

A.L.P.O. SOLAR SECTION - Solar Ephemeris for 2009

Glossary of Terms

There are four parameters that are used to calculate the heliographic coordinates of a feature on the solar disk:

*Four parameters used in the calculate the heliographic coordinates of a feature on the solar disk:-

Lo - the heliographic longitude of the centre of the disk - this decreases by an average value of 13.2° per day,

Po - the position angle of the north end of the axis of rotation, measured +ve if east of the north point of the disk,

Bo - the heliographic latitude of the centre of the disk and the apparent diameter of the Sun

ALPO Solar Section 2009 Solar Ephemeris
Ephemeris Computed by Brad Timerson, A.L.P.O. Solar Section

CALENDAR DATE	JULIAN DATE	ROTATION NUMBER	HELIOGRAPHIC			DIAMETER (arcmin)	RA (HH:MM)	DEC (deg)
			Lo	Bo	Po			
12/30/2008	2454830.5	2078	196.81	-2.80	2.95	32.530	18:38.2	-23.16
12/31/2008	2454831.5	2078	183.63	-2.92	2.46	32.531	18:42.7	-23.09
1/ 1/2009	2454832.5	2078	170.46	-3.04	1.98	32.531	18:47.1	-23.01
1/ 2/2009	2454833.5	2078	157.29	-3.15	1.49	32.531	18:51.5	-22.92
1/ 3/2009	2454834.5	2078	144.11	-3.27	1.01	32.531	18:55.9	-22.83
1/ 4/2009	2454835.5	2078	130.94	-3.38	0.52	32.531	18:60.3	-22.73
1/ 5/2009	2454836.5	2078	117.76	-3.50	0.04	32.531	19: 4.7	-22.62
1/ 6/2009	2454837.5	2078	104.59	-3.61	-0.44	32.531	19: 9.1	-22.51
1/ 7/2009	2454838.5	2078	91.42	-3.72	-0.93	32.530	19:13.4	-22.38
1/ 8/2009	2454839.5	2078	78.25	-3.83	-1.41	32.529	19:17.8	-22.25
1/ 9/2009	2454840.5	2078	65.07	-3.94	-1.89	32.528	19:22.2	-22.11
1/10/2009	2454841.5	2078	51.90	-4.05	-2.37	32.527	19:26.5	-21.97
1/11/2009	2454842.5	2078	38.73	-4.15	-2.84	32.526	19:30.8	-21.82
1/12/2009	2454843.5	2078	25.56	-4.26	-3.32	32.525	19:35.2	-21.66
1/13/2009	2454844.5	2078	12.39	-4.36	-3.79	32.523	19:39.5	-21.49
1/14/2009	2454845.5	2079	359.21	-4.46	-4.26	32.521	19:43.8	-21.32
1/15/2009	2454846.5	2079	346.04	-4.56	-4.73	32.519	19:48.1	-21.14
1/16/2009	2454847.5	2079	332.87	-4.66	-5.20	32.517	19:52.4	-20.95
1/17/2009	2454848.5	2079	319.70	-4.76	-5.66	32.515	19:56.7	-20.76
1/18/2009	2454849.5	2079	306.53	-4.86	-6.13	32.513	20:0 .9	-20.56
1/19/2009	2454850.5	2079	293.42	-4.95	-6.58	32.510	20: 5.2	-20.35
1/20/2009	2454851.5	2079	280.25	-5.04	-7.04	32.507	20: 9.4	-20.14
1/21/2009	2454852.5	2079	267.08	-5.14	-7.49	32.504	20:13.7	-19.92
1/22/2009	2454853.5	2079	253.91	-5.23	-7.94	32.501	20:17.9	-19.70
1/23/2009	2454854.5	2079	240.74	-5.31	-8.39	32.498	20:22.1	-19.46
1/24/2009	2454855.5	2079	227.57	-5.40	-8.83	32.495	20:26.3	-19.23
1/25/2009	2454856.5	2079	214.40	-5.49	-9.27	32.491	20:30.4	-18.98
1/26/2009	2454857.5	2079	201.23	-5.57	-9.70	32.487	20:34.6	-18.73
1/27/2009	2454858.5	2079	188.06	-5.65	-10.13	32.484	20:38.8	-18.48
1/28/2009	2454859.5	2079	174.89	-5.73	-10.56	32.480	20:42.9	-18.22

