Appendix A

Cranfield ReSeDA Data Tables

The following tables summarise much of the data processing carried out to prepare the aircraft data for analysis. These tables can be used to trace back through the files to check data quality and to determine values of parameters assumed in the data processing (e.g. if steps need to be repeated).

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Table A1 Experiment Flight Summary

This table lists the flights carried out for the ReSeDA campaign and associated experiments in June 1997.

Flight	Site[1]	Date	Time[2]						Weather[3]				Remarks
			Take-off[2] UT	Duration[2] s	Start (GPS)	Take-off	Land	End	Windspeed ms^{-1}	Wind dir. deg.	Temp. deg. C	Cloud or Rg ($W m^{-2}$)	
1	Alpilles	18/6/97	17:26:01	4	550689728	222	226	307	4.5	347	26.5	clear	Failed to take-off (first attempted launch)
2	l'Ermite	20/6/97	14:19:02	809	550851459	72	881	907	3.6	(235.8)	23.5	clear	Humitter cap on (= slow time response); radiometers OK
3			16:59:56	781	550861004	181	962	985	3	(222.8)	22.1	clear	Transects $\perp^r$ field boundary; motor cut
4	Alpilles	21/6/97	14:42:49	779	550938989	369	1148	1191	4.1	154.7	22.84	<200	Transects + spiral climb; overcast
5			15:51:34	946	550943321	162	1108	1143	4.7	163.9	23.42	<200	Transects inc. wheat-wheat as ctrl
6	Alpilles	22/6/97	12:57:12	1195	551019221	200	1395	1424	2.8	302.5	22.47	>800	Soil drying after overnight rain; transects + boxes
7			15:07:49	1095	551027086	172	1267	1301	3.2	259.8	24.15	>600	Repeat transects; soil drying well
8			17:43:25	848	551036446	148	996	1008	4.27	285.3	22.9	<400	Various transects
9	La Crau	23/6/97	10:58:18	748	551098030	177	925	944	5	(305)	22.7	clear	Transects $\perp^r$ canal
10			12:51:40	855	551105350	139	994	1030	5	(11.28)	22.7	cloud	Transects; passes over prairie only
11			14:16:39	0	551110420	168	168	170	6.1	(354)	23.6	clear	Failed to take-off.

Notes

1. The Alpilles site is the main ReSeDA site. The other flights complement the ReSeDA experiment and were carried primarily for INRA Avignon.
2. Local time is UT + 2 hr. The take-off time is based on the last GPS record for which the aircraft was stationary; landing time is the time of the last valid GPS record before becoming stationary again. Duration is the period from take-off to landing. The start, take-off, land, and end times correspond to the data collected for each flight. Start time is the GPS time in integer seconds, and take-off, land and end are times relative to the start in seconds.
3. The weather data were supplied by INRA, Avignon (D. Courault. Values in brackets apply to the Alpilles site, not the site at which the aircraft flew, although the site separation is less than 20 km). Rg is "rayonnement global", i.e. solar irradiance (direct + diffuse).

Table A2 Cranfield ReSeDA Aircraft Experiment / Data File Timing

This table relates the various timing methods used for the flights (e.g. clocks, file record numbers) to facilitate data analysis.

Date	**Flight**	**Event**	**Time (GPS)**	**Time (UT)** (Local time = UT + 2 hr)	**GPS time / s**	**GPS time in week / s** (week # = 910 or 911)	**Time from start / s**[(1)] (= GPS record #)	**Hi8 Clock**	**Sensor data record #** (= time from start (s) x 16)	**Remarks**
18/6/97	1	Start	17:22:08	17:21:57	550689728	321728	0	18:23	0	
		Take-off	17:25:50	17:25:39	550689950	321950	222		3552	Failed to t/o
		Land	17:25:54	17:25:43	550689954	321954	226		3616	
		End	17:27:15	17:27:04	550690035	322035	307		4927	
20/6/97	2	Start	14:17:39	14:17:28	550851459	483459	0	15:15	0	
		Take-off	14:18:51	14:18:40	550851531	483531	72	15:16:45	1152	
		Land	14:32:20	14:32:09	550852340	484340	881	15:30:11	14096	
		End	14:32:46	14:32:35	550852366	484366	907		14527	
	3	Start	16:56:44	16:56:33	550861004	493004	0	17:56	0	
		Take-off	16:59:45	16:59:34	550861185	493185	181	17:57:34+	2896	
		Land	17:12:46	17:12:35	550861966	493966	962	18:10:37	15392	
		End	17:13:09	17:12:58	550861989	493989	985		15775	
21/6/97	4	Start	14:36:29	14:36:18	550938989	570989	0	15:39	0	

