

East Tasmania Offshore

Airborne Magnetic and Elevation Survey

for

Geoscience Australia

Acquisition and Processing Report

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Authorised for release by :

Survey flown: February – April 2011

by



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FAS JOB# 2189

GA JOB# 1194

CONTENTS

1. INTRODUCTION	3
2. SURVEY DETAILS.....	3
2.1 Project Identification.....	3
2.2 Survey Location	3
2.3 Specifications and Tolerances	5
3. PROJECT PERSONNEL.....	6
4. ACQUISITION.....	7
4.1 Aircraft and Equipment	7
4.2 Base Stations.....	7
4.3 Survey Operations	8
4.4 Recorded Parameters.....	8
4.5 Calibrations and System Checks	9
4.5.1 Magnetic Compensation.....	9
4.5.2 Radar Altimeter Stacks.....	9
5. PROCESSING	10
5.1 Hardware and Software	10
5.2 GPS Positioning.....	10
5.2.1 Spheroids, Datums and Zones	10
5.2.2 Quality Control	10
5.3 Magnetism	10
5.3.1 Quality Control	10
5.3.2 Parallax Correction.....	10
5.3.3 Diurnal Correction	11
5.3.4 IGRF Correction.....	11
5.3.5 Levelling.....	11
5.3.6 Gridding & Further Enhancements	12
5.4 Digital Elevation	12
6. PRELIMINARY PRODUCTS.....	13
6.1 Raw Located Data	13
7. FINAL PRODUCTS.....	13
7.1 Final Located Data.....	13
7.2 Final Gridded Data.....	13

APPENDICES

- A BASE STATION LOGS
- B OPERATIONS REPORT
- C RAW LOCATED DATA FORMATS
- D FINAL LOCATED DATA FORM

LIST OF TABLES

TABLE 1 – OPERATIONS SUMMARY	8
TABLE 2 – MAGNETIC COMPENSATION STATISTICS	9
TABLE 3 – RADAR ALTIMETER STACKS	9
TABLE 4 – PARALLAX VALUES.....	11
TABLE 5 – DIURNAL BASE VALUES.....	11
TABLE 6 – IGRF BASE VALUES	11
TABLE 7 – MAGNETIC MICRO-LEVELLING PARAMETERS.....	12

1. INTRODUCTION

This report provides details of the East Tasmania Offshore airborne magnetic and elevation survey, carried out in Tasmania. The survey area consists of 25907 line kilometres flown in one block over 51 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:	East Tasmania Offshore, TAS
Contractor:	Fugro Airborne Surveys Pty Ltd
Geoscience Job No.:	1194
Fugro Job No.:	2189

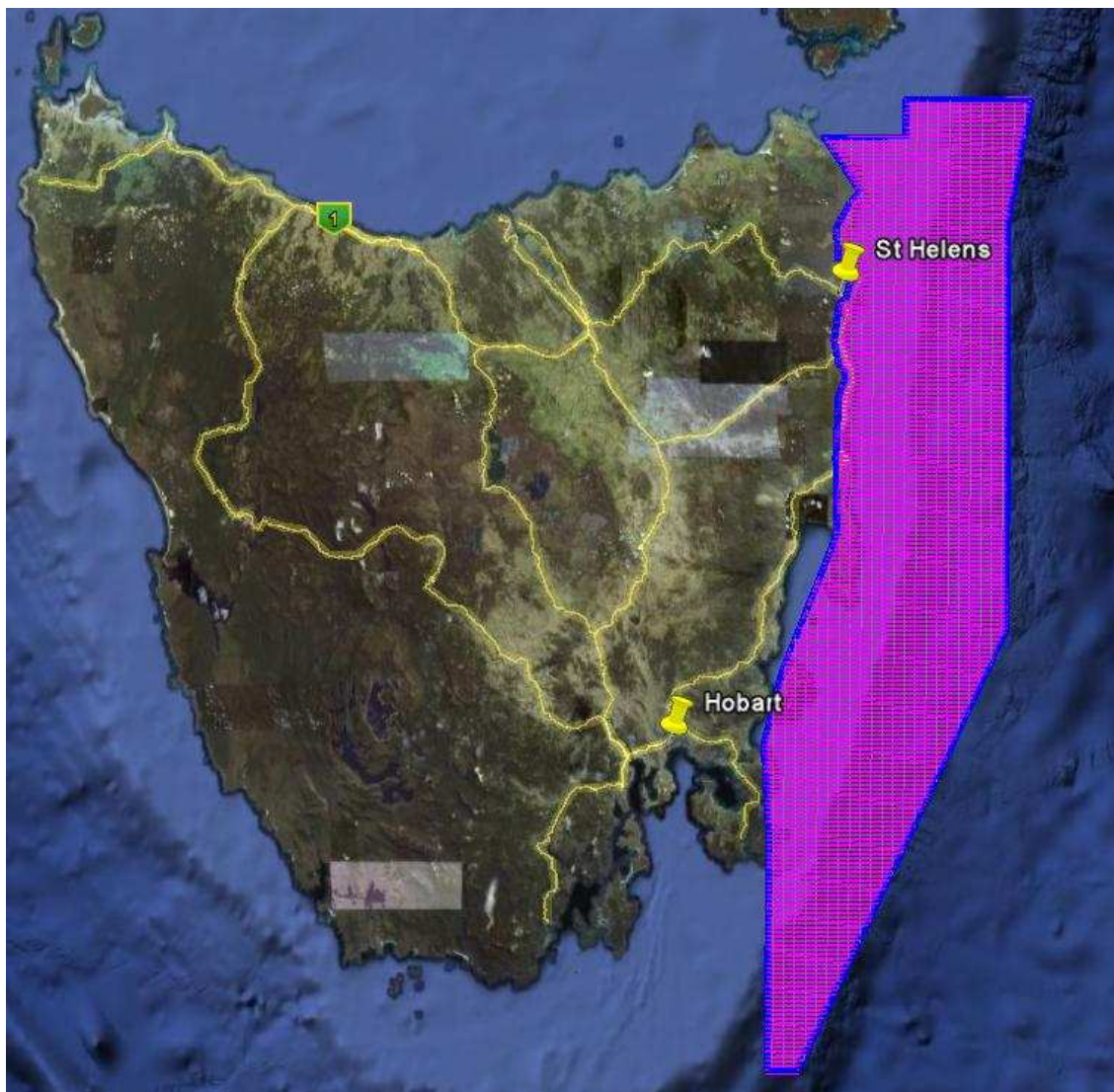
2.2 Survey Location

The survey location is shown in Figure 1.