1/29/2009	2454860.5	2079	161.72	-5.81	-10.98	32.475	20:47.0	-17.95
1/30/2009	2454861.5	2079	148.55	-5.88	-11.40	32.471	20:51.1	-17.68
1/31/2009	2454862.5	2079	135.38	-5.96	-11.81	32.467	20:55.2	-17.41
2/ 1/2009	2454863.5	2079	122.21	-6.03	-12.22	32.462	20:59.3	-17.13
2/ 2/2009	2454864.5	2079	109.04	-6.10	-12.63	32.457	21: 3.4	-16.84
2/ 3/2009	2454865.5	2079	95.87	-6.17	-13.03	32.453	21: 7.4	-16.55
2/ 4/2009	2454866.5	2079	82.70	-6.24	-13.42	32.447	21:11.5	-16.25
2/ 5/2009	2454867.5	2079	69.53	-6.30	-13.81	32.442	21:15.5	-15.95
2/ 6/2009	2454868.5	2079	56.36	-6.36	-14.20	32.437	21:19.5	-15.64
2/ 7/2009	2454869.5	2079	43.19	-6.42	-14.58	32.432	21:23.5	-15.33
2/ 8/2009	2454870.5	2079	30.08	-6.48	-14.96	32.426	21:27.5	-15.02
2/ 9/2009	2454871.5	2079	16.91	-6.54	-15.33	32.420	21:31.5	-14.70
2/10/2009	2454872.5	2079	3.74	-6.59	-15.69	32.415	21:35.5	-14.38
2/11/2009	2454873.5	2080	350.57	-6.65	-16.05	32.409	21:39.4	-14.05
2/12/2009	2454874.5	2080	337.40	-6.70	-16.41	32.402	21:43.4	-13.72
2/13/2009	2454875.5	2080	324.23	-6.74	-16.75	32.396	21:47.3	-13.39
2/14/2009	2454876.5	2080	311.06	-6.79	-17.10	32.390	21:51.2	-13.05
2/15/2009	2454877.5	2080	297.89	-6.83	-17.44	32.384	21:55.1	-12.71
2/16/2009	2454878.5	2080	284.72	-6.88	-17.77	32.377	21:59.0	-12.36
2/17/2009	2454879.5	2080	271.54	-6.91	-18.09	32.370	22: 2.9	-12.02
2/18/2009	2454880.5	2080	258.37	-6.95	-18.42	32.363	22: 6.7	-11.66
2/19/2009	2454881.5	2080	245.20	-6.99	-18.73	32.357	22:10.6	-11.31
2/20/2009	2454882.5	2080	232.03	-7.02	-19.04	32.350	22:14.4	-10.95
2/21/2009	2454883.5	2080	218.86	-7.05	-19.34	32.342	22:18.3	-10.59
2/22/2009	2454884.5	2080	205.68	-7.08	-19.64	32.335	22:22.1	-10.23
