



DIGITAL DATA: DOCUMENTATION

ENVIRONMENT CANTERBURY

WAIMAKARIRI RIVER

VOLUME 210013702NOB

Summary Data Description

Airborne laser scanning was captured over Christchurch and the adjoining Waimakariri River between 06th to 9th of July 2003. The data contained within this volume relates to the Waimakariri River area only.

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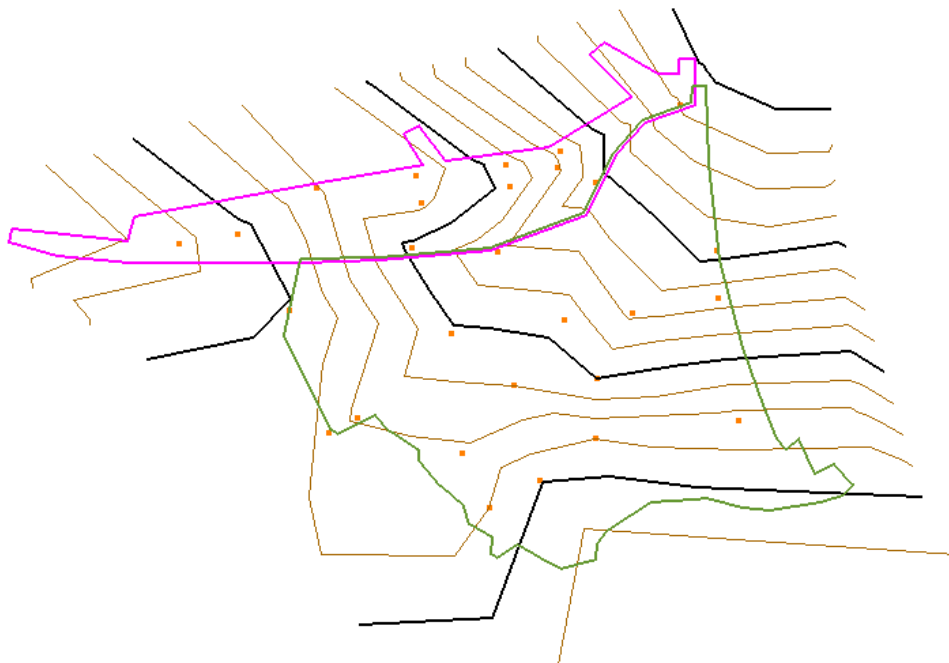
1. PROJECT REPORT

Acquisition: Airborne Laser Scanning (ALS) data was acquired from a fixed wing aircraft between 6th to 9th July 2003. Delays in acquiring the data were due to low cloud over the project area.

Ground Support: GPS base station support was provided by the client without incident. The ground check points acquired by the client allowed an assessment of the accuracy of the ALS data.

Data Processing: Reduction of the ALS data proceeded without any significant problems. Laser strikes were classified into ground and non-ground points using a single algorithm across the project area. Manual checking and editing of the data classification against low-resolution intensity imagery created by AAM further improved the quality of the terrain model.

Further Processing: A local geoid model was created covering the C.C.C and Waimakariri River project areas. The geoid separation between the ellipsoidal and local orthometric heights supplied was computed with a resulting N value. The geoid model was then derived using the N value separation and compared to the International geoid model EGM96 as used by the Concord Conversion program. The EGM96 geoid model is a generalised geoid model with minor variations existing with local project areas. Graphics indicated the EGM96 model with a gentle north/south slope. This was expected, as EGM96 is an estimated geoid model with long wavelength corrections. The local geoid is similar, with what appears to be a ridgeline running in a northeast to southwest direction. The outer extents of the geoid model were then extrapolated to cover the project area. The geoid model has been supplied as a dxf file. All data supplied within this volume has been adjusted to the AAMHatch geoid model.



AAM Local Geoid Model
0.05m Contours

The intensity value attributed each xyz laser point was used to derive a low resolution grey scaled image of the project area. Intensity data was also supplied in digital form being xyzi.

The tile layout has been supplied in dxf format.