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

	Longitude	Latitude		Longitude	Latitude
1	149.064716	-40.675630	15	148.259099	-41.569801
2	148.977566	-41.082654	16	148.235257	-41.488220
3	149.019475	-42.432891	17	148.254933	-41.364527
4	148.122116	-43.902157	18	148.284800	-41.348457
5	147.989407	-43.903383	19	148.298032	-41.304258
6	147.981782	-43.152015	20	148.310767	-41.284306
7	147.953614	-42.824195	21	148.249370	-41.243833
8	148.028594	-42.589644	22	148.237056	-41.112219
9	148.261554	-42.134216	23	148.295816	-41.025611
10	148.251898	-41.870183	24	148.339115	-40.993161
11	148.259714	-41.695248	25	148.183334	-40.818598
12	148.259714	-41.670372	26	148.534700	-40.810896
13	148.285111	-41.619682	27	148.531282	-40.684093
14	148.284519	-41.589875			

Figure 1 East Tasmania Offshore, Tas



2.3 Specifications and Tolerances

Project Number	2189/1194
Approx. line kilometres (including ties)	25,907.14 km
Traverse direction	090°-270°
Traverse spacing	800 m
Traverse line numbers	1000101 – 1045201
Tie-line direction	000°-180°
Tie-line spacing	4,000 m
Tie line numbers	1900101 – 1902901
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)	0.5 and 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	Alan Lily Til Ribarich Carl Pommers Christian Marsh
SURVEY OPERATORS	Stephen Rawlings (Crew Leader) Steve Richards (Crew Leader)
FIELD PROCESSING	Stephen Rawlings Steve Richards
TECHNICIAN/ENGINEER	Clint Hazelwood Gary Kreider
DATA PROCESSING	Doug Gay Kevin Harrington

4. ACQUISITION

4.1 Aircraft and Equipment

VH-FNV

Aircraft Model	Diamond DA42
Aircraft Registration	VH-FNV
Aircraft Magnetometer	Scintrex CS-3 Caesium vapour
Magnetic Compensator	Fugro FASDAS mag decoupler unit
Base station magnetometer	1 x CF1 and 1 x Scintrex ENVI magnetometer
Altimeter	Collins ALT-55 radio altimeter
Barometer	FASDAS Enviro Sensor
Thermometer	FASDAS Enviro Sensor
Navigation system	Fugro Omnistar in VBS (Virtual Base Station) Novatel 3000L 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 OEMV and 3000L GPS Receivers

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

A CF1 and a Scintrex ENVI mag base station magnetometer 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 0.5 and 2 seconds respectively 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. The base stations were located at Hobart and St Helens Airports.

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 H.

Date	Aircraft	Base	Comment
February 22, 2011	VH-FNV	Hobart, TAS	Aircraft arrives on site
February 25, 2011	VH-FNV	Hobart, TAS	Acquisition commence
March 17, 2011	VH-FNV	St Helens, TAS	Aircraft moves base
April 4, 2011	VH-FNV	Hobart, TAS	Aircraft moves base (reflights)
April 20, 2011	VH-FNV	Hobart, 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	0.1	unit
Uncompensated Total Magnetic Intensity (TMI)	0.001	nT
Fluxgates X, Y & Z	0.01	nT
Compensated TMI	0.001	nT
Terrain clearance (radar altimeter)	0.1	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	0.1	°C
Barometric pressure	0.1	hPa
Resolution	0.1	%
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-FNV	24/02/11	2	0.328	0.034	9.57
	24/03/11	23	0.382	0.019	24.61
	26/03/11	26	0.307	0.013	21.06

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 2189, OFFSHORE EAST TASMANIA - VH-FNV (Diamond)

Flown 16th/20th April, 2011, Flights 48/51

Planned Height (feet)	Planned Height (m)	Radar Altimeter (m)	Barometric Height (m)	GPS Height (m)	Hr – Hb (m)	Hr – Hg (m)	Hr – Hpl (m)
100	30	37	36	37	1	0	7
150	46	53	52	52	1	0	7
200	61	66	65	66	1	0	5
250	76	82	81	82	1	0	5
300	91	96	95	96	1	0	4
350	107	110	110	110	-0	0	3
400	122	126	128	126	-2	0	4
500	152	153	156	153	-3	0	1
600	183	189	194	188	-5	0	6
800	244	249	254	249	-5	0	5
1000	305	302	306	303	-4	0	-3

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 Osborne Park, Perth.