		Take-off	14:42:38	14:42:27	550939358	571358	369	15:40:32	5904	
		Land	14:55:37	14:55:26	550940137	572137	1148	15:53:27	18368	
		End	14:56:20	14:56:09	550940180	572180	1191		19071	
	5	Start	15:48:41	15:48:30	550943321	575321	0	16:48	0	
		Take-off	15:51:23	15:51:12	550943483	575483	162	16:49:17	2592	
		Land	16:07:09	16:06:58	550944429	576429	1108	17:04:59	17728	
		End	16:07:44	16:07:33	550944464	576464	1143		18303	
22/6/97	6	Start	12:53:41	12:53:30	551019221	46421	0	13:54	0	
		Take-off	12:57:01	12:56:50	551019421	46621	200	13:54:54	3200	
		Land	13:16:56	13:16:45	551020616	47816	1395	14:14:44	22320	
		End	13:17:25	13:17:14	551020645	47845	1424		22799	
	7	Start	15:04:46	15:04:35	551027086	54286	0	16:05	0	
		Take-off	15:07:38	15:07:27	551027258	54458	172	16:05	2752	
		Land	15:25:53	15:25:42	551028353	55553	1267	16:23:41	20272	
		End	15:26:27	15:26:16	551028387	55587	1301		20831	
	8 abort	Start						18:39		
		Take-off		17:04:38				18:41:06		Lost rudder on t/o; flight aborted.
		Land						18:55:10		

		End								
	8	Start	17:40:46	17:40:35	551036446	63646	0	18:39	0	
		Take-off	17:43:14	17:43:03	551036594	63794	148	18:41:06	2368	
		Land	17:57:22	17:57:11	551037442	64642	996	18:55:10	15936	
		End	17:57:34	17:57:23	551037454	64654	1008		16143	
23/6/97	9	Start	10:47:10	10:46:59	551098030	125230	0	11:45	0	
		Take-off	10:50:07	10:49:56	551098207	125407	177	11:48:00	2832	
		Land	11:02:35	11:02:24	551098955	126155	925	12:00:25	14800	
		End	11:02:54	11:02:43	551098974	126174	944		15119	
	10	Start	12:49:10	12:48:59	551105350	132550	0	13:48	0	
		Take-off	12:51:29	12:51:18	551105489	132689	139	13:49:22	2224	
		Land	13:05:44	13:05:33	551106344	133544	994	14:03:44	15904	
		End	13:06:20	13:06:09	551106380	133580	1030		16495	
	11	Start	14:13:40	14:13:29	551110420	137620	0	15:14	0	
		Take-off	14:16:28	14:16:17	551110588	137788	168	15:14	2688	Failed to t/o
		Land	14:16:28	14:16:17	551110588	137788	168		2688	
		End	14:16:30	14:16:19	551110590	137790	170		2719	

Notes

1. Take-off time is the last GPS time for which the a/c was stationary; landing is the last valid GPS record before becoming stationary again. Time for take-off, landing and end are relative to the start of the flight dataset.

Table A3 Index to VHS / SVHS tape copy of ReSeDA flights filmed

An SVHS tape copy of the original Hi8 video film of the flights was made (SVHS copy held by Dave Dyer). This table is an index to the SVHS tape.

Counter start	Counter (landing)	Counter start	Counter (landing)	Date	Local time (GMT+2h)	Flight #	Remarks
		0:00:00		9/6/97	15.53		Alpilles site preview
		0:01:10			18.07		Mas de l'Ermite preview
		0:02:20 0:03:30			18.47 19.03		La Crau preview barley / fallow transition fallow / prairie transition
		0:05:10		18/6/97	19.23	1	Failed t/o
		0:05:35		20/6/97	11.44		View of GPS reference position at Alpilles site for 18/6/97.
		0:06:50	0:19:40		16.16	2	Humitter cap on; radiometers OK.
		0:21:00	0:34:00		18.56	3	For t/o only saw a/c on rail, not the climb away.
		0:35:40	0:48:30	21/6/97	16.40	4	
		0:49:30	1:04:00		17.50	5	
		1:05:00	1:22:10	22/6/97	14.55	6	
		1:22:30	1:40:20		16.05	7	Missed t/o completely (airborne by start of filming).
		1:41:50			19.05		Failed t/o - a/c lost rudder.
		1:43:40	1:57:40		19.40	8	
3600	3845	1:59:50	2:11:40	23/6/97	12.47	9	
3880	4130	2:13:20	2:26:00		14.49	10	
4150		2:27:00			16.14	11	Failed t/o

