Virtual Base Station) Ashtech 12 Channel GPS receiver
Data acquisition system	FAS digital acquisition system

4.2 Base Stations

Base Station Logs can be found in Appendix A.

GPS Receiver

Model Novatel OEM4 GPS Receiver

The acquired WGS84 GPS positions (latitude, longitude and altitude) were differentially post-processed in the field. Final co-ordinates reference GDA94, MGA Zone 55.

Magnetometers

Two Scintrex ENVI mag 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. These data were displayed and recorded on a laptop computer. The base stations were run continuously throughout the survey flying period with a sampling interval of 2 seconds and a sensitivity of 0.1 nT.

The base station data were closely examined after each days production flying to determine if any data had been acquired during periods of out-of-specification diurnal variation. Below is a summary of base station locations.

Location VH-WAM - Strahan Aerodrome

4.3 Survey Operations

A summary of the acquisition phase is given in Table 1. Full operations reports are provided in Appendix B. The survey flight logs are provided as Appendix E.

Date	Aircraft	Base	Comment
January 15, 2008	VH-WAM	Strahan, Tas	Acquisition commenced
March 6, 2008	VH-WAM	Strahan, Tas	Acquisition complete

TABLE 1 – OPERATIONS SUMMARY

4.4 Recorded Parameters

All acquired data were recorded digitally.

The following parameters are recorded at 10 Hz:

<i>Parameter</i>	<i>Resolution</i>	<i>units</i>
Fiducial number	1.0	unit
Uncompensated Total Magnetic Intensity (TMI)	0.001	nT
Fluxgates X, Y & Z	0.01	nT
Fluxgate Total Field	0.01	nT
Compensated TMI	0.001	nT
Terrain clearance (radar altimeter)	0.01	m

The following parameters are recorded at 1 Hz:

<i>Parameter</i>	<i>Resolution</i>	<i>units</i>
GPS time	1.0	s
Latitude	0.0000001	°
Longitude	0.0000001	°
GPS height	0.01	m
Outside air temperature	1.0	°C
Barometric pressure	0.01	hPa
Number of satellites	1.0	
Position dilution of precision (PDOP)	0.1	
HDOP	0.1	

4.5 Calibrations and System Checks

4.5.1 Magnetic Compensation

Magnetic compensation sequences were flown before acquisition commenced and after routine maintenance was performed, as required. The resulting coefficients were used for real-time magnetic compensation:

Aircraft	Date	Flight	StDev (UnC)	StDev (Cmp)	IR
VH-WAM	16/01/08	2	0.1444	0.047	3.063
	2/02/08	18	0.119	0.037	3.196
	24/02/08	37	0.194	0.023	8.351

TABLE 2 – MAGNETIC COMPENSATION STATISTICS

UNC: Standard deviation of uncompensated TMI (nT)

CMP: Standard deviation of compensated TMI (nT)

IR: Improvement ratio (UNC/CMP)

4.5.2 Radar Altimeter Stacks

Prior to commencement of acquisition, radar altimeter stacks were flown as accurately as possible with reference to the radar altimeter indicator, which was set at a pre-determined height. The results are shown below in Table 3.

**RADAR ALTIMETER/BAROMETRIC ALTIMETER CHECK
JOB 1969, SWTOAMS SURVEY VH-WAM**

Flown 23rd November, 2006, Pre-survey

Planned Height (feet)	Planned Height (metres)	Radar Altimeter (metres)	Barometric Height (metres)	GPS Height (metres)	Hr – Hb (metres)	Hr – Hg (metres)
100	30	31	31	31	-0	0
150	46	46	47	46	-2	-0
200	61	61	62	61	-1	0
250	76	76	76	76	0	0
300	91	92	91	92	1	0
350	107	108	107	108	0	-0
400	122	122	121	122	1	0
500	152	152	150	152	2	-0
600	183	183	180	183	3	0
800	244	240	235	240	6	0
1000	305	289	282	289	7	0

TABLE 3 – RADAR ALTIMETER STACKS

5. PROCESSING

5.1 Hardware and Software

All data processing was carried out by Fugro Airborne Surveys Pty Ltd in its Western Australia office in Floreat, Perth.

Hardware	Core2 Duo PC (Windows XP) HP Designjet 1050 and 1055 Plotters Pioneer DVD Writer
Software	Fugro in-house software Oasis montaj 6.4.2

5.2 GPS Positioning

5.2.1 Spheroids, Datums and Zones

The acquired GPS positions (latitude, longitude and altitude) were differentially post-processed in the field. Final co-ordinates reference GDA94, MGA Zone 55.

The 1 Hz position data was interpolated to coordinate all 10 Hz data.

5.2.2 Quality Control

The following position quality control plots were produced:

- flight path
- ground speed

5.3 Magnetics

5.3.1 Quality Control

The following quality control plots were produced:

- diurnal variation
- radar altimeter

This visual aspect of quality control was aided by the determination of statistics (max., min., mean and SD.) for all parameters for every line.

System spikes were removed from the magnetic data but cultural responses were retained.

5.3.2 Parallax Correction

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. The co-ordinates were moved by linear interpolation.

Data	Parallax
GPS easting	-0.6 sec (~45 m)
GPS northing	-0.6 sec (~45 m)
GPS height	-0.6 sec (~45 m)
Magnetics	0 sec
Radar altitude	0 sec
Pressure	0.3 sec (~23 m)
Temperature	0 sec

TABLE 4 – PARALLAX VALUES

5.3.3 Diurnal Correction

The magnetic data were corrected for diurnal variations. The correction formula was:

diurnal corrected TMI = compensated TMI *minus* diurnal *plus* mean diurnal value

Area Name	Aircraft	Mean Diurnal Value
SW Tasmania Offshore	VH-WAM	62160 nT

TABLE 5 – DIURNAL BASE VALUES

5.3.4 IGRF Correction

The International Geophysical Reference Field (IGRF) was removed from the data using the 2005 model extrapolated to the survey date 15/01/2008. The correction formula was:

IGRF corrected MI = diurnal corrected TMI *minus* local IGRF (no mean IGRF value added back)

Area Name	Mean IGRF Value
SW Tasmania Offshore	0

TABLE 6 – IGRF BASE VALUES

5.3.5 Levelling

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.

Tie line levelling and further micro-levelling produced the final levelled magnetics. The parameters used for levelling the magnetics are shown in Table 7 and 8.

Tie Lines	Mean Correction
Traverse Lines	To all crossovers 5 point median filter, 3 point Hanning filter

TABLE 7 – MAGNETIC TIE-LINE LEVELLING PARAMETERS

Filter Type	High Pass	Threshold (nT)
Hanning	23 cells	2

TABLE 8 – MAGNETIC MICRO-LEVELLING PARAMETERS

5.3.6 Low Pass Filtered Channel

Low pass filtering was selectively applied to parts of the data bounded by polygons, listed in table 9, to remove perceived wave noise from the final levelled magnetic channel to make a selectively smoothed MI channel. The filter wavelength was 80 readings.