Hardware	Cooler Master PC (Windows XP) RM DVD writer
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Software	Fugro in-house software Oasis montaj 7.2
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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 and x-track
- ground speed

5.3 Magnetism

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	-0.5 sec (~36 m)
GPS northing	-0.5 sec (~36 m)
GPS height	-0.5 sec (~36 m)
Magnetics	0 sec
Radar altitude	0 sec
Pressure	0 sec
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	Date	Mean Diurnal Value
East Tasmania Offshore	23 Feb – 27 Feb	61692 nT
	28 Feb – 29 Feb	61762 nT
	01 Mar – 14 Mar	61692 nT
	15 Mar – 16 Mar	61762 nT
	24 Mar – 31 Mar	61080 nT
	01 Apr – 02 Apr	61164.5 nT
	03 Apr – 19 Apr	61080 nT
	20 Apr	61740 nT

TABLE 5 – DIURNAL BASE VALUES

5.3.4 IGRF Correction

The International Geophysical Reference Field (IGRF) was removed from the data using the 2010 model extrapolated to the survey date 24/02/2011. The correction formula was:

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

Area Name	Mean IGRF Value
East Tasmania Offshore	61522 nT

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 micro-levelling the magnetics are shown in Table 7 .

Filter Type	High Pass	Threshold (nT)
Hanning	13 cells	1

TABLE 7 – MAGNETIC MICRO-LEVELLING PARAMETERS

5.3.6 Gridding & Further Enhancements

A bi-cubic spline algorithm was used to produce gridded data of 160 metre cell size.

The TMI gridded data was then reduced to the pole and a first vertical derivative of the RTP grid calculated.

Inputs into the RTP algorithm:

Inclination: -71.742°

Declination: 14.998°

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 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.

- Total Magnetic Intensity (TMI), nT
- TMI reduced to the pole (RTP), nT
- RTP 1st vertical derivative (RTP1VD), nT/m

APPENDIX A

BASE STATION LOGS

VH-FNV Base Records

GPS Base Records - Hobart

Job Number: 2189
 Aircraft: FNV
 Date Calculated: 26-Feb-11
 Calculated by: D Gay

Client: Geoscience Australia
 Job Name: Offshore Eastern Tasmania
 Crew Leader: Stephen Rawlings
 Signature:

BASE GPS - Calculated Base GPS Co-ordinates

Latitude: 42° 50' 26.91016" S Longitude: 147° 30' 35.47996" Height: 2.203 m E

Antenna Location: On roof of TasAir Hanger, above awning on Eastern side of the hanger.

GPS Base Records – St Helens

Job Number: 2189
 Aircraft: FNV
 Date Calculated: 20-Mar-11
 Calculated by: Kevin Harrington

Client: Geoscience Australia
 Job Name: Offshore Eastern Tasmania
 Crew Leader: Stephen Rawlings
 Signature:

BASE GPS - Calculated Base GPS Co-ordinates

Latitude: 41° 19' 49.83572" S Longitude: 148° 14' 48.54607" Height: 31.223 m E

Antenna Location: North side of accomodation black

Magnetic Base Station Records - Hobart

Base Magnetometer # 1				Date	22/2/11
Location:	Hobart Airport			61856.1 nT	
Type:	CF1			2m N	
Serial No.:	C283 75207	61854.6 nT	2m W	61856.6 nT	2m E 61856.1 nT
Cycle Rate:	2Hz			2m S	
Sensor Height:	3 m AGL			618565.9 nT	

Base Magnetometer # 2				Date	22/2/11
Location:	Hobart Airport			61756.9 nT	
Type:	Envimag			2m N	
Serial No.:	Envi14	61755.7 nT	2m W	61757.4 nT	2m E 61757.7 nT
Cycle Rate:	2Hz			2m S	
Sensor Height:	2.5 m AGL			61757.3 nT	



Magnetic Base Station Records – St Helens

Base Magnetometer # 3				Date	18/3/11
Location:	St Helens Aerodrome			61168.2 nT	
Type:	CF1			2m N	
Serial No.:	C283 75207	61167.9 nT	2m W	61169.0 nT	2m E 61170.4 nT
Cycle Rate:	2Hz			2m S	
Sensor Height:	3 m AGL			61171.3 nT	

Base Magnetometer # 4				Date	18/3/11
Location:	St Helens Aerodrome			61096.7 nT	
Type:	Envimag			2m N	
Serial No.:	Envi14	61094.5 nT	2m W	61093.2 nT	2m E 61091.6 nT
Cycle Rate:	2Hz			2m S	
Sensor Height:	2.5 m AGL			61091.0 nT	



APPENDIX B

OPERATIONS REPORT

System: FASDAS
Aircraft: VH-FNV

1067.3 Hrs - Progressive M/R Hrs at the start of job, prior to mobilisation

Total Job kms: 30895.526 Kms

1175.3 Hrs - The hours the Periodic Inspection is actually due at start of the job

Plan Kms Remain: 0.000 Kms

% Complete: 100.000 %

Job Number: 2189
Contract Number: G2023B
Job Name: Offshore East Tasmania
Area Names: Tasmania Offshore
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									
21-February-2011														0.50	MO	FNV waiting for weather to improve.
Julian Day 52														0.50	SETUP	SJR setting up in Hobart
Monday									94.7	13.3						
Date 22-Feb		AL				7:06:00	10:06:00	3.0						0.50	MO	Essendon to Hobart.
Julian Day 53		SM	AL			13:52:00	16:12:00	2.3						0.50	SAF	recce
Tuesday									89.4	18.6						Comment Til Ribarich arrived in Hobart.
Date 23-Feb	1	SM				8:00:00	9:18:00	1.3						0.10	TF	comp box
Julian Day 54														0.90	SETUP	Job startup meeting. Waiting for PTW.
Wednesday																Comment Clint Hazelwood arrived on site to replace alternator.
									88.1	19.9						
Date 24-Feb		AL	SM			11:45:00	13:20:00	1.6						0.40	A	Alternator being replaced due survey power tripping.
Julian Day 55	2													0.10	TR	comp box
Thursday													0.50	0.50	W	low cloud base over airport
									86.5	21.5						
Date 25-Feb	3	AL	TR	307.550		14:55:00	17:49:00	2.9						0.25	P	
Julian Day 56													0.50	0.75	W	low cloud base over airport
Friday									83.6	24.4	307.550					
Date 26-Feb	4	AL	SM	677.540		6:36:00	11:02:00	4.4						0.50	P	
Julian Day 57	5	SM	AL	748.055		13:26:00	17:46:00	4.3						0.50	P	
Saturday									74.9	33.1	1733.145					Comment Weather ended operations early for the day
																Comment Clint Hazelwood departed.
Date 27-Feb	6	SM	TR	980.864		6:39:00	11:32:00	4.9						0.50	P	
Julian Day 58	7	TR	SM	575.859		13:05:00	16:23:00	3.3						0.50	P	
Sunday																
									66.7	41.3	3289.868					
Totals This Week: ▶				3289.868		Week Hours: ▶			28.1	▲: A/C Hrs to Next Service			1.00	7.00		