20:11:51,

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Table A4 Source Sensor and GPS data file Quick-Look processing

These files are used to create the initial quick-look plots with Matlab. Errors are not corrected since one purpose of these plots is to show the data quality.

Flight	Date	Time	Sensor data (directory mydata\reseda\data)						GPS C/A data (directory mydata\reseda\data)					
		UT	Source file	data records	Output file	Error #	**Start time**	**End time**	Source file	Record #	Output file	Error #	Start time	End time
1	18/6/97		Flit1.csv	4569	f01.dat	468	**550689728**	**550690035**	Flit1.pos	194	f01pos.dat	27	550689773	550690032
2	20/6/97		Flit2.csv	14540	f02.dat	41	**550851459**	**550852366**	Flit2.pos	904	f02pos.dat	20	550851460	550852366
3			Flit3.csv	15762	f03.dat	42	**550861004**	**550861989**	Flit3.pos	963	f03pos.dat	14	550861025	550861989
4	21/6/97		Flit4.csv	19104	f04.dat	38	**550938989**	**550940180**	Flit4.pos	1193	f04pos.dat	25	550938990	550940179
5		15.46	Flit5.csv	18264	f05.dat	38	**550943321**	**550944464**	Flit5.pos	1115	f05pos.dat	10	550943345	550944463
6	22/6/97		Flit6.csv	22771	f06.dat	44	**551019221**	**551020645**	Flit6.pos	1406	f06pos.dat	1	551019239	551020644
7			Flit7.csv	20818	f07.dat	23	**551027086**	**551028387**	Flit7.pos	1288	f07pos.dat	2	551027099	551028387
8			Flit8.csv	16120	f08.dat	36	**551036446**	**551037454**	Flit8.pos	988	f08pos.dat	9	551036465	551037454
9	23/6/97	10.45	Flit9.csv	15101	f09.dat	79	**551098030**	**551098974**	Flit9.pos	941	f09pos.dat	40	551098031	551098974
10		12.47	Flit10.csv	16408	f10.dat	112	**551105350**	**551106380**	Flit10.pos	1002	f10pos.dat	35	551105363	551106377
11									Flit11.pos				551110420	551110590
Ground			Ground.csv	7679	gnd.dat	28	**551028918**	**551030158**	Ground.pos	414	Gndpos.dat	6	551029024	551030157
Posn. 2			Posit2.csv	7484	p02.dat	2836	**550944730**	**550945428**	Posit2.pos	156	p02pos.dat	258	550944743	550944898
Posn. 3			Posit3.csv	9083	p03.dat	502	**551106682**	**551107800**	Posit3.pos	457	p03pos.dat	88	551106701	551107799

1. Some sensor data files were created using program res_expt version 1.20 and do not have the date and time decoded from GPS available.
2. The number of data records listed may or may not include the first record (usually discarded because of poor quality).
3. The source .csv file may require minor editing (e.g. create end of file marker, modify header) in which case it is usually renamed fnnsen.csv or fnnpos.csv (sensor or GPS data respectively, e.g. f10sen.csv).

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Table A5 ReSeDA Data File Index (GPS Position Data)