2/23/2009	2454885.5	2080	192.51	-7.11	-19.93	32.328	22:25.9	-9.86
2/24/2009	2454886.5	2080	179.34	-7.13	-20.22	32.320	22:29.7	-9.50
2/25/2009	2454887.5	2080	166.16	-7.15	-20.50	32.313	22:33.5	-9.13
2/26/2009	2454888.5	2080	152.99	-7.17	-20.77	32.305	22:37.3	-8.75
2/27/2009	2454889.5	2080	139.81	-7.19	-21.04	32.298	22:41.0	-8.38
2/28/2009	2454890.5	2080	126.70	-7.20	-21.30	32.290	22:44.8	-8.00
3/ 1/2009	2454891.5	2080	113.53	-7.22	-21.55	32.282	22:48.6	-7.62
3/ 2/2009	2454892.5	2080	100.35	-7.23	-21.80	32.274	22:52.3	-7.24
3/ 3/2009	2454893.5	2080	87.17	-7.24	-22.04	32.266	22:56.0	-6.86
3/ 4/2009	2454894.5	2080	74.00	-7.24	-22.28	32.258	22:59.8	-6.47
3/ 5/2009	2454895.5	2080	60.82	-7.25	-22.51	32.250	23: 3.5	-6.09
3/ 6/2009	2454896.5	2080	47.64	-7.25	-22.73	32.241	23: 7.2	-5.70
3/ 7/2009	2454897.5	2080	34.46	-7.25	-22.95	32.233	23:10.9	-5.31
3/ 8/2009	2454898.5	2080	21.28	-7.25	-23.16	32.225	23:14.6	-4.92
3/ 9/2009	2454899.5	2080	8.11	-7.24	-23.36	32.216	23:18.3	-4.53
3/10/2009	2454900.5	2081	354.93	-7.24	-23.56	32.208	23:22.0	-4.14
3/11/2009	2454901.5	2081	341.75	-7.23	-23.75	32.199	23:25.7	-3.75
3/12/2009	2454902.5	2081	328.56	-7.21	-23.93	32.190	23:29.4	-3.36
3/13/2009	2454903.5	2081	315.38	-7.20	-24.11	32.182	23:33.0	-2.96
3/14/2009	2454904.5	2081	302.20	-7.19	-24.28	32.173	23:36.7	-2.57
3/15/2009	2454905.5	2081	289.02	-7.17	-24.44	32.164	23:40.4	-2.17
3/16/2009	2454906.5	2081	275.84	-7.15	-24.60	32.155	23:44.0	-1.78
3/17/2009	2454907.5	2081	262.65	-7.12	-24.75	32.146	23:47.7	-1.38
3/18/2009	2454908.5	2081	249.47	-7.10	-24.89	32.137	23:51.4	-0.99
3/19/2009	2454909.5	2081	236.28	-7.07	-25.03	32.128	23:55.0	-0.59