System: FASDAS
Aircraft: VH-FNV

1067.3 Hrs - Progressive M/R Hrs at the start of job, prior to mobilisation

Total Job kms: 30895.526 Kms

1175.3 Hrs - The hours the Periodic Inspection is actually due at start of the job

Plan Kms Remain: 0.000 Kms
% Complete: 100.000 %

Job Number: 2189
Contract Number: G2023B
Job Name: Offshore East Tasmania
Area Names: Tasmania Offshore
Client: Geoscience Australia

Date	Fit	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-February-2011	8	TR	AL	901.495		6:56:00	11:55:00	5.0						0.60	P	
Julian Day 59	9	AL	TR	718.101		13:35:00	17:25:00	3.8						0.40	P	
Monday									57.9	50.1	4909.464					
Date 1-Mar													1.00	1.00	W	bad weather all day
Julian Day 60																
Tuesday									57.9	50.1	4909.464					
Date 2-Mar													1.00	1.00	W	bad weather all day
Julian Day 61																
Wednesday									57.9	50.1	4909.464					
Date 3-Mar	10	AL	TR		60.344	13:22:00	14:32:00	1.2					1.00	0.10	S	pm fit returned early due very strong winds.
Julian Day 62														0.90	W	bad weather
Thursday									56.7	51.3	4909.464	60.344				
Date 4-Mar													1.00	1.00	W	bad weather, strong winds
Julian Day 63																
Friday									56.7	51.3	4909.464	60.344				
Date 5-Mar	11	SM	TR	416.179	473.948	6:34:00	11:09:00	4.6						0.50	P & S	Reflights called by FASP.
Julian Day 64													0.50	0.50	D	Diurnal activity
Saturday									52.1	55.9	5325.643	534.292				
Date 6-Mar	12	TR	AL	750.017	76.525	6:50:00	11:50:00	5.0						0.60	P & S	Reflights called by FASP.
Julian Day 65	13	AL	TR	604.963		13:29:00	17:01:00	3.5						0.40	P	
Sunday																
									43.6	64.4	6680.623	610.817				
Totals This Week: ►				3390.755	610.817	Week Hours: ►		23.1	▲: A/C Hrs to Next Service				4.50	7.00		

System: FASDAS
Aircraft: VH-FNV

1067.3 Hrs - Progressive M/R Hrs at the start of job, prior to mobilisation

Total Job kms: 30895.526 Kms

1175.3 Hrs - The hours the Periodic Inspection is actually due at start of the job

Plan Kms Remain: 0.000 Kms

% Complete: 100.000 %

Job Number: 2189
Contract Number: G2023B
Job Name: Offshore East Tasmania
Area Names: Tasmania Offshore
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									
07-March-2011	14	AL	SM	711.111	135.206	6:33:00	11:27:00	4.9						0.50	P & S	Reflights called by FASP.
Julian Day 66													0.50	0.50	D	diurnal activity
Monday									38.7	69.3	7391.734	746.023				
Date 8-Mar													0.50	0.50	W	bad weather in the morning
Julian Day 67	15	SM	TR	786.872		12:25:00	17:20:00	4.9						0.50	P	
Tuesday									33.8	74.2	8178.606	746.023				
Date 9-Mar													0.50	0.50	W	bad weather in the morning
Julian Day 68	16	TR	AL	792.282		13:07:00	18:07:00	5.0						0.50	P	
Wednesday									28.8	79.2	8970.888	746.023				
Date 10-Mar													1.00	1.00	W	bad weather all day
Julian Day 69																
Thursday									28.8	79.2	8970.888	746.023				
Date 11-Mar	17	SM	TR	935.256		6:37:00	11:32:00	4.9						0.50	P	
Julian Day 70													0.50	0.50	D	diurnal activity
Friday									23.9	84.1	9906.144	746.023				
Date 12-Mar													1.00	1.00	D	severe diurnal activity
Julian Day 71																
Saturday									23.9	84.1	9906.144	746.023				
Date 13-Mar	18	AL	SM	850.530		6:47:00	11:31:00	4.7						0.50	P	
Julian Day 72														0.20	D	diurnal activity
Sunday	19	SM	AL	437.462		14:42:00	17:35:00	2.9						0.30	P	
															Comment	Steven Richards arrived in Hobart.
									16.3	91.7	11194.136	746.023				
Totals This Week: ►				4513.513	135.206	Week Hours: ►			27.4	▲: A/C Hrs to Next Service			4.00	7.00		