Flight	Date	Aircraft C/A Position			Reference GPS[3]				Aircraft GPS			Aircraft DGPS	
					Ephemeris		Observations		Observations				
		Original (ASCII, csv)	Edited ASCII	Binary LUT[7] (created using reseda.exe option 3.3)	Original rxn (RINEX ASCII)	Binary ephemeris	Original .rxo (RINEX ASCII)	Edited .rxo (RINEX ASCII)[2]	Original Trimble binary	Trimble ASCII (using gpslst.exe)	RINEX .rxo format[4]	ASCII (DGPS option 5)	**Binary LUT[5]** (reseda option 3.9)
1	18/6/97	flit1.pos	f01pos0.csv	f01pos0.lut	f1211691.rxn f1211692.rxn[1]	ephem18.dat	f1211691.rxo f1211692.rxo[6]	f01ref0.rxo	flit01.gps	f01gps.txt	f01gps1.rxo	f01dgps1.txt	**f01dgps0.lut**
2	20/6/97	flit2.pos	f02pos0.csv	f02pos0.lut	f1211713.rxn	ephem20.dat	f1211713.rxo	f02ref.rxo	flit02.gps	f02gps.txt	f02gps1.rxo	f02dgps1.txt	**f02dgps0.lut**
3		flit3.pos	f03pos0.csv	f03pos0.lut				f03ref.rxo	flit03.gps	f03gps.txt	f03gps1.rxo	f03dgps0.txt	**f03dgps0.lut**
4	21/6/97	flit4.pos	f04pos0.csv	f04pos0.lut	12121721.rxn	ephem21.dat	12121721.rxo	f04ref.rxo	flit04.gps	f04gps.txt	f04gps1.rxo	f04dgps0.txt	**f04dgps0.lut**
5		flit5.pos	f05pos0.csv	f05pos0.lut				f05ref0.rxo	flit05.gps	f05gps.txt	f05gps2.rxo	f05dgps0.txt	**f05dgps0.lut**
6	22/6/97	flit6.pos	f06pos0.csv	f06pos0.lut	12121732.rxn	ephem22.dat	12121732.rxo	f06ref0.rxo	flit06.gps	f06gps.txt	f06gps2.rxo	f06dgps0.txt	**f06dgps0.lut**
7		flit7.pos	f07pos0.csv	f07pos0.lut				f07ref0.rxo	flit07.gps	f07gps.txt	f07gps2.rxo	f07dgps0.txt	**f07dgps0.lut**
8		flit8.pos	f08pos0.csv	f08pos0.lut				f08ref.rxo	flit08.gps	f08gps.txt	f08gps1.rxo	f08dgps0.txt	**f08dgps0.lut**
9	23/6/97	flit9.pos	f09pos0.csv	f09pos0.lut	dom21741.rxn	ephem23.dat	dom21741.rxo	f09ref1.rxo	flit09.gps	f09gps.txt	f09gps1.rxo	f09dgps0.txt	**f09dgps0.lut**
10		flit10.pos	f10pos3.csv	f10pos3.lut[8]				f10ref.rxo	flit10.gps	f10gps.txt	f10gps2.rxo	f10dgps0.txt	**f10dgps1.lut**
11		flit11.pos											

Notes

1. The two files were combined into one using a standard ASCII editor before running DGPS to create the binary ephemeris data file.
2. Observations for just the flight period were selected using an ASCII editor and written to the edited .rxo file. The time period for the edited file should match that of the aircraft GPS RINEX observations exactly. Some reference file records may need deleting to match the aircraft file (e.g. f09ref1.rxo compared with f09ref.rxo).
3. Program DGPS operates on these files; the final binary LUT is used by reseda.exe (and is based on the quick-look LUT).
4. User may need to manually enter the date (and time?) for the first few sets of pseudo-ranges (until the Trimble file gives the week number). Two runs through unwrapping the code phase are required (output for flight nn from 1st run is usually fnngps0.rxo, and from 2nd run is fnngps1.rxo) : the 1st sets the Rx clock drift to 0 and calculates C/A position. From this first run a reasonable clock drift model can be obtained which is then used to unwrap the code phase properly (avoiding problems at clock offset jumps) to create the definitive pseudoranges.

5. Reseda option 3.9 creates an ASCII list of errors found and corrected (file has .err suffix) when it creates the LUT with the differential corrections.
6. Files f1211691.rxo (covers 15:55:09-16:33:27) and f1211692.rxo (16:33:49-18:03:37) combined into one file f121169.rxo.
7. The original quick-look C/A position plots are created using files fnnpos.dat (for flight nn). The files fnnpos0.lut etc. are more recent versions to create the GPS lut.
8. File f10pos3a.lut was created when checking f10dgps1.lut (24 Aug 1999), and is exactly the same as f10pos3.lut; f10pos3a.lut was deleted to avoid confusion.

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Table A6 **DGPS Data Processing (Aircraft Trimble GPS Data and Code Phase Unwrapping)**

The Trimble receiver on the aircraft records code phase for each satellite's pseudorange, which needs unwrapping using knowledge of satellite position and the receiver clock drift.