	Easting (bottom left)	Northing (bottom left)	Easting (top right)	Northing (top right)
Box 1	246700	5325300	291800	5333900
Box 2	308900	5201900	390400	5229000
Box 3	272900	5281800	291600	5289400
Box 4	296600	5245100	336700	5249500
Box 5	301800	5233700	347500	5240300
Box 6	331800	5180900	405000	5190500
Box 7	340900	5165300	418700	5176100

TABLE 9 – BOUNDING BOXES FOR SMOOTHING

5.3.7 Gridding & Further Enhancements

A bi-cubic spline algorithm was used to produce gridded data, of both the MI and MI smoothed channels, with a grid cell size of 160 metres.

The MI and MI smoothed grids were then reduced to the pole and a first vertical derivative of the RTP grid calculated.

Inputs into the RTP algorithm:

Inclination: -72.957°

Declination: 13.441°

5.4 **Digital Elevation**

No processing was carried out on the digital elevation data. Only raw digital elevation components were delivered as located data.

6. PRELIMINARY PRODUCTS

6.1 Corrected MI TIFF

An TIFF image of the corrected MI channel was made and delivered.

6.2 Raw Located Data

- 0.1 second magnetics
- 0.1 second digital elevation

Preliminary raw located data is in ASEG-GDF II format. Descriptions of each are shown in Appendix C.

7. FINAL PRODUCTS

7.1 Final Located Data

- 0.1 second magnetics

Final located data is in ASEG-GDF II format. Descriptions are shown in Appendix D.

7.2 Final Gridded Data

Final gridded data was produced in ERMapper format.

- Magnetic intensity (mag), nT
- Magnetic intensity reduced to the pole (RTP), nT
- RTP 1st vertical derivative (RTP1VD), nT/m
- Magnetic intensity smoothed (magS), nT
- Magnetic intensity smoothed reduced to the pole (RTPS), nT
- RTPS 1st vertical derivative (RTPS1VD), nT/m

APPENDIX A

BASE STATION LOGS

VH-WAM Base Records

GPS Base Records

Job Number:	1969	Client:	GEOSCIENCE AUSTRALIA
Aircraft:	VH-WAM	Job Name:	STRAHAN OFFSHORE NW
Date Calculated:	16-Jan-08	Crew Leader:	GAVIN JONES
Calculated by:	MOSES MUREITHI & GAVIN JONES	Signature:	

BASE GPS - Calculated Base GPS Co-ordinates

Latitude: ° ' " Longitude: ° ' " Height: m

Antenna Location: Attached to roof of room 1106 at the Strahan Village Villas. Attached to PVC ventilation tube in the middle of the roof.

BASE GPS – Method of Position Determination (GPS BASE POSITION AVERAGED OVER TIME)

Concatenated Base File Name: Sample Duration: Hours

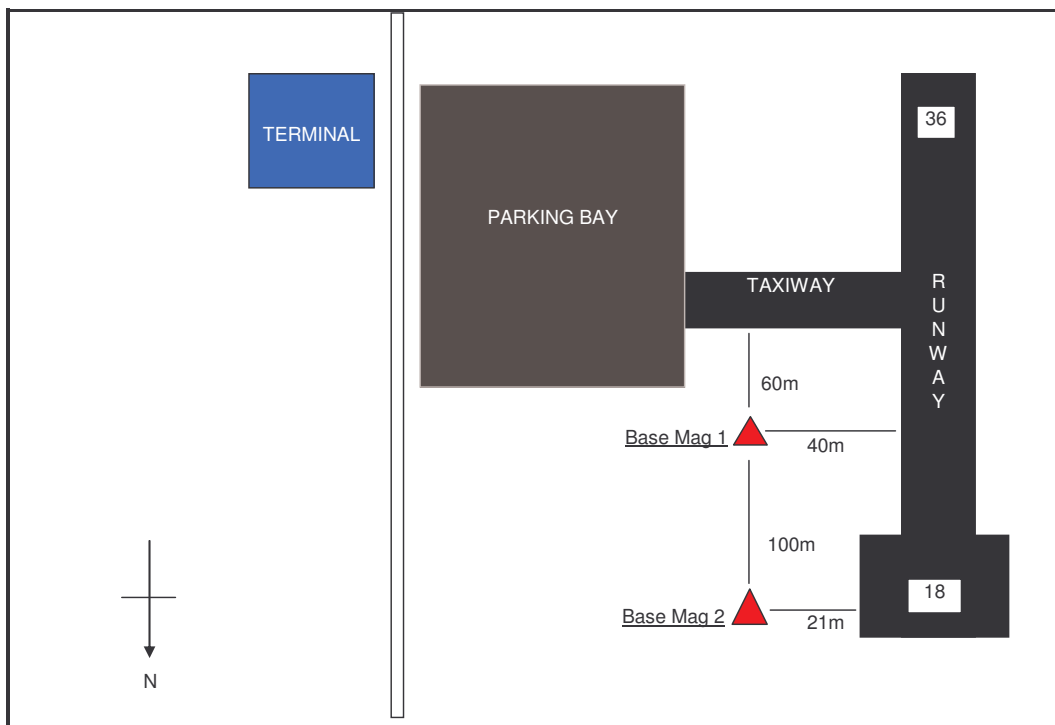
Magnetic Base Station Records

Base Magnetometer #1

Location:	Strahan Aerodrome (See Below)	62163.5 nT			
Type:	ENVIMAG	2m N			
Serial No.:	96007265	62163.4 nT	2m W	62163.5 nT	2m E 62163.0 nT
Cycle Rate:	2	2m S			
Sensor Height:	2 m AGL	62163.3 nT			

Base Magnetometer #2

Location:	Strahan Aerodrome (See Below)	62157.8 nT			
Type:	ENVIMAG	2m N			
Serial No.:	9403068	62157.1 nT	2m W	62157.5 nT	2m E 62157.1 nT
Cycle Rate:	2	2m S			
Sensor Height:	2 m AGL	62157.4 nT			



APPENDIX B

OPERATIONS REPORT

System: FASDAS
Aircraft: VH-WAM

23545.3 Hrs - Progressive M/R Hrs at the start of job, prior to mobilisation

Total Job kms: 26553.763 Kms

23639.8 Hrs - The hours the Periodic Inspection is actually due at start of the job

Plan Kms Remain: 21056.618 Kms

% Complete: 20.702 %

Job Number: 1969
Contract Number: QM5464
Job Name: Strahan Offshore
Area Names: Offshore SW
Client: Geoscience Australia