Data Presentation: The data provided on this volume has been supplied in accordance with a specification agreed with the primary client. Subsequent users experiencing difficulties in handling the data should please contact AAMHatch to arrange a more appropriate data presentation

Further Issues: There are no further issues to report.

3. ADDITIONAL SERVICES

AAMHatch can perform the following additional services on the data contained on this volume if required:

- Change horizontal datum : to NZTM or other local grid
- Improve data classification : by tailoring parameters to suit regional variations
- Further classification : Assist building identification by further classifying non-ground strikes
- Data subset : by dividing the data into different tiles or polygons
- Data presentation : by creating contours, profiles, perspectives, flythroughs, colour-coded height plots etc.
- Data gridding : to convert the measured spot heights into a regular grids

4. METADATA

DATA CHARACTERISTICS

Characteristic	Description
Format	Space delimited ASCII
Size	45 million ground data points (approximate) 25 million non-ground data points (approximate) 14 million thinned ground data points (approximate) 70 million intensity data points (approximate)
Captured terrain model	1.3m average point separation
Supplied terrain model	1.8m estimated point density, separated into ground & non-ground
Data thinning	Points not contributing to the terrain definition within 0.13m removed
Laser Intensity	Supplied on all returns
Laser footprint size	0.220m (0.2mrad)
Video	Captured over the project area (not supplied)
Further details	Geoid report methodology, emailed to John Walter on the 09/10/03 File name: geoid_report.pdf

REFERENCE SYSTEMS

	Horizontal	Vertical
Datum	NZGD1949	MSL
Projection	NZMG	N/A
Geoid Model	N/A	
Reference Point	Base Station A 5741299.943 N 2480731.527 E	Base Station A 35.877 RL

SOURCE DATA

	Source	Description	Ref No	Date
Laser scanning	AAM GeoScan	25,000 Hz	810215	6 th – 9 th July 2003
GPS base data	C.C.C.	Static GPS	810215	6 th – 9 th July 2003
Base Stn coords	C.C.C.	Unknown	810215	6 th – 9 th July 2003
Test points	C.C.C.	Unknown	810215	unknown
Geiod Model	C.C.C.	Unknown	810215	unknown

ACCURACY

	Measured Point	Derived Point	Basis of Estimation
Vertical data		0.07 0.15 0.14	Comparison with 155 test pts Deductive estimate Comparison with 25 pts used in geoid model calculations. This is a measure of system noise across the entire project site based on different flight runs and computed gps trajectories
Horizontal data	< 0.55		System specifications ($1/2000$ flying height)

ACCURACY NOTES:

- Values shown represent standard error (68% confidence level or 1 sigma), in metres
- “Derived points” are those interpolated from a terrain model.
- “Measured points” are those observed directly.

USE OF DATA

- Council planning and analysis

LIMITATIONS OF DATA

- The definition of the ground under trees and dense vegetation may be less accurate.
- The definition of the ground in steep heavily vegetated areas may be less accurate.

5. CONDITIONS OF SUPPLY

The data in this volume has been commissioned by **ENVIRONMENT CANTERBURY**.

The data in this volume is provided to **ENVIRONMENT CANTERBURY** under a license by which the data is not sold, lent or distributed to any other party; and used only for the project for which provided, subject to the following conditions:

1. This file (README.PDF) is always stored with the unaltered data contained in this volume.
2. The data is not altered in any way without the approval of AAMHatch. The data may be copied from this file to another.
3. The data is not used for purposes beyond that intended.

Any responsibility of AAMHatch is removed if any of these conditions is not observed.

4. AAMHatch maintains an archive copy of the data in this volume together with this README file for at least 7 years after delivery.