System: FASDAS
Aircraft: VH-FNV

1067.3 Hrs - Progressive M/R Hrs at the start of job, prior to mobilisation

Total Job kms: 30895.526 Kms

1175.3 Hrs - The hours the Periodic Inspection is actually due at start of the job

Plan Kms Remain: 0.000 Kms

% Complete: 100.000 %

Job Number: 2189
Contract Number: G2023B
Job Name: Offshore East Tasmania
Area Names: Tasmania Offshore
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	Stdby Days	Activity Contribution	Activity	COMMENTS <u>Weather, Data delivery</u> <u>Aircraft movement, etc</u>
						Start	End									
21-March-2011														0.50	MA	Aircraft ferried from Hobart to St Helens.
Julian Day 80													0.50	0.50	W	Low cloud.
Monday									100.9	107.1	13098.029	1457.488				
Date 22-Mar													1.00	1.00	W	Rain, low cloud.
Julian Day 81															Comment	Til Ribarich out, Christian Marsh in
Tuesday									100.9	107.1	13098.029	1457.488				
Date 23-Mar													1.00	1.00	W	Heavy rain, low cloud.
Julian Day 82																
Wednesday									100.9	107.1	13098.029	1457.488				
Date 24-Mar														0.30	W	Early rain
Julian Day 83	23	AL	SR			11:30:00	12:15:00	0.8						0.20	TF	Comp box. Slot 2 (Sdcomp 0.019, FOM: 0.716)
Thursday	24	AL	CP	615.259	154.075	14:00:00	18:15:00	4.3						0.50	P & S	Reflights called by FASP.
									95.8	112.2	13713.288	1611.563				
Date 25-Mar													0.50	0.50	W	High winds (>50knts)
Julian Day 84	25	CP	AL	968.376		12:45:00	18:15:00	5.5						0.50	P	
Friday																
									90.3	117.7	14681.664	1611.563				
Date 26-Mar														0.20	E	Waiting for new fluxgate to arrive in Launceston
Julian Day 85		CM	AL			9:30:00	10:40:00	1.2						0.15	E	Return flight to Launceston to retrieve fluxgate
Saturday														0.15	E	Installation of fluxgate
26	CM	SR				12:30:00	14:00:00	1.5						0.20	TF	Compbox - slot 5, Sdcomp = 0.015, FOM =
27	AL	CM	533.961	19.000		15:30:00	18:50:00	3.3	84.3	123.7	15215.625	1630.563		0.30	P & S	Reflights called by FASP
Date 27-Mar	28	CM	AL	897.465		7:15:00	12:00:00	4.8						0.50	P	
Julian Day 86	29	CP	CM	774.365		14:05:00	18:40:00	4.6						0.50	P	
Sunday																
									74.9	133.1	16887.455	1630.563				
Totals This Week: ▶				3789.426	173.075	Week Hours: ▶		25.8	▲: A/C Hrs to Next Service				3.00	7.00		

System: FASDAS
Aircraft: VH-FNV

1067.3 Hrs - Progressive M/R Hrs at the start of job, prior to mobilisation

Total Job kms: 30895.526 Kms

1175.3 Hrs - The hours the Periodic Inspection is actually due at start of the job

Plan Kms Remain: 0.000 Kms

% Complete: 100.000 %

Job Number: 2189
Contract Number: G2023B
Job Name: Offshore East Tasmania
Area Names: Tasmania Offshore
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	Stdby Days	Activity Contribution	Activity	COMMENTS <u>Weather, Data delivery</u> <u>Aircraft movement, etc</u>
						Start	End									
28-March-2011	30	CM	CP	934.837		7:05:00	12:05:00	5.0						0.50	P	
Julian Day 87	31	CP	CM	900.934		14:00:00	18:50:00	4.8						0.50	P	
Monday									65.1	142.9	18723.226	1630.563				
Date 29-Mar						7:20:00	7:25:00	0.1						0.05	Comment	Returned due FASDAS power issue.
Julian Day 88	32	AL	CP	918.305		7:45:00	12:45:00	5.0						0.50	P	
Tuesday	33	CP	AL	634.362		14:45:00	18:30:00	3.8						0.45	P	
Date 30-Mar	34	AL	CM	891.755		7:00:00	11:40:00	4.7						0.50	P	
Julian Day 89													0.50	0.50	W	High winds (45-50knts) and diurnal activity.
Wednesday									51.5	156.5	21167.648	1630.563				
Date 31-Mar	35	CP	AL	639.796		7:25:00	11:25:00	4.0						0.40	P	
Julian Day 90		CM	CP			12:05:00	12:10:00	0.1						0.05	Comment	Returned due FASDAS power issue.
Thursday	36	CM	CP	837.623		12:25:00	18:55:00	6.5						0.55	P & R	FASDAS stopped recording after 3/4 of flt.
Date 1-Apr									40.9	167.1	22645.067	1630.563				
Julian Day 91													1.00	1.00	W	High winds and severe turbulence.
Friday															Comment	A Lilly to Launceston for departure to Perth.
Date 2-Apr	37	CM	CP	755.548		7:20:00	11:20:00	4.0						0.50	P	
Julian Day 92	38	CP	CM	1117.526	33.982	12:30:00	18:10:00	5.7						0.50	P & S	Reflights called by FASP
Saturday									31.2	176.8	24518.141	1664.545				
Date 3-Apr	39	CP	CM	914.881	190.056	6:20:00	12:00:00	5.7						0.50	P & S	Severe diurnal activity for half of this flight.
Julian Day 93	40	CM	CP	705.000	47.000	13:20:00	17:45:00	4.4						0.50	P & S	Reflights called by FASP
Sunday									21.1	186.9	26138.022	1901.601				
Totals This Week: ▶				9250.567	271.038	Week Hours: ▶		53.7	▲: A/C Hrs to Next Service				1.50	7.00		