Date	Flt	Pilot initials	On board Oper initials	Production inc. Reflights Exc. Scrubs	FAS Scrub	Time		Engine Hours on M/R	Hours to Periodic Inspection	Job Hrs to Date	Prod. to Date	FAS Scrubs to Date	Stdbys Days	Activity Contribution	Activity	COMMENTS <u>Weather, Data delivery</u> <u>Aircraft movement, etc</u>
						Start	End									
14-January-2008 Julian Day 14														1.00	MO	Strahan base was setup
Monday																
									83.3	11.2						
Date 15-Jan Julian Day 15	1	GU	GJ & MM			13:25:00	16:00:00	2.6						0.50	MO	Base Mags were put up
Tuesday														0.50	TF	Comp Box and Recce were flown
									80.7	13.8						
Date 16-Jan Julian Day 16	2	TM	MM			14:30:00	15:10:00	0.7					0.50	0.50	W	Cloud cover, unable to get high enough for a comp bow
Wednesday														0.50	TF	Comp Box was flown
									80.0	14.5						
Date 17-Jan Julian Day 17	3	GU	GJ	90.814	356.164	8:20:00	10:55:00	2.6						0.50	P	
Thursday	4	TM	MM	1024.526		11:40:00	16:50:00	5.2						0.50	P	
									72.2	22.3	1115.340	356.164				
Date 18-Jan Julian Day 18	5	GU	GJ	723.143	225.981	6:55:00	12:30:00	5.6						0.50	P	
Friday	6	TM	MM	914.456	85.806	13:30:00	18:30:00	5.0						0.50	P	
									61.6	32.9	2752.939	667.951				
Date 19-Jan Julian Day 19	7	TM	MM	884.341	133.358	6:50:00	11:50:00	5.0						0.50	P	
Saturday	8	GU	GJ	842.691		12:45:00	17:45:00	5.0						0.50	P	
									51.6	42.9	4479.971	801.309				
Date 20-Jan Julian Day 20	9	GU	GJ	1017.174	52.000	6:45:00	11:50:00	5.1						0.50	P	
Sunday													0.50	0.50	W	Limited Visability
									46.5	48.0	5497.145	853.309				
Totals This Week: ▶				5497.145	853.309	Week Hours: ▶		36.8	▲ : A/C Hrs to Next Service				1.00	7.00		

System: FASDAS
Aircraft: VH-WAM

23545.3 Hrs - Progressive M/R Hrs at the start of job, prior to mobilisation

Total Job kms: 26553.763 Kms

23639.8 Hrs - The hours the Periodic Inspection is actually due at start of the job

Plan Kms Remain: 21056.618 Kms

% Complete: 20.702 %

Job Number: 1969
Contract Number: QM5464
Job Name: Strahan Offshore
Area Names: Offshore SW
Client: Geoscience Australia

Date	Flt	Pilot initials	On board Oper initials	Production inc. Reflights	FAS Scrub	Time		Engine Hours on M/R	Hours to Periodic Inspectio	Job Hrs to Date	Prod. to Date	FAS Scrubs to Date	Stdby Days	Activity Contribution	Activity	COMMENTS <u>Weather, Data delivery</u> <u>Aircraft movement, etc</u>
						Start	End									
21-January-2008	10	TM	MM		756.077	6:45:00	11:05:00	4.3						0.50	S	flight scrubbed due to noisy mag
Julian Day 21	11	GU	GJ		993.361	12:00:00	17:14:00	5.2						0.50	S	flight scrubbed due to noisy mag
Monday									37.0	57.5	5497.145	2602.747				
Date 22-Jan	12	GU	GJ		815.712	8:00:00	12:05:00	4.1						0.50	S	flight scrubbed due to noisy mag
Julian Day 22														0.50	A	No Fuel remaining
Tuesday									32.9	61.6	5497.145	3418.459				
Date 23-Jan														1.00	A	No Fuel
Julian Day 23																
Wednesday									32.9	61.6	5497.145	3418.459				
Date 24-Jan	13	TM	MM		820.420	6:50:00	12:15:00	5.4						0.50	S	flight scrubbed due to noisy mag
Julian Day 24	14	GU	GJ		575.209	14:00:00	17:05:00	3.1						0.50	S	flight scrubbed due to noisy mag
Thursday									24.4	70.1	5497.145	4814.088				
Date 25-Jan		GU	GJ			6:30:00	7:35:00	1.1					1.00	1.00	W	Unable to get into Wynard due to weather
Julian Day 25															Comment	Fuel Arrived overnight
Friday									23.3	71.2	5497.145	4814.088				
Date 26-Jan	15	TM	MM		1077.442	7:35:00	12:45:00	5.2						0.50	S	flight scrubbed due to noisy mag
Julian Day 26	16	GU	GJ		836.934	14:00:00	18:13:00	4.2						0.50	S	flight scrubbed due to noisy mag
Saturday									13.9	80.6	5497.145	6728.464				
Date 27-Jan	17	GU	GJ		957.061	7:10:00	12:20:00	5.2						0.50	S	flight scrubbed due to noisy mag
Julian Day 27														0.50	A	Front Landing gear leaking fluids.
Sunday									8.7	85.8	5497.145	7685.525				
Totals This Week: ▶					6832.216	Week Hours:▶		37.8	▲: A/C Hrs to Next Service				1.00	7.00		

System: FASDAS
Aircraft: VH-WAM

23545.3 Hrs - Progressive M/R Hrs at the start of job, prior to mobilisation

Total Job kms: 26553.763 Kms

23639.8 Hrs - The hours the Periodic Inspection is actually due at start of the job

Plan Kms Remain: 18329.469 Kms
% Complete: 30.972%

Job Number: 1969
Contract Number: QM5464
Job Name: Strahan Offshore
Area Names: Offshore SW
Client: Geoscience Australia