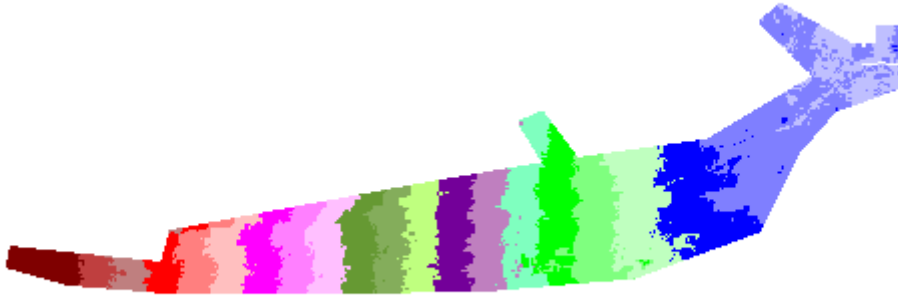
Any problems associated with the information in the data files contained in this volume should be reported to:

AAMHatch

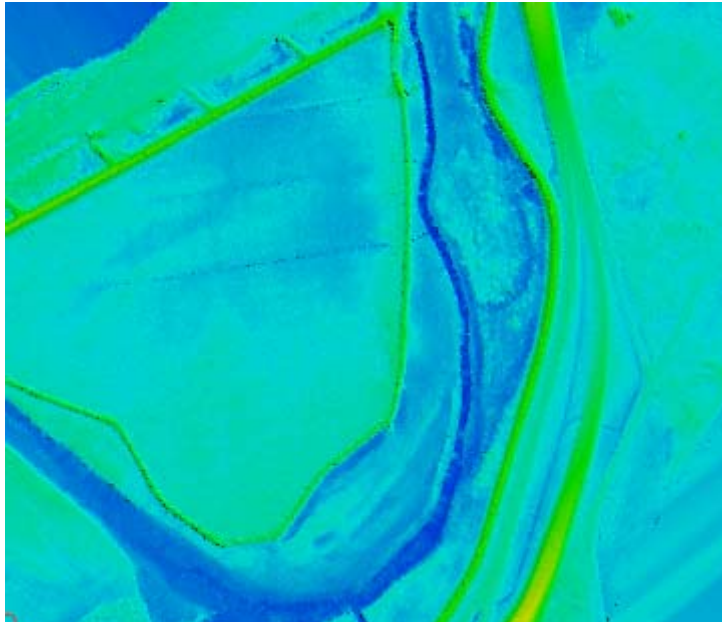
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6. VALIDATION PLOT

Elevation by colours



Sample view of river section



7. FILES SUPPLIED

DVD 1 of 2

02/12/2003	01:21p	160,553	Waimak_tile_layout.dxf
28/11/2003	05:10p	30,986	geoid_model.dxf