System: FASDAS
Aircraft: VH-FNV

1067.3 Hrs - Progressive M/R Hrs at the start of job, prior to mobilisation

Total Job kms: 30895.526 Kms

1175.3 Hrs - The hours the Periodic Inspection is actually due at start of the job

Plan Kms Remain: 0.000 Kms

% Complete: 100.000 %

Job Number: 2189
Contract Number: G2023B
Job Name: Offshore East Tasmania
Area Names: Tasmania Offshore
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	Stdby Days	Activity Contribution	Activity	COMMENTS <u>Weather, Data delivery</u> <u>Aircraft movement, etc</u>
						Start	End									
04-April-2011														0.40	SAF	Fatigue management.
Julian Day 94	41	CM	CP	888.268	209.544	9:50:00	15:30:00	5.7						0.60	P & R & S	Reflights called by FASP.
Monday									15.4	192.6	27026.290	2111.145				
Date 5-Apr	42	CP	CM	1052.104		6:25:00	12:15:00	5.8						0.60	P & R	Reflights called by FASP.
Julian Day 95	43	CM	CP	440.127		13:40:00	18:00:00	4.3						0.40	P & R	Reflights called by FASP.
Tuesday									5.3	202.7	28518.521	2111.145				
Date 6-Apr	44	CM	CP	326.559	644.747	6:00:00	11:45:00	5.8					0.50	0.50	P & R & S	Reflights called by FASP. Diurnal activity.
Julian Day 96													0.50	0.50	D	Diurnal activity. Data sent to FASP.
Wednesday									-0.5	208.5	28845.080	2755.892				
Date 7-Apr														0.20	Comment	Late take off due fog.
Julian Day 97	45	CP	CM	171.346	505.980	7:35:00	12:25:00	4.8						0.40	P & R & S	Reflights called by FASP. Some diurnal activity.
Thursday														0.40	R	Aircraft arrives in Hobart for maintenance.
Date 8-Apr									-9.0	217.0	29645.878	3261.872				
Julian Day 98														1.00	MA	Check 1 at Tasair, Hobart International Airport.
Friday															Comment	C Marsh, S Richards & C Pommers depart
Date 9-Apr									-9.0	217.0	29645.878	3261.872				
Julian Day 99														1.00	MA	Check 1 at Tasair, Hobart International Airport.
Saturday															Comment	No crew on site.
Date 10-Apr									-9.0	217.0	29645.878	3261.872				
Julian Day 100														0.90	MA	Check 1 at Tasair, Hobart International Airport.
Sunday															Comment	Steve Richards and Carl Pommers return to
		CP				17:30:00	17:35:00	0.1						0.10	MA	Test flight after maintenance.
									90.9	217.1	29645.878	3261.872				
Totals This Week: ▶				3507.856	1360.271	Week Hours: ▶		30.2	▲: A/C Hrs to Next Service				0.50	7.00		

Total Job kms:	30895.526	Kms
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	Stdby Days	Activity Contribution	Activity	COMMENTS <u>Weather, Data delivery, Aircraft movement, etc</u>
						Start	End									
11-April-2011 Julian Day 101														1.00	W	Low cloud and rain.
Monday																
									90.9	217.1	29645.878	3261.872				
12-Apr Julian Day 102														1.00	W	Low cloud, heavy rain, high winds.
Tuesday																
									90.9	217.1	29645.878	3261.872				
13-Apr Julian Day 103														1.00	W	Low cloud and rain.
Wednesday																
									90.9	217.1	29645.878	3261.872				
14-Apr Julian Day 104														1.00	W	Low cloud all day.
Thursday																
									90.9	217.1	29645.878	3261.872				
15-Apr Julian Day 105	47	CM	CP			11:30:00	11:35:00	0.1						0.30	W	Low cloud.
Friday														0.10	Comment	FASDAS shutdown on on takeoff AC return
														0.60	E	Aircraft AOG until arrival of G. Kreider.
									90.8	217.2	29645.878	3261.872				
16-Apr Julian Day 106														0.30	E	Waiting for G Kreider to arrive with spare fluxgate.
Saturday														0.20	E	Fluxgate installed.
	48	CM	SR			12:30:00	14:20:00	1.8						0.20	TF	Compbox and Radalt stacks - best Sdcomp =
	49	CP	CM	164.326		16:10:00	17:50:00	1.7						0.20	S	Diurnal and radalt level shift.
									87.3	220.7	29645.878	3426.198		0.10	A	AC grounded until a LAME has checked it over.
17-Apr Julian Day 107														1.00	A	Waiting for arrival of LAME.
Sunday																
									87.3	220.7	29645.878	3426.198				
Totals This Week: ▶					164.326	Week Hours:▶		3.6	▲ : A/C Hrs to Next Service					7.00		

System: FASDAS
Aircraft: VH-FNV

1067.3 Hrs - Progressive M/R Hrs at the start of job, prior to mobilisation

Job Number: 2189
Contract Number: G2023B
Job Name: Offshore East Tasmania
Area Names: Tasmania Offshore
Client: Geoscience Australia

Total Job kms: 30895.526 Kms

1175.3 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 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-April-2011														1.00	A	Gav Berg arrives re alternator & starter motor issue.
Julian Day 108																
Monday									87.3	220.7	29645.878	3426.198				
Date 19-Apr														0.40	A	New starter motor installed. Ground runs
Julian Day 109	50	CM	CP	863.836		12:10:00	17:45:00	5.6						0.60	R	From previous flights.
Tuesday																
Date 20-Apr	51	CM	CP	385.812		6:30:00	9:50:00	3.3			30509.714	3426.198		0.30	R	From previous flights.
Julian Day 110														0.40	Comment	Waiting for data to be reviewed by FASP processor.
Wednesday														0.30	SETUP	Base packed up.
															Comment	Gary Kreider and Gav Berg depart for Perth.
									78.4	229.6	30895.526	3426.198				
Date 21-Apr														1.00	MO	CM and CP ferry aircraft to Essendon.
Julian Day 111															Comment	SR flies back to Brisbane for break.
Thursday																
									78.4	229.6	30895.526	3426.198				
Date 22-Apr																
Julian Day 112																
Friday																
									78.4	229.6	30895.526	3426.198				
Date 23-Apr																
Julian Day 113																
Saturday																
									78.4	229.6	30895.526	3426.198				
Date 24-Apr																
Julian Day 114																
Sunday																
									78.4	229.6	30895.526	3426.198				
Totals This Week: ▶				1249.648		Week Hours:▶		8.9	▲: A/C Hrs to Next Service					4.00		