Flight	**Trimble data (ASCII)**	**Data valid period (Aircraft GPS time)**			**Receiver clock drift model**			**Expt. Duration**	**Records to process**	**Period of good data common to ref & a/c[(3)]**	
		Start		End	Offset / km	Rate / km s^{-1}	t_0 / s (from start of GPS week)	(approx.) / s			
1	f01gps.txt	Wed	17:22:27	17:27:15	0	-0.36	321747	307	1st 210 records OK	17:22:27 - 17:25:57	
2	f02gps.txt	Fri	14:17:37	14:32:46	208	-0.466	483457	907	909 (0-908)	14:17:37 - 14:43:45	
3	f03gps.txt		16:57:03	17:13:09	240	-0.366	493023	985	966 (0-965)	16:57:03 - 17:13:08	
4	f04gps.txt	Sat	14:36:25	14:56:20	100	-0.253	570985	1191	1195 (0-1194)	14:36:25 - 14:56:19	
5	f05gps.txt		15:48:58	16:07:44	131	-0.281	575338	1143	1120 (0-1119)	15:49:03 - 16:47:03	
6	f06gps.txt	Sun	12:53:57	13:17:25	274.5	-0.386	46437	1424	1407 (0-1406)	12:53:57 - 13:17:24	
7	f07gps.txt		15:04:57	15:26:27	115.5	-0.336	54297	1301	1285	15:05:02 - 15:26:26	
8	f08gps.txt		17:41:03	17:57:34	50	-0.31	63663	1008	991	17:41:03 - 17:57:33	
9	f09gps.txt	Mon	10:47:07	11:02:54	75	-0.391	125227	944	rec 0-947		
10	f10gps.txt		12:49:21	13:06:18	31.0	-0.32	132561	1030			

Notes

1. The experiment duration in seconds is approximately the number of GPS records available in the GPS files.
2. The length of Flight 1 is short enough that the clock error is always less than 90 km and the clock correction model is not strictly needed (but it does need checking in case it overlaps the "cut" at +/- 150 km).
3. The aircraft and reference GPS observation files need to be synchronised on a record-by-record basis. This is achieved by ensuring that only good data records for the same period of time are contained in each file. The original files may need editing (ASCII editor) to delete records which do not match.

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Table A7 ReSeDA Data File Index (Payload and Map Data)

Flight	Date	Payload data			Map									
		Original ASCII	Edited ASCII	**Binary LUT**	Coordinate references	Site features mm units	Site features in LZII coords.	Site Elevation	Elevation in LZII	**Elevation LUT(2)**	Origin in LZ II étendu (km)	GPS reference wrt origin (m)(1) East	North	Height
1	18/6/97	flit1.csv	f01sen0.csv	**f01sen0.lut**	alpxy.txt	alp_trax.txt	alp_map.txt	alp_ht.txt	alp_ht0.txt	**alp_ht0.lut**	794, 1869	479.1	619.8	11.0
2	20/6/97	flit2.csv	f02sen0.csv	**f02sen0.lut**	ermitexy0.txt	ermitemp.txt	ermitmp0.txt	ermiteht.txt	ermitht0.txt	**ermitht0.lut**	794, 1855	-131.8	589.8	36.0
3		flit3.csv	f03sen0.csv	**f03sen0.lut**										
4	21/6/97	flit4.csv	f04sen0.csv	**f04sen0.lut**	alpxy.txt	alp_trax.txt	alp_map.txt	alp_ht.txt	alp_ht0.txt	**alp_ht0.lut**	794, 1869	728.0	783.6	11.0
5		flit5.csv	f05sen0.csv	**f05sen0.lut**										
6	22/6/97	flit6.csv	f06sen0.csv	**f06sen0.lut**										
7		flit7.csv	f07sen0.csv	**f07sen0.lut**										
8		flit8.csv	f08sen0.csv	**f08sen0.lut**										
9	23/6/97	flit9.csv	f09sen.csv	**f09sen0.lut**	lacrauxy.txt	lacraump.txt	lacraum0.txt	lacrauht.txt	lacrauh0.txt	**lacrauh0.lut**	790, 1848	263.4	62.8	10.0
10		flit10.csv	f10sen.csv	**f10sen4.lut**										
11														

Notes

1. The values given (dx,dy,dz) should be added to the local origin to give the location of the GPS reference antenna relative to the origin in the local coordinates.
2. Program ReSeDA produces a Matlab readable form of the lut (ready for direct execution as an m-file), which conventionally has the same name as the lut but with the suffix .m.