Intensity

28/11/2003	04:13p	67,529,936	Wiamak.ecw	Intensity image in ECW format
28/11/2003	04:13p	869	Wiamak.ers	
27/11/2003	05:09p	5,092,759	Waimak001.int	ALS data with Intensity values in ASCII format
27/11/2003	05:10p	14,311,942	Waimak002.int	
27/11/2003	05:11p	1,671,258	Waimak009.int	
27/11/2003	05:12p	49,203,605	Waimak010.int	
27/11/2003	05:14p	40,879,399	Waimak011.int	
02/12/2003	12:19p	32,031,789	Waimak012.int	
27/11/2003	05:15p	1,617,435	Waimak015.int	
27/11/2003	05:15p	823,491	Waimak016.int	
27/11/2003	05:18p	10,909,482	Waimak020.int	
27/11/2003	05:20p	49,549,799	Waimak021.int	
02/12/2003	12:27p	48,621,573	Waimak022.int	
02/12/2003	12:29p	16,802,874	Waimak023.int	
27/11/2003	05:26p	15,623,420	Waimak031.int	
27/11/2003	05:28p	40,619,072	Waimak032.int	
27/11/2003	05:29p	20,106,070	Waimak033.int	
27/11/2003	05:31p	29,905,003	Waimak034.int	
27/11/2003	05:33p	43,875,779	Waimak035.int	
27/11/2003	05:35p	70,056,923	Waimak036.int	
02/12/2003	12:31p	44,903,005	Waimak037.int	
02/12/2003	12:30p	93,433	Waimak038.int	
27/11/2003	05:44p	6,267,591	Waimak047.int	
27/11/2003	05:45p	18,641,935	Waimak048.int	
27/11/2003	05:46p	32,554,459	Waimak049.int	
27/11/2003	05:48p	47,112,876	Waimak050.int	
27/11/2003	05:50p	59,398,305	Waimak051.int	
27/11/2003	05:53p	70,809,692	Waimak052.int	
27/11/2003	05:56p	72,331,775	Waimak053.int	
27/11/2003	05:58p	73,147,162	Waimak054.int	
27/11/2003	06:01p	76,590,029	Waimak055.int	
27/11/2003	06:04p	76,831,710	Waimak056.int	
02/12/2003	12:33p	70,462,074	Waimak057.int	
02/12/2003	12:34p	5,434,938	Waimak058.int	
27/11/2003	06:14p	6,332,843	Waimak062.int	
27/11/2003	06:15p	15,193,823	Waimak063.int	
27/11/2003	06:15p	6,671,458	Waimak064.int	
27/11/2003	06:15p	573,503	Waimak065.int	
27/11/2003	06:17p	49,083,966	Waimak066.int	
27/11/2003	06:19p	66,629,246	Waimak067.int	
27/11/2003	06:21p	75,504,226	Waimak068.int	
27/11/2003	06:23p	72,876,284	Waimak069.int	
27/11/2003	06:26p	74,760,871	Waimak070.int	
27/11/2003	06:28p	75,832,928	Waimak071.int	
27/11/2003	06:30p	74,427,554	Waimak072.int	
27/11/2003	06:33p	75,403,669	Waimak073.int	
27/11/2003	06:35p	78,657,745	Waimak074.int	
27/11/2003	06:37p	77,749,653	Waimak075.int	
02/12/2003	12:39p	74,054,948	Waimak076.int	
02/12/2003	12:36p	58,628,474	Waimak077.int	
02/12/2003	12:37p	25,042,543	Waimak078.int	
27/11/2003	06:51p	4,147,342	Waimak083.int	
27/11/2003	06:52p	27,797,234	Waimak084.int	
27/11/2003	06:54p	41,784,894	Waimak085.int	
27/11/2003	06:55p	47,878,162	Waimak086.int	
27/11/2003	06:57p	53,880,323	Waimak087.int	
27/11/2003	06:59p	52,690,072	Waimak088.int	

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27/11/2003	07:00p	50,381,369	Waimak089.int
27/11/2003	07:02p	49,440,441	Waimak090.int
02/12/2003	01:12p	49,429,522	Waimak091.int
02/12/2003	01:13p	48,064,103	Waimak092.int
02/12/2003	01:15p	47,177,364	Waimak093.int
02/12/2003	01:16p	43,205,226	Waimak094.int
02/12/2003	01:17p	34,620,672	Waimak095.int
02/12/2003	01:18p	29,821,117	Waimak096.int
02/12/2003	01:19p	10,681,605	Waimak097.int