Date	Flt	Pilot initials	On board Oper initials	Production Inc. Reflights Exc. Scrubs	FAS Scrub	Time		Engine Hours on M/R	Hours to Periodic Inspectio	Job Hrs to Date	Prod. to Date	FAS Scrubs to Date	Stdb Days	Activity Contribution	Activity	COMMENTS <u>Weather, Data delivery</u> <u>Aircraft movement, etc</u>
						Start	End									
28-January-2008		TM/GU				12:10:00	13:00:00	0.8						1.00	A	WAM ferried to YWYY for maintenance on the front landing
Julian Day 28																
Monday									7.9	86.6	5497.145	7685.525				
Date 29-Jan		GU				13:00:00	14:25:00	1.4						1.00	MA	WAM ferried to YMES for maintenance at GAM in Essendon
Julian Day 29																
Tuesday									6.5	88.0	5497.145	7685.525				
Date 30-Jan														1.00	MA	Maintance on the aircraft, Check 1
Julian Day 30																
Wednesday									6.5	88.0	5497.145	7685.525				
Date 31-Jan														1.00	MA	Maintance on the aircraft, Check 1
Julian Day 31															Comment	PI Actullaly due changed to 23759.8
Thursday																
Date 1-Feb						9:00:00	12:25:00	3.4	126.5	88.0	5497.145	7685.525				
Julian Day 32														1.00	MA	Maintenance on aircraft, Check 1. WAM ferried to Strahan
Friday									123.1	91.4	5497.145	7685.525				
Date 2-Feb	18	TM	MM			6:20:00	7:14:00	0.9						0.50	TF	Comp Box Flown
Julian Day 33	19	TM	MM	759.291		10:03:00	14:00:00	3.9						0.50	P	
Saturday																
Date 3-Feb	20	TM	MM	935.804	85.498	6:10:00	11:15:00	5.1	118.3	96.2	6256.436	7685.525		0.50	P	
Julian Day 34	21	GU	GJ	1032.054	85.851	11:50:00	17:25:00	5.6						0.50	P	
Sunday															Comment	T Wilhelmi flew to Davenport then over nighted in Davenport
									107.6	106.9	8224.294	7856.874				
Totals This Week: ▶				2727.149	171.349	Week Hours: ▶		21.1	▲ : A/C Hrs to Next Service					7.00		

System: FASDAS
Aircraft: VH-WAM

23545.3 Hrs - Progressive M/R Hrs at the start of job, prior to mobilisation

Job Number: 1969
Contract Number: QM5464
Job Name: Strahan Offshore
Area Names: Offshore SW
Client: Geoscience Australia

Total Job kms: 26553.763 Kms

23639.8 Hrs - The hours the Periodic Inspection is actually due at start of the job

Plan Kms Remain: 12285.850 Kms
% Complete: 53.732 %

Date	Flt	Pilot initials	On board Oper initials	Production inc. Reflights Exc. Scrubs	FAS Scrub	Time		Engine Hours on M/R	Hours to Periodic Inspectio	Job Hrs to Date	Prod. to Date	FAS Scrubs to Date	Stdby Days	Activity Contribution	Activity	COMMENTS <u>Weather, Data delivery</u> <u>Aircraft movement, etc</u>
						Start	End									
04-February-2008	22	GU	GJ	494.988	25.000	6:00:00	9:30:00	3.5						0.50	P	
Julian Day 35	23	TM	MM	995.452		10:36:00	15:30:00	4.9						0.50	P	
Monday																
									99.2	115.3	9714.734	7881.874				T Wilhelmi in G. Underwood out
Date 5-Feb	24.1	TM	MM			6:20:00	7:14:00	0.9					0.50	0.50	W	Low Fog/Cloud over the survey area
Julian Day 36	24.2	TW	GJ			12:00:00	14:05:00	2.1					0.50	0.50	W	Low Fog/Cloud over the survey area
Tuesday																
									96.2	118.3	9714.734	7881.874				
Date 6-Feb	25.1	TW	GJ			6:19:00	7:50:00	1.5					0.50	0.50	W	Low Fog/Cloud over the survey area
Julian Day 37	25.2	TM	MM			12:20:00	13:55:00	1.6					0.50	0.50	W	Low Fog/Cloud over the survey area
Wednesday																
									93.1	121.4	9714.734	7881.874				
Date 7-Feb	26.1	TM	MM	1492.798	87.408	8:20:00	13:00:00	4.7						0.50	P	Heavy cloud and rain over survey. AM take off delayed
Julian Day 38	26.2	TW	GJ			13:50:00	18:20:00	4.5						0.50	P	
Thursday																
									83.9	130.6	11207.532	7969.282				
Date 8-Feb	27.1	TW	GJ	1626.628	389.284	6:18:00	11:48:00	5.5						0.50	P	
Julian Day 39	27.2	TM	MM			12:32:00	17:44:00	5.2						0.50	P	
Friday																
									73.2	141.3	12834.160	8358.566				
Date 9-Feb	28	TW	MM	1065.812		6:30:00	12:00:00	5.5						0.50	P	
Julian Day 40														0.50	MA	TW & TM flew check flights with Chief Pilot.
Saturday																
									67.2	147.3	13899.972	8358.566				
Date 10-Feb						7:30:00	10:00:00	2.5						0.30	TR	Aircraft was used for check flights with the Chief Pilot in
Julian Day 41						13:44:00	14:15:00	0.5						0.20	MA	WAM ferried to Strahan - oil change and spar inspection
Sunday	29	TM	GJ	367.941	138.811	15:26:00	19:02:00	3.6						0.50	P	
									60.6	153.9	14267.913	8497.377				
Totals This Week: ▶				6043.619	640.503	Week Hours: ▶		46.5	▲: A/C Hrs to Next Service				2.00	7.00		

System: FASDAS
Aircraft: VH-WAM

23545.3 Hrs - Progressive M/R Hrs at the start of job, prior to mobilisation

Total Job kms: 26553.763 Kms

23639.8 Hrs - The hours the Periodic Inspection is actually due at start of the job

Plan Kms Remain: 7118.439 Kms
% Complete: 73.192 %

Job Number: 1969
Contract Number: QM5464
Job Name: Strahan Offshore
Area Names: Offshore SW
Client: Geoscience Australia

Date	Flt	Pilot initials	On board Oper initials	Production inc. Reflights Exc. Scrubs	FAS Scrub	Time		Engine Hours on M/R	Hours to Periodic Inspectio	Job Hrs to Date	Prod. to Date	FAS Scrubs to Date	Stdb Days	Activity Contribution	Activity	COMMENTS <u>Weather, Data delivery</u> <u>Aircraft movement, etc</u>
						Start	End									
11-February-2008													0.50	0.50	W	Poor weather deterring production due to visibility
Julian Day 42	30	TM	MM	70.727	655.251	15:00:00	19:16:00	4.3						0.50	P	
Monday									56.3	158.2	14338.640	9152.628				
Date 12-Feb	31	TM	GJ		226.186	6:21:00	7:45:00	1.4					0.50	0.50	P	
Julian Day 43													0.50	0.50	W	Low cloud/ Fog over survey area.
Tuesday									54.9	159.6	14338.640	9378.814				
Date 13-Feb	32	TW	MM	634.580		6:24:00	9:34:00	3.2					0.50	0.50	P	flight cut short due to weather.
Julian Day 44													0.50	0.50	W	Visibility Less than 1km
Wednesday									51.7	162.8	14973.220	9378.814				
Date 14-Feb	33	TM	GJ	1164.207		11:09:00	16:45:00	5.6					0.50	0.50	W	Visibility Less than 1km at the airport
Julian Day 45													0.50	0.50	P	
Thursday									46.1	168.4	16137.427	9378.814				
Date 15-Feb	34.1	TW	MM	921.292	558.349	6:30:00	12:00:00	5.5						0.50	P	
Julian Day 46	34.2	TM	GJ			12:50:00	16:20:00	3.5						0.30	R	Reflight from flt 17
Friday						17:35:00	18:05:00	0.5						0.20	E	Spikes occurring in the mag, Test flight to trouble shoot
									36.6	177.9	17058.719	9937.163				
Date 16-Feb	35.1	TM	GJ	2074.685		7:49:00	12:49:00	5.0						0.50	R	Reflight from Flt's 10 and 13
Julian Day 47	35.2	TW	MM			13:51:00	19:10:00	5.3						0.50	R	Reflight from Flt's 10 and 13
Saturday															Comment	Steve R. and Kobus T. flew in
									26.3	188.2	19133.404	9937.163				
Date 17-Feb						11:10:00	11:46:00	0.6						0.30	A	WAM was flown up to Wynyard for fuel.
Julian Day 48	36	KT	TM	301.920	108.368	12:17:00	15:59:00	3.7						0.70	R	Reflight from Flt's 10 and 11
Sunday															Comment	Moses M. and Troy W. returned to Perth
									22.0	192.5	19435.324	10045.531				
Totals This Week: ▶				5167.411	1548.154	Week Hours:▶		38.6	▲: A/C Hrs to Next Service				2.00	7.00		