3/20/2009	2454910.5	2081	223.10	-7.05	-25.16	32.119	23:58.7	-0.19
3/21/2009	2454911.5	2081	209.97	-7.01	-25.28	32.110	00: 2.3	0.20
3/22/2009	2454912.5	2081	196.78	-6.98	-25.39	32.101	00: 5.9	0.60
3/23/2009	2454913.5	2081	183.60	-6.95	-25.50	32.092	00: 9.6	0.99
3/24/2009	2454914.5	2081	170.41	-6.91	-25.60	32.083	00:13.2	1.39
3/25/2009	2454915.5	2081	157.22	-6.87	-25.70	32.074	00:16.9	1.78
3/26/2009	2454916.5	2081	144.03	-6.83	-25.79	32.065	00:20.5	2.17
3/27/2009	2454917.5	2081	130.84	-6.79	-25.87	32.055	00:24.2	2.56
3/28/2009	2454918.5	2081	117.65	-6.74	-25.94	32.046	00:27.8	2.96
3/29/2009	2454919.5	2081	104.45	-6.69	-26.01	32.037	00:31.4	3.35
3/30/2009	2454920.5	2081	91.26	-6.64	-26.07	32.028	00:35.1	3.74
3/31/2009	2454921.5	2081	78.07	-6.59	-26.12	32.019	00:38.7	4.12
4/ 1/2009	2454922.5	2081	64.87	-6.54	-26.16	32.009	00:42.4	4.51
4/ 2/2009	2454923.5	2081	51.68	-6.49	-26.20	32.000	00:46.0	4.90
4/ 3/2009	2454924.5	2081	38.48	-6.43	-26.23	31.991	00:49.7	5.28
4/ 4/2009	2454925.5	2081	25.28	-6.37	-26.26	31.982	00:53.3	5.66
4/ 5/2009	2454926.5	2081	12.09	-6.31	-26.27	31.973	00:57.0	6.04
4/ 6/2009	2454927.5	2082	358.89	-6.25	-26.28	31.963	01:0 .6	6.42
4/ 7/2009	2454928.5	2082	345.69	-6.18	-26.28	31.954	01: 4.3	6.80
4/ 8/2009	2454929.5	2082	332.49	-6.12	-26.28	31.945	01: 8.0	7.18
4/ 9/2009	2454930.5	2082	319.29	-6.05	-26.26	31.936	01:11.6	7.55
4/10/2009	2454931.5	2082	306.15	-5.98	-26.24	31.927	01:15.3	7.92
4/11/2009	2454932.5	2082	292.94	-5.91	-26.21	31.918	01:19.0	8.29
4/12/2009	2454933.5	2082	279.74	-5.83	-26.18	31.909	01:22.7	8.66
4/13/2009	2454934.5	2082	266.54	-5.76	-26.14	31.900	01:26.4	9.02
4/14/2009	2454935.5	2082	253.33	-5.68	-26.09	31.891	01:30.0	9.38
4/15/2009	2454936.5	2082	240.13	-5.61	-26.03	31.882	01:33.7	9.74
4/16/2009	2454937.5	2082	226.92	-5.53	-25.97	31.873	01:37.5	10.10
4/17/2009	2454938.5	2082	213.71	-5.45	-25.89	31.864	01:41.2	10.45
4/18/2009	2454939.5	2082	200.50	-5.36	-25.82	31.855	01:44.9	10.80
4/19/2009	2454940.5	2082	187.29	-5.28	-25.73	31.846	01:48.6	11.15
4/20/2009	2454941.5	2082	174.08	-5.19	-25.64	31.838	01:52.3	11.50
4/21/2009	2454942.5	2082	160.87	-5.11	-25.53	31.829	01:56.1	11.84
4/22/2009	2454943.5	2082	147.66	-5.02	-25.43	31.820	01:59.8	12.18
4/23/2009	2454944.5	2082	134.45	-4.93	-25.31	31.812	02: 3.6	12.51
4/24/2009	2454945.5	2082	121.24	-4.84	-25.19	31.803	02: 7.3	12.84
4/25/2009	2454946.5	2082	108.02	-4.74	-25.06	31.795	02:11.1	13.17
4/26/2009	2454947.5	2082	94.81	-4.65	-24.92	31.786	02:14.9	13.49
4/27/2009	2454948.5	2082	81.59	-4.56	-24.77	31.778	02:18.6	13.82
4/28/2009	2454949.5	2082	68.37	-4.46	-24.62	31.770	02:22.4	14.13
4/29/2009	2454950.5	2082	55.16	-4.36	-24.46	31.762	02:26.2	14.45
4/30/2009	2454951.5	2082	42.00	-4.26	-24.29	31.754	02:30.0	14.75
5/ 1/2009	2454952.5	2082	28.78	-4.16	-24.12	31.746	02:33.9	15.06
5/ 2/2009	2454953.5	2082	15.56	-4.06	-23.94	31.738	02:37.7	15.36
5/ 3/2009	2454954.5	2082	2.34	-3.96	-23.75	31.730	02:41.5	15.66
5/ 4/2009	2454955.5	2083	349.12	-3.86	-23.55	31.722	02:45.4	15.95
5/ 5/2009	2454956.5	2083	335.90	-3.75	-23.35	31.714	02:49.2	16.24
5/ 6/2009	2454957.5	2083	322.68	-3.65	-23.14	31.706	02:53.1	16.52
5/ 7/2009	2454958.5	2083	309.45	-3.54	-22.92	31.699	02:57.0	16.80
5/ 8/2009	2454959.5	2083	296.23	-3.43	-22.70	31.691	03:0 .8	17.07