Thinned Ground

27/11/2003	05:09p	888,026	Waimak001.thn	Thinned ground ALS data in ASCII format
27/11/2003	05:10p	2,266,410	Waimak002.thn	
27/11/2003	05:11p	274,660	Waimak009.thn	
27/11/2003	05:12p	7,055,078	Waimak010.thn	
27/11/2003	05:13p	7,161,682	Waimak011.thn	
02/12/2003	12:15p	5,162,376	Waimak012.thn	
27/11/2003	05:15p	260,640	Waimak015.thn	
27/11/2003	05:15p	110,080	Waimak016.thn	
27/11/2003	05:17p	1,743,037	Waimak020.thn	
27/11/2003	05:18p	8,637,263	Waimak021.thn	
02/12/2003	12:15p	9,149,480	Waimak022.thn	
02/12/2003	12:15p	3,242,633	Waimak023.thn	
27/11/2003	05:26p	2,669,664	Waimak031.thn	
27/11/2003	05:27p	6,620,000	Waimak032.thn	
27/11/2003	05:29p	3,386,272	Waimak033.thn	
27/11/2003	05:30p	5,141,632	Waimak034.thn	
27/11/2003	05:32p	8,374,575	Waimak035.thn	
27/11/2003	05:34p	12,618,358	Waimak036.thn	
02/12/2003	12:16p	8,159,409	Waimak037.thn	
02/12/2003	12:16p	12,152	Waimak038.thn	
27/11/2003	05:43p	894,713	Waimak047.thn	
27/11/2003	05:44p	3,009,888	Waimak048.thn	
27/11/2003	05:45p	5,128,128	Waimak049.thn	
27/11/2003	05:47p	8,371,424	Waimak050.thn	
27/11/2003	05:49p	10,607,680	Waimak051.thn	
27/11/2003	05:52p	12,338,752	Waimak052.thn	
27/11/2003	05:54p	12,796,896	Waimak053.thn	
27/11/2003	05:57p	13,005,952	Waimak054.thn	
27/11/2003	06:00p	13,161,536	Waimak055.thn	
27/11/2003	06:02p	13,533,698	Waimak056.thn	
02/12/2003	12:16p	12,082,826	Waimak057.thn	
02/12/2003	12:16p	1,063,175	Waimak058.thn	
27/11/2003	06:14p	1,074,414	Waimak062.thn	
27/11/2003	06:14p	2,256,936	Waimak063.thn	
27/11/2003	06:15p	1,047,882	Waimak064.thn	
27/11/2003	06:15p	133,650	Waimak065.thn	
27/11/2003	06:16p	8,169,975	Waimak066.thn	
27/11/2003	06:18p	12,422,192	Waimak067.thn	
27/11/2003	06:20p	9,646,363	Waimak068.thn	
27/11/2003	06:22p	9,140,800	Waimak069.thn	
27/11/2003	06:24p	9,085,280	Waimak070.thn	
27/11/2003	06:27p	12,891,296	Waimak071.thn	
27/11/2003	06:29p	12,642,624	Waimak072.thn	
27/11/2003	06:31p	14,309,600	Waimak073.thn	
27/11/2003	06:34p	12,981,088	Waimak074.thn	
27/11/2003	06:36p	12,988,960	Waimak075.thn	
02/12/2003	12:40p	12,639,232	Waimak076.thn	
02/12/2003	12:16p	8,849,710	Waimak077.thn	
02/12/2003	12:16p	3,225,443	Waimak078.thn	
27/11/2003	06:51p	714,417	Waimak083.thn	
27/11/2003	06:52p	4,458,597	Waimak084.thn	
27/11/2003	06:53p	6,668,805	Waimak085.thn	
27/11/2003	06:54p	7,214,460	Waimak086.thn	
27/11/2003	06:56p	8,441,994	Waimak087.thn	
27/11/2003	06:58p	9,296,784	Waimak088.thn	
27/11/2003	06:59p	6,649,292	Waimak089.thn	
27/11/2003	07:01p	6,757,184	Waimak090.thn	
02/12/2003	12:16p	6,694,848	Waimak091.thn	
02/12/2003	12:17p	8,469,568	Waimak092.thn	

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02/12/2003	12:17p	7,478,016	Waimak093.thn
02/12/2003	12:17p	7,250,112	Waimak094.thn
02/12/2003	12:17p	6,280,608	Waimak095.thn
02/12/2003	12:17p	4,712,704	Waimak096.thn
02/12/2003	12:17p	1,715,136	Waimak097.thn