System: FASDAS
Aircraft: VH-WAM

23545.3 Hrs - Progressive M/R Hrs at the start of job, prior to mobilisation

Total Job kms: 26553.763 Kms

23639.8 Hrs - The hours the Periodic Inspection is actually due at start of the job

Plan Kms Remain: 7118.439 Kms
% Complete: 73.192 %

Job Number: 1969
Contract Number: QM5464
Job Name: Strahan Offshore
Area Names: Offshore SW
Client: Geoscience Australia

Date	Flt	Pilot initials	On board Oper initials	Production inc. Reflights Exc. Scrubs	FAS Scrub	Time		Engine Hours on M/R	Hours to Periodic Inspectio	Job Hrs to Date	Prod. to Date	FAS Scrubs to Date	Stdb Days	Activity Contribution	Activity	COMMENTS <u>Weather, Data delivery</u> <u>Aircraft movement, etc</u>
						Start	End									
18-February-2008		KT/TM				10:00:00	10:36:00	0.6						0.50	MA	Kobus T. and Tim M. ferried WAM to Wynyard.
Julian Day 49		KT/TM				11:16:00	12:40:00	1.4						0.50	MA	Kobus T. and Tim M. ferried WAM to Essendon for Check
Monday																
									20.0	194.5	19435.324	10045.531				
Date 19-Feb														1.00	MA	WAM in Essendon for check 2
Julian Day 50																
Tuesday																
									20.0	194.5	19435.324	10045.531				
Date 20-Feb														1.00	MA	WAM in Essendon for check 2
Julian Day 51																
Wednesday																
									20.0	194.5	19435.324	10045.531				
Date 21-Feb		TM				15:02:00	15:28:00	0.4						1.00	MA	WAM in Essendon for check 2. Flew test flight.
Julian Day 52															Comment	New MR issued hours to next PI changed to 23859.8
Thursday																
									119.6	194.9	19435.324	10045.531				
Date 22-Feb		KT				16:11:00	16:35:00	0.4						1.00	MA	WAM in Essendon for check 2. Flew test flight.
Julian Day 53															Comment	New mag sensor arrived.
Friday															Comment	32 Barrels of fuel arrived
									119.2	195.3	19435.324	10045.531				
Date 23-Feb		KT	TM			10:27:00	11:57:00	1.5						0.50	MA	Kobus T. and Tim M. ferried to Wynyard with Adam Ray.
Julian Day 54		TM	KT			12:35:00	13:23:00	0.8						0.50	MA	Kobus T. and Tim M. ferried to Strahan.
Saturday																
									116.9	197.6	19435.324	10045.531				
Date 24-Feb														0.50	E	New mag sensor changed to eliminate intermittent noise.
Julian Day 55	37	TM	SR			15:16:00	15:58:00	0.7						0.50	TF	Comp box flown.
Sunday																
									116.2	198.3	19435.324	10045.531				
Totals This Week: ▶						Week Hours: ▶		5.8	▲: A/C Hrs to Next Service					7.00		

System: FASDAS
Aircraft: VH-WAM

23545.3 Hrs - Progressive M/R Hrs at the start of job, prior to mobilisation

Total Job kms: 26553.763 Kms

23639.8 Hrs - The hours the Periodic Inspection is actually due at start of the job

Plan Kms Remain: 881.142 Kms
% Complete: 96.681 %

Job Number: 1969
Contract Number: QM5464
Job Name: Strahan Offshore
Area Names: Offshore SW
Client: Geoscience Australia

Date	Flt	Pilot initials	On board Oper initials	Production inc. Reflights Exc. Scrubs	FAS Scrub	Time		Engine Hours on M/R	Hours to Periodic Inspectio	Job Hrs to Date	Prod. to Date	FAS Scrubs to Date	Stdb Days	Activity Contribution	Activity	COMMENTS <u>Weather, Data delivery</u> <u>Aircraft movement, etc</u>
						Start	End									
25-February-2008														1.00	A	WAM vandalised previous night. Storm windows damaged.
Julian Day 56															A	Adam Rae arrived to repair damaged windows.
Monday															A	Parts to replace windows ordered from FAVA.
															Comment	Matt Price flew from Perth to Wynyard via Melbourne.
									116.2	198.3	19435.324	10045.531				
Date 26-Feb														1.00	A	Parts to replace windows arrived and are installed by Adam
Julian Day 57		TM				16:00:00	16:36:00	0.6							A	Test flight
Tuesday															Comment	Matt Price drove from Wynyard to Strahan in hire car.
															SAF	Job safety brief held for Matt Price.
									115.6	198.9	19435.324	10045.531				
Date 27-Feb	38.1	KT	GJ	1544.037	53.465	6:41:00	11:35:00	4.9						0.50	R	Reflight
Julian Day 58	38.2	TM	SR			13:07:00	18:13:00	5.1						0.50	R & S	Reflight and partial scrub due to mag noise.
Wednesday															Comment	Adam Rae drove from Strahan to Wynyard.
									105.6	208.9	20979.361	10098.996				
Date 28-Feb	39.1	TM	SR	1972.270	179.854	6:46:00	12:10:00	5.4						0.50	R	Reflight
Julian Day 59	39.2	KT	MP			13:00:00	18:06:00	5.1						0.50	R & S	Reflight and partial scrub due to diurnal.
Thursday															Comment	Matt Price replaced Gavin Jones as crew leader.
															Comment	Gavin Jones out
									95.1	219.4	22951.631	10278.850				
Date 29-Feb	40	KT	MP	512.510	256.236	6:30:00	11:24:00	4.9						0.50	R & S	Reflight and partial scrub due to diurnal activity.
Julian Day 60													0.50	0.50	D	Active diurnal
Friday																
									90.2	224.3	23464.141	10535.086				
Date 1-Mar	41	TM	SR	554.541	264.036	6:29:00	11:41:00	5.2						0.50	R & S	Reflight with some lines scrubbed due to diurnal activity
Julian Day 61													0.50	0.50	D	Active diurnal
Saturday															Comment	Unable to QC any data because of expired software licence.
									85.0	229.5	24018.682	10799.122				
Date 2-Mar	42.1	KT	MP	1653.939	121.167	6:32:00	12:02:00	5.5						0.50	R	Reflights
Julian Day 62	42.2	TM	SR			12:49:00	18:19:00	5.5						0.50	R & S	Reflight with some lines scrubbed due to diurnal activity
Sunday															Comment	Unable to QC any data because of expired software licence.
															SAF	Weekly Safety Meeting held.
									74.0	240.5	25672.621	10920.289				
Totals This Week: ▶				6237.297	874.758	Week Hours: ▶		42.2	▲: A/C Hrs to Next Service				1.00	7.00		