5/ 9/2009	2454960.5	2083	283.01	-3.33	-22.47	31.684	03: 4.7	17.34
5/10/2009	2454961.5	2083	269.78	-3.22	-22.23	31.677	03: 8.6	17.61
5/11/2009	2454962.5	2083	256.56	-3.11	-21.98	31.670	03:12.5	17.87
5/12/2009	2454963.5	2083	243.33	-3.00	-21.73	31.663	03:16.5	18.12
5/13/2009	2454964.5	2083	230.10	-2.88	-21.47	31.656	03:20.4	18.37
5/14/2009	2454965.5	2083	216.87	-2.77	-21.21	31.649	03:24.3	18.61
5/15/2009	2454966.5	2083	203.65	-2.66	-20.94	31.642	03:28.3	18.85
5/16/2009	2454967.5	2083	190.42	-2.55	-20.66	31.635	03:32.2	19.09
5/17/2009	2454968.5	2083	177.19	-2.43	-20.38	31.629	03:36.2	19.32
5/18/2009	2454969.5	2083	163.96	-2.32	-20.09	31.622	03:40.2	19.54
5/19/2009	2454970.5	2083	150.73	-2.20	-19.79	31.616	03:44.2	19.76
5/20/2009	2454971.5	2083	137.56	-2.09	-19.48	31.610	03:48.1	19.97
5/21/2009	2454972.5	2083	124.32	-1.97	-19.17	31.603	03:52.2	20.17
5/22/2009	2454973.5	2083	111.09	-1.85	-18.86	31.597	03:56.2	20.37
5/23/2009	2454974.5	2083	97.86	-1.73	-18.54	31.591	03:60.2	20.57
5/24/2009	2454975.5	2083	84.63	-1.62	-18.21	31.586	04: 4.2	20.76
5/25/2009	2454976.5	2083	71.39	-1.50	-17.88	31.580	04: 8.2	20.94
5/26/2009	2454977.5	2083	58.16	-1.38	-17.54	31.574	04:12.3	21.12
5/27/2009	2454978.5	2083	44.92	-1.26	-17.19	31.569	04:16.3	21.29
5/28/2009	2454979.5	2083	31.69	-1.14	-16.84	31.564	04:20.4	21.45
5/29/2009	2454980.5	2083	18.45	-1.02	-16.49	31.558	04:24.5	21.61
5/30/2009	2454981.5	2083	5.22	-0.90	-16.13	31.553	04:28.5	21.76
5/31/2009	2454982.5	2084	351.98	-0.78	-15.76	31.548	04:32.6	21.91
6/ 1/2009	2454983.5	2084	338.74	-0.66	-15.39	31.544	04:36.7	22.05
6/ 2/2009	2454984.5	2084	325.51	-0.54	-15.02	31.539	04:40.8	22.18
6/ 3/2009	2454985.5	2084	312.27	-0.42	-14.64	31.534	04:44.9	22.31
6/ 4/2009	2454986.5	2084	299.03	-0.30	-14.25	31.530	04:49.0	22.43
6/ 5/2009	2454987.5	2084	285.79	-0.18	-13.86	31.526	04:53.1	22.54
6/ 6/2009	2454988.5	2084	272.55	-0.06	-13.47	31.522	04:57.3	22.65
6/ 7/2009	2454989.5	2084	259.31	0.06	-13.07	31.517	05: 1.4	22.75
6/ 8/2009	2454990.5	2084	246.08	0.18	-12.67	31.514	05: 5.5	22.84
6/ 9/2009	2454991.5	2084	232.90	0.31	-12.26	31.510	05: 9.6	22.93
6/10/2009	2454992.5	2084	219.66	0.43	-11.85	31.506	05:13.8	23.01
6/11/2009	2454993.5	2084	206.42	0.55	-11.44	31.503	05:17.9	23.08
6/12/2009	2454994.5	2084	193.18	0.67	-11.02	31.499	05:22.1	23.15
6/13/2009	2454995.5	2084	179.94	0.79	-10.60	31.496	05:26.2	23.21
6/14/2009	2454996.5	2084	166.70	0.91	-10.18	31.493	05:30.4	23.26
6/15/2009	2454997.5	2084	153.46	1.03	-9.75	31.490	05:34.5	23.31
6/16/2009	2454998.5	2084	140.22	1.14	-9.32	31.487	05:38.7	23.35
6/17/2009	2454999.5	2084	126.98	1.26	-8.89	31.485	05:42.8	23.38
6/18/2009	2455000.5	2084	113.74	1.38	-8.46	31.482	05:47.0	23.41
6/19/2009	2455001.5	2084	100.50	1.50	-8.02	31.480	05:51.1	23.42
6/20/2009	2455002.5	2084	87.26	1.62	-7.58	31.478	05:55.3	23.44
6/21/2009	2455003.5	2084	74.02	1.73	-7.14	31.476	05:59.5	23.44
6/22/2009	2455004.5	2084	60.78	1.85	-6.70	31.474	06: 3.6	23.44
6/23/2009	2455005.5	2084	47.54	1.97	-6.25	31.472	06: 7.8	23.43
6/24/2009	2455006.5	2084	34.29	2.08	-5.81	31.470	06:11.9	23.42
6/25/2009	2455007.5	2084	21.05	2.20	-5.36	31.469	06:16.1	23.39
6/26/2009	2455008.5	2084	7.81	2.31	-4.91	31.467	06:20.2	23.36
6/27/2009	2455009.5	2085	354.57	2.43	-4.46	31.466	06:24.4	23.33