DVD 2 of 2**Ground**

27/11/2003	05:09p	3,121,080	Waimak001.grd	Ground ALS data in ASCII format
27/11/2003	05:09p	8,398,215	Waimak002.grd	
27/11/2003	05:10p	1,045,785	Waimak009.grd	
27/11/2003	05:11p	24,853,534	Waimak010.grd	
27/11/2003	05:13p	22,576,773	Waimak011.grd	
02/12/2003	11:43a	16,272,385	Waimak012.grd	
27/11/2003	05:15p	1,092,224	Waimak015.grd	
27/11/2003	05:15p	448,032	Waimak016.grd	
27/11/2003	05:17p	6,426,052	Waimak020.grd	
27/11/2003	05:18p	27,775,923	Waimak021.grd	
02/12/2003	11:44a	23,779,634	Waimak022.grd	
02/12/2003	11:44a	9,238,522	Waimak023.grd	
27/11/2003	05:26p	9,782,624	Waimak031.grd	
27/11/2003	05:27p	26,367,776	Waimak032.grd	
27/11/2003	05:28p	12,319,776	Waimak033.grd	
27/11/2003	05:30p	17,216,768	Waimak034.grd	
27/11/2003	05:31p	24,706,505	Waimak035.grd	
27/11/2003	05:33p	39,708,877	Waimak036.grd	
02/12/2003	11:45a	23,920,552	Waimak037.grd	
02/12/2003	11:45a	35,712	Waimak038.grd	
27/11/2003	05:43p	3,684,160	Waimak047.grd	
27/11/2003	05:44p	12,326,720	Waimak048.grd	
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27/11/2003	05:47p	29,781,344	Waimak050.grd	
27/11/2003	05:49p	35,912,192	Waimak051.grd	
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27/11/2003	05:54p	41,421,952	Waimak053.grd	
27/11/2003	05:56p	43,386,176	Waimak054.grd	
27/11/2003	05:59p	43,660,608	Waimak055.grd	
27/11/2003	06:02p	44,363,143	Waimak056.grd	
02/12/2003	11:45a	40,362,061	Waimak057.grd	
02/12/2003	11:46a	3,320,224	Waimak058.grd	
27/11/2003	06:14p	3,715,074	Waimak062.grd	
27/11/2003	06:14p	6,905,184	Waimak063.grd	
27/11/2003	06:15p	3,269,244	Waimak064.grd	
27/11/2003	06:15p	370,656	Waimak065.grd	
27/11/2003	06:16p	26,920,014	Waimak066.grd	
27/11/2003	06:17p	39,427,599	Waimak067.grd	
27/11/2003	06:20p	37,169,641	Waimak068.grd	
27/11/2003	06:22p	32,320,640	Waimak069.grd	
27/11/2003	06:24p	31,722,240	Waimak070.grd	
27/11/2003	06:26p	37,849,632	Waimak071.grd	
27/11/2003	06:29p	38,206,464	Waimak072.grd	
27/11/2003	06:31p	41,506,368	Waimak073.grd	
27/11/2003	06:33p	48,968,480	Waimak074.grd	
27/11/2003	06:36p	47,800,608	Waimak075.grd	
02/12/2003	12:41p	42,979,264	Waimak076.grd	
02/12/2003	11:46a	31,624,519	Waimak077.grd	
02/12/2003	11:46a	12,127,904	Waimak078.grd	
27/11/2003	06:51p	2,691,480	Waimak083.grd	
27/11/2003	06:52p	17,879,598	Waimak084.grd	
27/11/2003	06:53p	23,570,844	Waimak085.grd	
27/11/2003	06:54p	25,265,295	Waimak086.grd	
27/11/2003	06:56p	30,390,327	Waimak087.grd	
27/11/2003	06:57p	29,695,698	Waimak088.grd	
27/11/2003	06:59p	21,495,435	Waimak089.grd	
27/11/2003	07:00p	21,687,680	Waimak090.grd	
02/12/2003	11:47a	21,639,168	Waimak091.grd	
02/12/2003	11:47a	26,792,672	Waimak092.grd	
02/12/2003	11:48a	23,402,592	Waimak093.grd	
02/12/2003	11:48a	25,665,568	Waimak094.grd	
02/12/2003	11:49a	21,568,032	Waimak095.grd	