System: FASDAS
Aircraft: VH-WAM

23545.3 Hrs - Progressive M/R Hrs at the start of job, prior to mobilisation

Job Number: 1969
Contract Number: QM5464
Job Name: Strahan Offshore
Area Names: Offshore SW
Client: Geoscience Australia

Total Job kms: 26553.763 Kms

23639.8 Hrs - The hours the Periodic Inspection is actually due at start of the job

Plan Kms Remain: 0.000 Kms
% Complete: 100.000 %

Date	Flt	Pilot initials	On board Oper initials	Production inc. Reflights Exc. Scrubs	FAS Scrub	Time		Engine Hours on M/R	Hours to Periodic Inspection	Job Hrs to Date	Prod. to Date	FAS Scrubs to Date	Stdb Days	Activity Contribution	Activity	COMMENTS <u>Weather, Data delivery</u> <u>Aircraft movement</u> , etc
						Start	End									
03-March-2008	43	TM	SR	742.412	85.851	7:56:00	13:02:00	5.1						1.00	R & S	Reflights with some lines scrubbed due to diurnal activity.
Julian Day 63															Comment	Unable to QC data because of expired software licence.
Monday															Comment	Adam Rae drove from Wynyard to Strahan.
															Comment	Data sent to office via AAE. C/N:07464434.
									68.9	245.6	26415.033	11006.140				
Date 4-Mar		KT				16:41:00	17:23:00	0.7						1.00	A	WAM ferried to Wynyard by KT to repair failed undercarriage ram.
Julian Day 64															Comment	Adam Rae drove from Strahan to Wynyard.
Tuesday															Comment	New software licence arrived, allowing QC of data to recommence
															Comment	Data sent to office via AAE. C/N:07464433.
									68.2	246.3	26415.033	11006.140				
Date 5-Mar		KT				13:30:00	13:48:00	0.3						0.30	A	Test Flight after aircraft repairs.
Julian Day 65		KT				15:34:00	16:16:00	0.7						0.70	A	Kobus Terblanche ferried WAM from Wynyard to Strahan.
Wednesday																
									67.2	247.3	26415.033	11006.140				
Date 6-Mar	44	KT	MP	138.730		6:30:00	7:00:00	0.5					0.50	0.20	W	Returned to base. Low cloud/fog over the survey area.
Julian Day 66	44	KT	MP			10:00:00	12:00:00	2.0						0.80	R	Reflights
Thursday															Comment	Flying Complete. Waiting for processing to clear.
									64.7	249.8	26553.763	11006.140				
Date 7-Mar														1.00	Comment	Waiting to hear from FASP to get approval to start de-mobilisation.
Julian Day 67																
Friday																
									64.7	249.8	26553.763	11006.140				
Date 8-Mar														1.00	Comment	Waiting to get approval to start de-mobilisation.
Julian Day 68																
Saturday																
									64.7	249.8	26553.763	11006.140				
Date 9-Mar		TM	KT			12:00:00	14:06:00	2.1						1.00	MO	All base equipment packed for shipping.
Julian Day 69		KT	TM			15:00:00	17:00:00	2.0								
Sunday																
									60.6	253.9	26553.763	11006.140				
Totals This Week: ▶				881.142	85.851	Week Hours: ▶			13.4	▲: A/C Hrs to Next Service			0.50	7.00		

APPENDIX C

RAW LOCATED DATA FORMATS

MAGNETICS – RAW

```

COMM RAW POINT LOCATED DATA
COMM
COMM GEOSCIENCE AUSTRALIA PROJECT NUMBER:      1182
COMM
COMM JOB NUMBER:                                1969
COMM AREA NUMBER:                                1
COMM SURVEY COMPANY:                            Fugro Airborne Surveys
COMM CLIENT:                                    Geoscience Australia
COMM SURVEY TYPE:                               Magnetic Survey
COMM AREA NAME:                                 SWTOAMS
COMM STATE:                                     Tas
COMM COUNTRY:                                   Australia
COMM SURVEY FLOWN:                             January - March 2008
COMM LOCATED DATA CREATED:                    Sun Mar 23 09:34:14 2008
COMM
COMM SURVEY SPECIFICATIONS:
COMM
COMM TRAVERSE LINE SPACING:                      800 m
COMM TRAVERSE LINE DIRECTION:                   090 - 270 deg
COMM TIE LINE SPACING:                          4000 m
COMM TIE LINE DIRECTION:                        000 - 180 deg
COMM NOMINAL TERRAIN CLEARANCE:                  90 m
COMM RAW LINE KILOMETRES:                       26,785
COMM
COMM LINE NUMBERING
COMM
COMM TRAVERSE LINE NUMBERS:                      10001 - 10335
COMM TIE LINE NUMBERS:                          19001 - 19055
COMM
COMM AREA BOUNDARY
COMM DATUM                                       GDA94
COMM PROJECTION                                MGA
COMM ZONE                                       55
COMM
COMM easting northing
COMM 205208 5404008
COMM 290460 5403645
COMM 290893 5270872
COMM 361137 5271255
COMM 421169 5183307
COMM 421169 5138839
COMM 362685 5138964
COMM
COMM SURVEY EQUIPMENT
COMM
COMM AIRCRAFT:                                VH-WAM Aerocommander 500S
COMM
COMM MAGNETOMETER:                            Scintrex CS-2 CV Magnetometer
COMM INSTALLATION:                            Tail stinger installation
COMM RESOLUTION:                              0.001 nT
COMM RECORDING INTERVAL:                      0.1 s
COMM
COMM BASE MAGNETOMETER:                        Scintrex Envi-mag
COMM RECORDING INTERVAL:                      2 s
COMM LOCATION:                                Strahan Aerodrome
COMM
COMM THERMOMETER:                             Vaisala HMY133 Temperature & Humidity Sensor