6/28/2009	2455010.5	2085	341.33	2.54	-4.01	31.465	06:28.5	23.28
6/29/2009	2455011.5	2085	328.15	2.65	-3.55	31.464	06:32.7	23.24
6/30/2009	2455012.5	2085	314.91	2.76	-3.10	31.463	06:36.8	23.18
7/ 1/2009	2455013.5	2085	301.67	2.87	-2.65	31.463	06:40.9	23.12
7/ 2/2009	2455014.5	2085	288.43	2.98	-2.20	31.462	06:45.1	23.05
7/ 3/2009	2455015.5	2085	275.19	3.09	-1.74	31.462	06:49.2	22.97
7/ 4/2009	2455016.5	2085	261.95	3.20	-1.29	31.462	06:53.3	22.89
7/ 5/2009	2455017.5	2085	248.72	3.31	-0.84	31.462	06:57.4	22.80
7/ 6/2009	2455018.5	2085	235.48	3.42	-0.38	31.462	07: 1.6	22.70
7/ 7/2009	2455019.5	2085	222.24	3.52	0.07	31.462	07: 5.7	22.60
7/ 8/2009	2455020.5	2085	209.00	3.63	0.52	31.463	07: 9.8	22.49
7/ 9/2009	2455021.5	2085	195.76	3.73	0.97	31.463	07:13.8	22.37
7/10/2009	2455022.5	2085	182.52	3.83	1.42	31.464	07:17.9	22.25
7/11/2009	2455023.5	2085	169.28	3.93	1.87	31.465	07:22.0	22.12
7/12/2009	2455024.5	2085	156.05	4.03	2.32	31.466	07:26.1	21.98
7/13/2009	2455025.5	2085	142.81	4.13	2.77	31.467	07:30.1	21.84
7/14/2009	2455026.5	2085	129.57	4.23	3.21	31.468	07:34.2	21.69
7/15/2009	2455027.5	2085	116.34	4.33	3.66	31.470	07:38.3	21.54
7/16/2009	2455028.5	2085	103.10	4.43	4.10	31.471	07:42.3	21.38
7/17/2009	2455029.5	2085	89.86	4.52	4.54	31.473	07:46.3	21.21
7/18/2009	2455030.5	2085	76.63	4.61	4.98	31.475	07:50.3	21.04
7/19/2009	2455031.5	2085	63.45	4.71	5.41	31.477	07:54.4	20.86
7/20/2009	2455032.5	2085	50.22	4.80	5.85	31.479	07:58.4	20.68
7/21/2009	2455033.5	2085	36.99	4.89	6.28	31.482	08: 2.4	20.49
7/22/2009	2455034.5	2085	23.75	4.98	6.71	31.484	08: 6.3	20.30
7/23/2009	2455035.5	2085	10.52	5.06	7.13	31.487	08:10.3	20.09
7/24/2009	2455036.5	2086	357.28	5.15	7.56	31.489	08:14.3	19.89
7/25/2009	2455037.5	2086	344.05	5.23	7.98	31.492	08:18.2	19.68
7/26/2009	2455038.5	2086	330.82	5.32	8.40	31.495	08:22.2	19.46
7/27/2009	2455039.5	2086	317.59	5.40	8.81	31.498	08:26.1	19.24
7/28/2009	2455040.5	2086	304.36	5.48	9.23	31.502	08:30.0	19.01
7/29/2009	2455041.5	2086	291.13	5.56	9.63	31.505	08:34.0	18.77
7/30/2009	2455042.5	2086	277.89	5.63	10.04	31.509	08:37.9	18.54
7/31/2009	2455043.5	2086	264.67	5.71	10.44	31.513	08:41.8	18.29
8/ 1/2009	2455044.5	2086	251.44	5.78	10.84	31.516	08:45.7	18.04
8/ 2/2009	2455045.5	2086	238.21	5.85	11.24	31.520	08:49.5	17.79
8/ 3/2009	2455046.5	2086	224.98	5.93	11.63	31.525	08:53.4	17.53
8/ 4/2009	2455047.5	2086	211.75	5.99	12.02	31.529	08:57.3	17.27
8/ 5/2009	2455048.5	2086	198.52	6.06	12.40	31.533	09: 1.1	17.00
8/ 6/2009	2455049.5	2086	185.30	6.13	12.78	31.538	09: 4.9	16.73
8/ 7/2009	2455050.5	2086	172.07	6.19	13.16	31.542	09: 8.8	16.45
8/ 8/2009	2455051.5	2086	158.84	6.25	13.53	31.547	09:12.6	16.17
8/ 9/2009	2455052.5	2086	145.68	6.31	13.90	31.552	09:16.4	15.88
8/10/2009	2455053.5	2086	132.46	6.37	14.26	31.557	09:20.2	15.59
8/11/2009	2455054.5	2086	119.23	6.43	14.62	31.562	09:24.0	15.30
8/12/2009	2455055.5	2086	106.01	6.49	14.98	31.568	09:27.8	15.00
8/13/2009	2455056.5	2086	92.79	6.54	15.33	31.573	09:31.5	14.70
8/14/2009	2455057.5	2086	79.56	6.59	15.67	31.578	09:35.3	14.39
8/15/2009	2455058.5	2086	66.34	6.64	16.02	31.584	09:39.0	14.08
8/16/2009	2455059.5	2086	53.12	6.69	16.35	31.590	09:42.8	13.77