APPENDIX C

RAW LOCATED DATA FORMATS

MAGNETICS – RAW

COMM RAW POINT LOCATED DATA
 COMM
 COMM GEOSCIENCE AUSTRALIA PROJECT NUMBER: 1194
 COMM
 COMM JOB NUMBER: 2189
 COMM AREA NUMBER: 1
 COMM SURVEY COMPANY: Fugro Airborne Surveys
 COMM CLIENT: Geoscience Australia
 COMM SURVEY TYPE: Offshore Magnetic Survey
 COMM AREA NAME: East Tasmania
 COMM STATE: Tasmania
 COMM COUNTRY: Australia
 COMM SURVEY FLOWN: February 2011 - April 2011
 COMM LOCATED DATA CREATED: 15 June 2011
 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: 31054.2 km
 COMM
 COMM LINE NUMBERING
 COMM
 COMM TRAVERSE LINE NUMBERS: 1000101 - 1045201
 COMM TIE LINE NUMBERS: 1900101 - 1902901
 COMM
 COMM AREA BOUNDARY
 COMM DATUM GDA94
 COMM PROJECTION MGA
 COMM ZONE 55
 COMM

COMM	EASTING	NORTHING
COMM	674500	5495200
COMM	666112	5450183
COMM	666112	5300182
COMM	590112	5138382
COMM	579453	5138382
COMM	579826	5221836
COMM	577949	5258266
COMM	584395	5284240
COMM	604259	5334551
COMM	603890	5363879
COMM	604823	5383292
COMM	604823	5386055
COMM	607062	5391651
COMM	607062	5394961
COMM	604976	5397221
COMM	603117	5406307
COMM	604959	5420016
COMM	607483	5421763
COMM	608664	5426654
COMM	609763	5428853
COMM	604686	5433422
COMM	603862	5448048

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COMM      608939      5457591
COMM      612634      5461138
COMM      599793      5480706
COMM      629441      5481101
COMM      629398      5495183
COMM
COMM SURVEY EQUIPMENT
COMM
COMM AIRCRAFT:                      VH-FNV Diamond DA42
COMM
COMM MAGNETOMETER:                  Scintrex CS3 CV Magnetometer
COMM INSTALLATION:                  Nose stinger installation
COMM RESOLUTION:                    0.001 nT
COMM RECORDING INTERVAL:            0.1 s
COMM
COMM BASE MAGNETOMETER:              CF1 mag
COMM RECORDING INTERVAL:            0.5 s
COMM BASE MAGNETOMETER:              Scintrex Envi-mag
COMM RECORDING INTERVAL:            2 s
COMM LOCATION:                      Hobart Airport
COMM
COMM THERMOMETER:                   FASDAS Enviro sensor
COMM RECORDING INTERVAL:            1.0 s
COMM
COMM BAROMETER:                     FASDAS Enviro sensor
COMM RECORDING INTERVAL:            1.0 s
COMM
COMM RADAR ALTIMETER:               Collins Alt-55
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 NO PROCESSING TO MAGNETICS DATA
COMM
COMM CO-ORDINATES
COMM PARALLAX CORRECTION:            -0.5 s
COMM
COMM RADAR ALTIMETER DATA
COMM PARALLAX CORRECTION:            0 s
COMM
COMM MAGNETIC DATA
COMM PARALLAX CORRECTION:            0 s
COMM
COMM TEMPERATURE DATA
COMM PARALLAX CORRECTION:            0 s
COMM
COMM PRESSURE DATA
COMM PARALLAX CORRECTION:            0 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
 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 With regard to DIGITAL TERRAIN DATA, the accuracy of the elevation
 COMM calculation is directly dependent on the accuracy of the two input
 COMM parameters, radar altitude and GPS altitude. The radar altitude value
 COMM may be erroneous in areas of heavy tree cover, where the altimeter
 COMM reflects the distance to the tree canopy rather than the ground. The
 COMM GPS altitude value is primarily dependent on the number of available
 COMM satellites. Although post-processing of GPS data will yield X and Y
 COMM accuracies in the order of 1-2 metres, the accuracy of the altitude
 COMM value is usually much less, sometimes in the ± 5 metre range. Further
 COMM inaccuracies may be introduced during the interpolation and gridding
 COMM process. Because of the inherent inaccuracies of this method, no
 COMM guarantee is made or implied that the information displayed is a true
 COMM representation of the height above sea level. Although this product
 COMM may be of some use as a general reference,

COMM THIS PRODUCT MUST NOT BE USED FOR NAVIGATION PURPOSES.