```

```

COMM RECORDING INTERVAL:                                1.0 s
COMM
COMM BAROMETER:                                          Paroscientific Digibaro
COMM RECORDING INTERVAL:                                1.0 s
COMM
COMM RADAR ALTIMETER:                                   Sperry Stars AA-200 Radar Altimeter
COMM RECORDING INTERVAL:                                0.1 s
COMM
COMM NAVIGATION:                                         real-time differential GPS
COMM RECORDING INTERVAL:                                1.0 s
COMM
COMM ACQUISITION SYSTEM:                                Fugro DAS
COMM
COMM DATA PROCESSING
COMM
COMM CO-ORDINATES
COMM PARALLAX CORRECTION (RAW DATA, NOT APPLIED):      -0.6 s
COMM
COMM RADAR ALTIMETER DATA
COMM PARALLAX CORRECTION (RAW DATA, NOT APPLIED):      0 s
COMM
COMM MAGNETIC DATA
COMM PARALLAX CORRECTION (RAW DATA, NOT APPLIED):      0 s
COMM
COMM TEMPERATURE DATA
COMM PARALLAX CORRECTION (RAW DATA, NOT APPLIED):      0 s
COMM
COMM PRESSURE DATA
COMM PARALLAX CORRECTION (RAW DATA, NOT APPLIED):      0.3 s
COMM
COMM LINE DATA FORMAT
COMM A space is left between fixed fields so that a field of, for example,
COMM A8 should only ever have a maximum of 7 characters in it, even when it
COMM is a null, thus:
COMM
COMM GA Project number                                -999                                I4
COMM Flight number                                    -99                                I4
COMM Line number                                       -99999                             I7
COMM Fiducial number                                   -999999                             I8
COMM Date (YYYYMMDD)                                  -9999999                             I9
COMM Bearing                                           deg                                -99                                I4
COMM Raw longitude                                     deg                                -999.99999999                      F14.8
COMM Raw latitude                                     deg                                -99.99999999                       F13.8
COMM Raw easting                                       m                                  -99999.99                         F10.2
COMM Raw northing                                     m                                  -999999.99                        F11.2
COMM Raw altimeter                                    m                                  -999.99                           F8.2
COMM Raw pressure                                     hPa                               -999.99                           F8.2
COMM Raw temperature                                   deg C                             -9.9                              F5.1
COMM Fluxgate X component                             nT                                -99999.999                        F11.3
COMM Fluxgate Y component                             nT                                -99999.999                        F11.3
COMM Fluxgate Z component                             nT                                -99999.999                        F11.3
COMM Uncompensated TMI                                nT                                -99999.999                        F11.3
COMM Compensated TMI                                  nT                                -99999.999                        F11.3
COMM Magnetic Diurnal                                 nT                                -9999.999                         F10.3

```

DIGITAL ELEVATION MODEL – RAW

```

COMM RAW POINT LOCATED DATA
COMM
COMM GEOSCIENCE AUSTRALIA PROJECT NUMBER:      1182
COMM
COMM JOB NUMBER:                                1969
COMM AREA NUMBER:                               1
COMM SURVEY COMPANY:                           Fugro Airborne Surveys
COMM CLIENT:                                   Geoscience Australia
COMM SURVEY TYPE:                               Magnetic Survey
COMM AREA NAME:                                SWTOAMS
COMM STATE:                                    Tas
COMM COUNTRY:                                  Australia
COMM SURVEY FLOWN:                             January - March 2008
COMM LOCATED DATA CREATED:                    Sun Mar 23 09:53:10 2008
COMM
COMM SURVEY SPECIFICATIONS:
COMM
COMM TRAVERSE LINE SPACING:                     800 m
COMM TRAVERSE LINE DIRECTION:                  090 - 270 deg
COMM TIE LINE SPACING:                         4000 m
COMM TIE LINE DIRECTION:                       000 - 180 deg
COMM NOMINAL TERRAIN CLEARANCE:                 90 m
COMM RAW LINE KILOMETRES:                      26,785
COMM
COMM LINE NUMBERING
COMM
COMM TRAVERSE LINE NUMBERS:                    10001 - 10335
COMM TIE LINE NUMBERS:                        19001 - 19055
COMM
COMM AREA BOUNDARY
COMM DATUM                                     GDA94
COMM PROJECTION                               MGA
COMM ZONE                                     55
COMM
COMM easting northing
COMM 205208 5404008
COMM 290460 5403645
COMM 290893 5270872
COMM 361137 5271255
COMM 421169 5183307
COMM 421169 5138839
COMM 362685 5138964
COMM
COMM SURVEY EQUIPMENT
COMM
COMM AIRCRAFT:                                VH-WAM Aerocommander 500S
COMM
COMM THERMOMETER:                             Vaisala HMY133 Temperature & Humidity Sensor
COMM RECORDING INTERVAL:                      1.0 s
COMM
COMM BAROMETER:                               Paroscientific Digibaro
COMM RECORDING INTERVAL:                      1.0 s
COMM
COMM RADAR ALTIMETER:                         Sperry Stars AA-200 Radar Altimeter
COMM RECORDING INTERVAL:                      0.1 s
COMM
COMM NAVIGATION:                             real-time differential GPS
COMM RECORDING INTERVAL:                      1.0 s

```



```

COMM
COMM ACQUISITION SYSTEM:                               Fugro DAS
COMM
COMM DATA PROCESSING
COMM
COMM CO-ORDINATES
COMM PARALLAX CORRECTION (RAW DATA, NOT APPLIED):      -0.6 s
COMM
COMM GPS HEIGHT DATA
COMM PARALLAX CORRECTION (RAW DATA, NOT APPLIED):      -0.6 s
COMM
COMM RADAR ALTIMETER DATA
COMM PARALLAX CORRECTION (RAW DATA, NOT APPLIED):      0 s
COMM
COMM TEMPERATURE DATA
COMM PARALLAX CORRECTION (RAW DATA, NOT APPLIED):      0 s
COMM
COMM PRESSURE DATA
COMM PARALLAX CORRECTION (RAW DATA, NOT APPLIED):      0.3 s
COMM
COMM LINE DATA FORMAT
COMM A space is left between fixed fields so that a field of, for example,
COMM A8 should only ever have a maximum of 7 characters in it, even when it
COMM is a null, thus:
COMM
COMM GA Project number          -999          I4
COMM Flight number              -99           I4
COMM Line number                -99999        I7
COMM Fiducial number            -999999       I8
COMM Date (YYYYMMDD)            -9999999     I9
COMM Bearing                    -99           I4
COMM Raw longitude               deg          F14.8
COMM Raw latitude               deg          F13.8
COMM Raw easting                m            F10.2
COMM Raw northing               m            F11.2
COMM Raw altimeter              m            F8.2
COMM Raw pressure               hPa          F8.2
COMM Raw temperature            deg C        F5.1
COMM Time (GPS)                 s            F9.1
COMM Raw GPS height             m            F8.2