Table A8 ReSeDA Experiment Site Details

Site	**File ASCII(1)**	**Grid origin / m**		**Grid pitch**	**No. of points**		**Grid size**	**Local Coordinate System Origin**	
		x	**y**	**m**	**Easting**	**Northing**	**km**	**Lambert Zone II étendu**	**WGS84**
Alpilles	alp_ht0.txt	0	0	50	31	31	1.5 x 1.5	794, 1869 (km); 0 m	43° 47.75894' N, 4° 44.67012' E, 44.45 m
La Crau	lacrauh0.txt(2)	-200	-400	25	33	29	0.8 x 0.7	790, 1848 (km); 0 m	43° 36.50382' N, 4° 41.22560' E, 44.46 m
Mas l'Hermite	ermitht0.txt(3)	-500	250	40	26	26	1.0 x 1.0	794, 1855 (km); 0 m	43° 40.21191' N, 4° 44.35160' E, 44.44 m

Notes

1. The binary file name is the same except that the suffix .txt changes to .lut. Program ReSeDA uses the binary file as input.
2. 46 points (~SE corner) had low number of degrees of freedom.
3. Grid origin's y value set to 250 m to give enough points in each quadrant for points along the southern edge of the grid.

Table A9 **ReSeDA Data Processing (GPS vertical drift correction using the payload barometer)**

The corrections are calculated using the binary look-up tables for GPS (or DGPS) position and the aircraft payload (see tables above). Two versions (binary and ASCII) of the output file are created to allow the corrections to be inspected directly.

Flight	**Atmospheric Parameters[(1)]**										**Data processing parameters**					**Output file**
	temp. / °C	Humitter temp. / DN (ADC2)	Humitter temp. / deg C	pressure / DN (ADC0)	pressure / Pa	t/off height above ref. / m	air density / kg m^{-3}	pressure / Pa (at ref. height)	Humitter humidity /DN (ADC1)	Humitter humidity / %	Step size / rec	Window for mean height and variance / rec	Variance limit / m^2	No. points for GPS correct[n]	Time step for correction / s	(.dat and .txt suffices; reseda option 3.8)
1	26.5	1405.80	-8.7	769.30	101116	9.0	1.167	101219	679.80	66.8	8	17	1.0	9	1	**f01dz0**
2	23.5	1177.99	2.5	844.77	100636	33.0	1.175	101017	667.76	67.4	8	17	2.0	9	1	**f02dz0**
3	22.1	1009.44	10.7	851.99	100591	33.0	1.181	100973	710.40	65.3	8	17	2.0	9	1	**f03dz0**
4	22.8	620.47	29.7	841.20	100659	8.0	1.179	100752	760.34	62.9	8	17	1.0	9	1	**f04dz0**
5	23.4	658.99	27.8	851.32	100595	8.0	1.176	100687	743.27	63.7	8	17	2.0	9	1	**f05dz0**
6	22.5	1033.51	9.5	801.94	100908	8.0	1.183	101001	761.75	62.8	8	17	2.0	9	1	**f06dz0**
7	24.2	1142.58	4.2	802.46	100905	8.0	1.176	100997	735.14	64.1	8	17	2.0	9	1	**f07dz0**
8	22.9	1097.27	6.4	771.27	101103	8.0	1.184	101196	756.88	63.0	8	17	2.0	9	1	**f08dz0**
9[(3)]	22.7	1023.69	10.0	723.36	101407	7.0	1.189	101489	787.82	61.5						
				727	101384		1.188	101466	785	61.7	8	17	2.0	9	1.0	**f09dz0**
10	22.7			728.5	101375	7.0	1.188	101457	747.5	63.5	4	25	2.0	9	1.0	**f10dz0**
											8	17	2.0	9	1.0	**f10dz1**

Notes

1. Pressure and humidity values are based on the payload sensor readings before take-off. Temperature values used are those reported by D. Courault (i.e. NOT the Humitter readings). The pressure needs to be given as that at the site reference height (e.g. 0 m altitude in Lambert Zone II étendu); the surface pressure gradient is approximately -11.8 Pa m^{-1}.
2. Spreadsheet projects\reseda\reseda.xls performs the calculations converting DN to readings, and the height correction. The DN (digital number) values are the average of the 1st 100 records of the sensor data file for the corresponding channels (ADC0-2).
3. Two versions of the parameters for Flight 9 are given: the lower line was used to create the file; the upper line was created by the same method as used for Flights 1-8 as a check.