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02/12/2003	11:49a	18,419,616	Waimak096.grd
02/12/2003	11:49a	5,968,224	Waimak097.grd
Non-Ground			
27/11/2003	05:09p	1,171,277	Waimak001.non
27/11/2003	05:10p	3,720,942	Waimak002.non
27/11/2003	05:11p	365,475	Waimak009.non
27/11/2003	05:11p	17,058,307	Waimak010.non
27/11/2003	05:13p	12,133,841	Waimak011.non
02/12/2003	12:06p	10,974,439	Waimak012.non
27/11/2003	05:15p	275,264	Waimak015.non
27/11/2003	05:15p	245,760	Waimak016.non
27/11/2003	05:17p	2,815,587	Waimak020.non
27/11/2003	05:18p	14,345,485	Waimak021.non
02/12/2003	12:06p	17,583,983	Waimak022.non
02/12/2003	12:06p	5,072,545	Waimak023.non
27/11/2003	05:26p	3,451,008	Waimak031.non
27/11/2003	05:27p	8,011,744	Waimak032.non
27/11/2003	05:29p	4,726,848	Waimak033.non
27/11/2003	05:30p	8,225,824	Waimak034.non
27/11/2003	05:31p	12,720,811	Waimak035.non
27/11/2003	05:34p	19,792,247	Waimak036.non
02/12/2003	12:07p	14,208,309	Waimak037.non
02/12/2003	12:07p	44,418	Waimak038.non
27/11/2003	05:43p	1,601,955	Waimak047.non
27/11/2003	05:44p	3,447,441	Waimak048.non
27/11/2003	05:45p	9,343,379	Waimak049.non
27/11/2003	05:47p	10,655,045	Waimak050.non
27/11/2003	05:49p	14,966,112	Waimak051.non
27/11/2003	05:51p	21,893,216	Waimak052.non
27/11/2003	05:54p	20,647,168	Waimak053.non
27/11/2003	05:57p	19,108,480	Waimak054.non
27/11/2003	05:59p	21,735,552	Waimak055.non
27/11/2003	06:02p	20,795,337	Waimak056.non
02/12/2003	12:07p	19,250,313	Waimak057.non
02/12/2003	12:08p	1,270,787	Waimak058.non
27/11/2003	06:14p	1,682,637	Waimak062.non
27/11/2003	06:14p	6,095,397	Waimak063.non
27/11/2003	06:15p	2,466,090	Waimak064.non
27/11/2003	06:15p	121,110	Waimak065.non
27/11/2003	06:16p	15,432,615	Waimak066.non
27/11/2003	06:18p	17,922,641	Waimak067.non
27/11/2003	06:20p	27,543,350	Waimak068.non
27/11/2003	06:22p	30,427,351	Waimak069.non
27/11/2003	06:24p	32,618,197	Waimak070.non
27/11/2003	06:27p	26,964,448	Waimak071.non
27/11/2003	06:29p	25,310,502	Waimak072.non
27/11/2003	06:31p	22,581,536	Waimak073.non
27/11/2003	06:33p	17,555,072	Waimak074.non
27/11/2003	06:36p	17,930,528	Waimak075.non
02/12/2003	12:41p	19,922,976	Waimak076.non
02/12/2003	12:08p	18,326,354	Waimak077.non
02/12/2003	12:08p	9,298,231	Waimak078.non
27/11/2003	06:51p	832,491	Waimak083.non
27/11/2003	06:52p	5,834,037	Waimak084.non
27/11/2003	06:53p	12,005,268	Waimak085.non
27/11/2003	06:54p	15,550,953	Waimak086.non
27/11/2003	06:56p	15,502,938	Waimak087.non
27/11/2003	06:57p	15,193,912	Waimak088.non
27/11/2003	06:59p	21,367,277	Waimak089.non
27/11/2003	07:01p	20,333,225	Waimak090.non
02/12/2003	12:09p	20,460,460	Waimak091.non
02/12/2003	12:09p	14,059,040	Waimak092.non
02/12/2003	12:09p	16,768,448	Waimak093.non
02/12/2003	12:09p	11,097,568	Waimak094.non
02/12/2003	12:10p	7,793,952	Waimak095.non
02/12/2003	12:10p	6,844,896	Waimak096.non
02/12/2003	12:10p	3,150,592	Waimak097.non

Non-ground ALS data in ASCII format