```

APPENDIX D

FINAL LOCATED DATA FORMATS

MAGNETICS – FINAL

COMM FINAL POINT LOCATED DATA
 COMM
 COMM GEOSCIENCE AUSTRALIA PROJECT NUMBER: 1182
 COMM
 COMM JOB NUMBER: 1969
 COMM AREA NUMBER: 1
 COMM SURVEY COMPANY: Fugro Airborne Surveys
 COMM CLIENT: Geoscience Australia
 COMM SURVEY TYPE: Magnetic Survey
 COMM AREA NAME: SWTOAMS
 COMM STATE: Tas
 COMM COUNTRY: Australia
 COMM SURVEY FLOWN: January - March 2008
 COMM LOCATED DATA CREATED: Wed May 14 06:39:28 2008
 COMM
 COMM SURVEY SPECIFICATIONS:
 COMM
 COMM TRAVERSE LINE SPACING: 800 m
 COMM TRAVERSE LINE DIRECTION: 090 - 270 deg
 COMM TIE LINE SPACING: 4000 m
 COMM TIE LINE DIRECTION: 000 - 180 deg
 COMM NOMINAL TERRAIN CLEARANCE: 90 m
 COMM FINAL LINE KILOMETRES: 26,552
 COMM
 COMM LINE NUMBERING
 COMM
 COMM TRAVERSE LINE NUMBERS: 10001 - 10335
 COMM TIE LINE NUMBERS: 19001 - 19055
 COMM
 COMM AREA BOUNDARY
 COMM DATUM GDA94
 COMM PROJECTION MGA
 COMM ZONE 55
 COMM
 COMM easting northing
 COMM 205208 5404008
 COMM 290460 5403645
 COMM 290893 5270872
 COMM 361137 5271255
 COMM 421169 5183307
 COMM 421169 5138839
 COMM 362685 5138964
 COMM
 COMM SURVEY EQUIPMENT
 COMM
 COMM AIRCRAFT: VH-WAM Aerocommander 500S
 COMM
 COMM MAGNETOMETER: Scintrex CS-2 CV Magnetometer
 COMM INSTALLATION: Tail stinger installation
 COMM RESOLUTION: 0.001 nT
 COMM RECORDING INTERVAL: 0.1 s
 COMM
 COMM BASE MAGNETOMETER: Scintrex Envi-mag
 COMM RECORDING INTERVAL: 2 s
 COMM LOCATION: Strahan Aerodrome
 COMM
 COMM THERMOMETER: Vaisala HMY133 Temperature & Humidity Sensor

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COMM RECORDING INTERVAL: 1.0 s
COMM
COMM BAROMETER: Paroscientific Digibaro
COMM RECORDING INTERVAL: 1.0 s
COMM
COMM RADAR ALTIMETER: Sperry Stars AA-200 Radar Altimeter
COMM RECORDING INTERVAL: 0.1 s
COMM
COMM NAVIGATION: real-time differential GPS
COMM RECORDING INTERVAL: 1.0 s
COMM
COMM ACQUISITION SYSTEM: Fugro DAS
COMM
COMM DATA PROCESSING
COMM
COMM CO-ORDINATES
COMM PARALLAX CORRECTION APPLIED: -0.6 s
COMM
COMM RADAR ALTIMETER DATA
COMM PARALLAX CORRECTION APPLIED: 0 s
COMM
COMM MAGNETIC DATA
COMM DIURNAL CORRECTION APPLIED: base value 62160 nT
COMM PARALLAX CORRECTION APPLIED: 0 s
COMM IGRF CORRECTION APPLIED: base value 0 nT
COMM IGRF MODEL 2005 extrapolated to: 2008/01/15
COMM DATA HAVE BEEN TIE LINE LEVELLED
COMM DATA HAVE BEEN MICROLEVELLED
COMM THE MI (smoothed) DATA HAVE HAD A LOW PASS FILTER
COMM APPLIED TO SELECTED PARTS OF THE AREA
COMM
COMM TEMPERATURE DATA
COMM PARALLAX CORRECTION APPLIED: 0 s
COMM
COMM PRESSURE DATA
COMM PARALLAX CORRECTION APPLIED: 0.3 s
COMM
COMM -----
COMM DISCLAIMER
COMM -----
COMM It is Fugro Airborne Survey's understanding that the data provided to
COMM the client is to be used for the purpose agreed between the parties.
COMM That purpose was a significant factor in determining the scope and
COMM level of the Services being offered to the Client. Should the purpose
COMM for which the data is used change, the data may no longer be valid or
COMM appropriate and any further use of, or reliance upon, the data in
COMM those circumstances by the Client without Fugro Airborne Survey's
COMM review and advice shall be at the Client's own or sole risk.
COMM
COMM The Services were performed by Fugro Airborne Survey exclusively for
COMM the purposes of the Client. Should the data be made available in whole
COMM or part to any third party, and such party relies thereon, that party
COMM does so wholly at its own and sole risk and Fugro Airborne Survey
COMM disclaims any liability to such party.
COMM
COMM Where the Services have involved Fugro Airborne Survey's use of any
COMM information provided by the Client or third parties, upon which
COMM Fugro Airborne Survey was reasonably entitled to rely, then the

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COMM Services are limited by the accuracy of such information. Fugro
 COMM Airborne Survey is not liable for any inaccuracies (including any
 COMM incompleteness) in the said information, save as otherwise provided
 COMM in the terms of the contract between the Client and Fugro Airborne
 COMM Survey.
 COMM -----
 COMM
 COMM
 COMM LINE DATA FORMAT
 COMM A space is left between fixed fields so that a field of, for example,
 COMM A8 should only ever have a maximum of 7 characters in it, even when it
 COMM is a null, thus:
 COMM

COMM GA Project number		-999	I4
COMM Flight number		-99	I4
COMM Line number		-99999	I7
COMM Fiducial number		-999999	I8
COMM Date (YYYYMMDD)		-9999999	I9
COMM Bearing	deg	-99	I4
COMM Longitude	deg	-999.99999999	F14.8
COMM Latitude	deg	-99.99999999	F13.8
COMM Easting	m	-99999.99	F10.2
COMM Northing	m	-999999.99	F11.2
COMM Altimeter	m	-999.99	F8.2
COMM Barometric Pressure	hPa	-999.99	F8.2
COMM Temperature	deg C	-9.9	F5.1
COMM Final MI (unsmoothed)	nT	-99999.999	F11.3
COMM Final MI (smoothed)	nT	-99999.999	F11.3