8/17/2009	2455060.5	2086	39.90	6.73	16.69	31.596	09:46.5	13.45
8/18/2009	2455061.5	2086	26.68	6.78	17.01	31.602	09:50.2	13.13
8/19/2009	2455062.5	2086	13.46	6.82	17.34	31.608	09:54.0	12.81
8/20/2009	2455063.5	2086	0.24	6.86	17.66	31.614	09:57.7	12.48
8/21/2009	2455064.5	2087	347.02	6.90	17.97	31.620	10: 1.4	12.15
8/22/2009	2455065.5	2087	333.80	6.94	18.28	31.627	10: 5.1	11.82
8/23/2009	2455066.5	2087	320.59	6.97	18.58	31.633	10: 8.8	11.48
8/24/2009	2455067.5	2087	307.37	7.00	18.88	31.640	10:12.4	11.14
8/25/2009	2455068.5	2087	294.15	7.03	19.17	31.647	10:16.1	10.79
8/26/2009	2455069.5	2087	280.94	7.06	19.46	31.654	10:19.8	10.45
8/27/2009	2455070.5	2087	267.72	7.09	19.74	31.661	10:23.4	10.10
8/28/2009	2455071.5	2087	254.51	7.11	20.02	31.668	10:27.1	9.75
8/29/2009	2455072.5	2087	241.36	7.14	20.29	31.675	10:30.7	9.39
8/30/2009	2455073.5	2087	228.14	7.16	20.56	31.682	10:34.4	9.04
8/31/2009	2455074.5	2087	214.93	7.18	20.82	31.689	10:38.0	8.68
9/ 1/2009	2455075.5	2087	201.72	7.19	21.08	31.697	10:41.6	8.32
9/ 2/2009	2455076.5	2087	188.51	7.21	21.33	31.704	10:45.3	7.95
9/ 3/2009	2455077.5	2087	175.30	7.22	21.57	31.712	10:48.9	7.59
9/ 4/2009	2455078.5	2087	162.09	7.23	21.81	31.720	10:52.5	7.22
9/ 5/2009	2455079.5	2087	148.87	7.24	22.05	31.728	10:56.1	6.85
9/ 6/2009	2455080.5	2087	135.67	7.24	22.28	31.735	10:59.7	6.48
9/ 7/2009	2455081.5	2087	122.46	7.25	22.50	31.743	11: 3.3	6.10
9/ 8/2009	2455082.5	2087	109.25	7.25	22.71	31.751	11: 6.9	5.73
9/ 9/2009	2455083.5	2087	96.04	7.25	22.92	31.759	11:10.5	5.35
9/10/2009	2455084.5	2087	82.83	7.25	23.13	31.768	11:14.1	4.97
9/11/2009	2455085.5	2087	69.63	7.24	23.33	31.776	11:17.7	4.59
9/12/2009	2455086.5	2087	56.42	7.24	23.52	31.784	11:21.3	4.21
9/13/2009	2455087.5	2087	43.21	7.23	23.71	31.793	11:24.9	3.83
9/14/2009	2455088.5	2087	30.01	7.22	23.89	31.801	11:28.5	3.45
9/15/2009	2455089.5	2087	16.80	7.20	24.06	31.809	11:32.1	3.06
9/16/2009	2455090.5	2087	3.60	7.19	24.23	31.818	11:35.7	2.68
9/17/2009	2455091.5	2088	350.39	7.17	24.39	31.827	11:39.3	2.29
9/18/2009	2455092.5	2088	337.25	7.15	24.55	31.835	11:42.9	1.91
9/19/2009	2455093.5	2088	324.05	7.13	24.70	31.844	11:46.4	1.52
9/20/2009	2455094.5	2088	310.85	7.11	24.84	31.853	11:50.0	1.13
9/21/2009	2455095.5	2088	297.64	7.08	24.98	31.862	11:53.6	0.74
9/22/2009	2455096.5	2088	284.44	7.06	25.11	31.870	11:57.2	0.35
9/23/2009	2455097.5	2088	271.24	7.03	25.23	31.879	12:0 .8	-0.04
9/24/2009	2455098.5	2088	258.04	7.00	25.35	31.888	12: 4.4	-0.43
9/25/2009	2455099.5	2088	244.84	6.96	25.46	31.897	12: 8.0	-0.82
9/26/2009	2455100.5	2088	231.64	6.93	25.56	31.906	12:11.6	-1.21
9/27/2009	2455101.5	2088	218.44	6.89	25.66	31.915	12:15.2	-1.60
9/28/2009	2455102.5	2088	205.24	6.85	25.75	31.924	12:18.8	-1.99
9/29/2009	2455103.5	2088	192.04	6.81	25.83	31.933	12:22.4	-2.38
9/30/2009	2455104.5	2088	178.84	6.76	25.91	31.943	12:26.0	-2.77
10/ 1/2009	2455105.5	2088	165.65	6.72	25.97	31.952	12:29.7	-3.15
10/ 2/2009	2455106.5	2088	152.45	6.67	26.04	31.961	12:33.3	-3.54
10/ 3/2009	2455107.5	2088	139.25	6.62	26.09	31.970	12:36.9	-3.93
10/ 4/2009	2455108.5	2088	126.05	6.57	26.14	31.979	12:40.5	-4.32
10/ 5/2009	2455109.5	2088	112.86	6.51	26.18	31.988	12:44.2	-4.70