Table A10 ReSeDA Data Processing Remarks

Flight	Remarks
1	Missing a/c GPS records for 17:23:53,54. Files f1211691.rxo (covers 15:55:09-16:33:27) and f1211692.rxo (16:33:49-18:03:37) combined into one file f121169.rxo. Loaded 188 of 308 GPS C/A data records into LUT. 4532 of 4928 sensor records loaded; 96 error sections found. f01dgps0.txt modified to f01dgps1.txt by removing last two records (bad position fix because only 1 sat used).
2	Loaded 901 of 908 GPS C/A data records into LUT. 14492 of 14528 sensor records loaded; 26 error sections found. Copied sensor record 14523 to 1424-7 (previously blank), and copied record 905 to 906-7 of f02dgps0.lut. f02dgps0.txt modified to f02dgps1.txt by removing last record (because only 1 sat used for position fix).
3	Loaded 963 of 986 GPS C/A data records into LUT. 15744 of 15776 sensor records loaded; 35 error sections found. Jump of about 50 m found in differential height between 16:58:51 and 16:58:52 (before take-off); this appears to be due to a change in the reference receiver solution as the satellite constellation changes. The solution quality is good both before and after and the aircraft receiver shows no such jump even though it uses the same satellites, so the jump is hard to understand (multi-path, receiver timing error, …?).
4	Nearest ephemeris data are at 16:00:00 and 18:00:00; none for 14:00:00 (which would be best for flight 4). Loaded 1186 of 1192 GPS C/A data records into LUT. 19029 of 19072 sensor records loaded; 22 error sections found.
5	Missing GPS record at 16:04:14. Error section 15:52:12 - 15:52:52 (inc.); due to sat 25 pseudo-range in file f05ref.rxo. Create f05ref0.rxo with sat 25 removed for relevant records. Loaded 1114 of 1144 GPS C/A data records into LUT. 18245 of 18304 sensor records loaded; 28 error sections found.
6	Missing GPS record at 13:04:10. Only 3 common sats for 1st 5 records so position fix incorrect: delete 1st 5 records from the two .rxo files to create f06ref0.rxo and f06gps2.rxo. 22752 of 22800 sensor records loaded; 30 error sections found.
7	20795 of 2-832 sensor records loaded; 22 error sections found.
8	16100 of 16144 sensor records loaded; 24 error sections found.
9	DGPS processing: a/c obs missing for 10:58:09, 11:02:52,54. Clock error (for reference?) for 11:00:35-59 incl., corresponds to period when sat 19 is used. It looks like the Trimble code phase unwrapping was bad for sat 19 for these records, so the Rinex .rxo records were edited to remove sat 19 from the solution (enough other sats are available to give a solution).
10	f10pos3a.lut created as a check from f10pos3.csv, with 1002 of 1031 records loaded; 17 error sections found (f10pos3.lut is identical; f10pos3a.lut deleted).

Table A11 ReSeDA Data Processing: General Software Notes

These comments relate to general data processing points which affect several flights.

Program	Operation	Remarks
reseda.exe (v 1.71)	GPS height correction using using barometer (option 3.8)	reseda takes one record too many for the heights calculated, and for the final record picks up 0 for the barometer reading. This corrupts the last few records (depends on smoothing filter size) of the height correction, but is not important since this is only for the time after the aircraft has landed.
reseda.exe (v 1.71)	load sensor data (option 4.4)	Fairly systematic "errors" in the datafile were found, e.g. missing records 75-79, too many records per second for 0 or 16 to 79. These may be due to the software (by Alan Stevenson) which creates the original .csv file, or which sends the data down from the aircraft. It's hard to see how reseda could create these since it loads each record individually, and does not have this problem on all the files.
reseda.exe	suggested improvements	Automatic error list for the sensor data error checking. The binary file's name being printed should be given when it is listed out to an ASCII file. Change the default file names to match those currently used. Detect errors that include the last record of a look-up table.



https://dspace.org/

Surface layer profiles of air temperature and humidity measured from unmanned aircraft

Hobbs, Stephen; Dyer, David; Courault, Dominique; Olioso, Albert; Lagouarde, Jean-Pierre ...

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