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		-99	I4
COMM Flight number		-99	I4
COMM Line number		-999999	I8
COMM Fiducial number		-999999	I8
COMM Date (YYYYMMDD)		-9999999	I9
COMM Bearing	deg	-99	I4
COMM Raw longitude	deg	-999.9999999	F13.7
COMM Raw latitude	deg	-99.9999999	F12.7
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	-99999999.9	F12.1
COMM Fluxgate Y component	nT	-99999999.9	F12.1

COMM Fluxgate Z component	nT	-999999999.9	F12.1
COMM Uncompensated TMI	nT	-99999.999	F11.3
COMM Compensated TMI	nT	-99999.999	F11.3
COMM Magnetic Diurnal	nT	-99999.999	F11.3

APPENDIX D

FINAL LOCATED DATA FORMATS

MAGNETICS – FINAL

COMM FINAL POINT LOCATED DATA

COMM

COMM GEOSCIENCE AUSTRALIA PROJECT NUMBER: 1194

COMM

COMM JOB NUMBER: 2189

COMM AREA NUMBER: 1

COMM SURVEY COMPANY: Fugro Airborne Surveys

COMM CLIENT: Geoscience Australia

COMM SURVEY TYPE: Offshore Magnetic Survey

COMM AREA NAME: East Tasmania

COMM STATE: Tasmania

COMM COUNTRY: Australia

COMM SURVEY FLOWN: February 2011 - April 2011

COMM LOCATED DATA CREATED: 07 June 2011

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: 25907.14 km

COMM

COMM LINE NUMBERING

COMM

COMM TRAVERSE LINE NUMBERS: 1000101 - 1045201

COMM TIE LINE NUMBERS: 1900101 - 1902901

COMM

COMM AREA BOUNDARY

COMM DATUM: GDA94

COMM PROJECTION: MGA

COMM ZONE: 55

COMM

COMM EASTING NORTHING

COMM 674500 5495200

COMM 666112 5450183

COMM 666112 5300182

COMM 590112 5138382

COMM 579453 5138382

COMM 579826 5221836

COMM 577949 5258266

COMM 584395 5284240

COMM 604259 5334551

COMM 603890 5363879

COMM 604823 5383292

COMM 604823 5386055

COMM 607062 5391651

COMM 607062 5394961

COMM 604976 5397221

COMM 603117 5406307

COMM 604959 5420016

COMM 607483 5421763

COMM 608664 5426654

COMM 609763 5428853

COMM 604686 5433422

COMM 603862 5448048

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COMM      608939      5457591
COMM      612634      5461138
COMM      599793      5480706
COMM      629441      5481101
COMM      629398      5495183
COMM
COMM SURVEY EQUIPMENT
COMM
COMM AIRCRAFT:                      VH-FNV Diamond DA42
COMM
COMM MAGNETOMETER:                  Scintrex CS3 CV Magnetometer
COMM INSTALLATION:                  Nose stinger installation
COMM RESOLUTION:                    0.001 nT
COMM RECORDING INTERVAL:            0.1 s
COMM
COMM BASE MAGNETOMETER:              CF1 mag
COMM RECORDING INTERVAL:            0.5 s
COMM BASE MAGNETOMETER:              Scintrex Envi-mag
COMM RECORDING INTERVAL:            2 s
COMM LOCATION:                      Hobart Airport
COMM
COMM THERMOMETER:                   FASDAS Enviro sensor
COMM RECORDING INTERVAL:            1.0 s
COMM
COMM BAROMETER:                     FASDAS Enviro sensor
COMM RECORDING INTERVAL:            1.0 s
COMM
COMM RADAR ALTIMETER:               Collins Alt-55
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:    -0.5 s
COMM
COMM RADAR ALTIMETER DATA
COMM PARALLAX CORRECTION APPLIED:    0 s
COMM
COMM MAGNETIC DATA
COMM DIURNAL CORRECTION APPLIED:      23 Feb - 27 Feb    base value 61692.0 nT
COMM                                28 Feb - 29 Feb    base value 61762.0 nT
COMM                                01 Mar - 14 Mar    base value 61692.0 nT
COMM                                15 Mar - 16 Mar    base value 61762.0 nT
COMM                                24 Mar - 31 Mar    base value 61080.0 nT
COMM                                01 Apr - 02 Apr    base value 61164.5 nT
COMM                                03 Apr - 19 Apr    base value 61080.0 nT
COMM                                20 Apr            base value 61740.0 nT
COMM
COMM
COMM PARALLAX CORRECTION APPLIED:      0 s
COMM IGRF CORRECTION APPLIED:          base value 61522 nT
COMM IGRF MODEL 2010 extrapolated to: 2011/02/24
COMM
COMM DATA HAVE BEEN CORRECTED FOR SWELL NOISE

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COMM DATA HAVE BEEN TIE LINE LEVELLED
 COMM DATA HAVE BEEN MICROLEVELLED
 COMM
 COMM TEMPERATURE DATA
 COMM PARALLAX CORRECTION APPLIED: 0 s
 COMM
 COMM PRESSURE DATA
 COMM PARALLAX CORRECTION APPLIED: 0 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
 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 With regard to DIGITAL TERRAIN DATA, the accuracy of the elevation
 COMM calculation is directly dependent on the accuracy of the two input
 COMM parameters, radar altitude and GPS altitude. The radar altitude value
 COMM may be erroneous in areas of heavy tree cover, where the altimeter
 COMM reflects the distance to the tree canopy rather than the ground. The
 COMM GPS altitude value is primarily dependent on the number of available
 COMM satellites. Although post-processing of GPS data will yield X and Y
 COMM accuracies in the order of 1-2 metres, the accuracy of the altitude
 COMM value is usually much less, sometimes in the ± 5 metre range. Further
 COMM inaccuracies may be introduced during the interpolation and gridding
 COMM process. Because of the inherent inaccuracies of this method, no
 COMM guarantee is made or implied that the information displayed is a true
 COMM representation of the height above sea level. Although this product
 COMM may be of some use as a general reference,
 COMM THIS PRODUCT MUST NOT BE USED FOR NAVIGATION PURPOSES.
 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		-99	I4
COMM Flight number		-99	I4
COMM Line number		-999999	I8
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 Levelled TMI	nT	-99999.999	F11.3
COMM Final TMI	nT	-99999.999	F11.3