10/ 6/2009	2455110.5	2088	99.66	6.46	26.22	31.998	12:47.8	-5.09
10/ 7/2009	2455111.5	2088	86.46	6.40	26.24	32.007	12:51.5	-5.47
10/ 8/2009	2455112.5	2088	73.33	6.34	26.26	32.016	12:55.1	-5.85
10/ 9/2009	2455113.5	2088	60.14	6.28	26.28	32.025	12:58.8	-6.23
10/10/2009	2455114.5	2088	46.94	6.21	26.28	32.034	13: 2.5	-6.61
10/11/2009	2455115.5	2088	33.75	6.15	26.28	32.044	13: 6.2	-6.99
10/12/2009	2455116.5	2088	20.55	6.08	26.27	32.053	13: 9.9	-7.37
10/13/2009	2455117.5	2088	7.36	6.01	26.25	32.062	13:13.6	-7.74
10/14/2009	2455118.5	2089	354.17	5.94	26.23	32.071	13:17.3	-8.12
10/15/2009	2455119.5	2089	340.97	5.87	26.20	32.080	13:21.0	-8.49
10/16/2009	2455120.5	2089	327.78	5.79	26.16	32.090	13:24.7	-8.86
10/17/2009	2455121.5	2089	314.59	5.72	26.11	32.099	13:28.4	-9.23
10/18/2009	2455122.5	2089	301.39	5.64	26.06	32.108	13:32.2	-9.59
10/19/2009	2455123.5	2089	288.20	5.56	25.99	32.117	13:35.9	-9.95
10/20/2009	2455124.5	2089	275.01	5.48	25.92	32.126	13:39.7	-10.31
10/21/2009	2455125.5	2089	261.82	5.39	25.85	32.135	13:43.5	-10.67
10/22/2009	2455126.5	2089	248.63	5.31	25.76	32.144	13:47.3	-11.03
10/23/2009	2455127.5	2089	235.43	5.22	25.67	32.153	13:51.1	-11.38
10/24/2009	2455128.5	2089	222.24	5.14	25.57	32.162	13:54.9	-11.73
10/25/2009	2455129.5	2089	209.05	5.05	25.46	32.170	13:58.7	-12.08
10/26/2009	2455130.5	2089	195.86	4.95	25.34	32.179	14: 2.5	-12.42
10/27/2009	2455131.5	2089	182.67	4.86	25.22	32.188	14: 6.4	-12.76
10/28/2009	2455132.5	2089	169.55	4.77	25.08	32.197	14:10.2	-13.10
10/29/2009	2455133.5	2089	156.36	4.67	24.94	32.205	14:14.1	-13.43
10/30/2009	2455134.5	2089	143.17	4.57	24.80	32.214	14:18.0	-13.76
10/31/2009	2455135.5	2089	129.98	4.47	24.64	32.222	14:21.9	-14.09
11/ 1/2009	2455136.5	2089	116.79	4.37	24.48	32.231	14:25.8	-14.41
11/ 2/2009	2455137.5	2089	103.60	4.27	24.31	32.239	14:29.7	-14.73
11/ 3/2009	2455138.5	2089	90.41	4.17	24.13	32.247	14:33.7	-15.04
11/ 4/2009	2455139.5	2089	77.22	4.07	23.94	32.256	14:37.6	-15.35
11/ 5/2009	2455140.5	2089	64.04	3.96	23.75	32.264	14:41.6	-15.66
11/ 6/2009	2455141.5	2089	50.85	3.85	23.54	32.272	14:45.6	-15.96
11/ 7/2009	2455142.5	2089	37.66	3.74	23.33	32.280	14:49.5	-16.26
11/ 8/2009	2455143.5	2089	24.47	3.64	23.11	32.288	14:53.5	-16.55
11/ 9/2009	2455144.5	2089	11.29	3.53	22.89	32.295	14:57.6	-16.84
11/10/2009	2455145.5	2090	358.10	3.41	22.65	32.303	15: 1.6	-17.13
11/11/2009	2455146.5	2090	344.91	3.30	22.41	32.311	15: 5.6	-17.40
11/12/2009	2455147.5	2090	331.73	3.19	22.16	32.318	15: 9.7	-17.68
11/13/2009	2455148.5	2090	318.54	3.07	21.91	32.326	15:13.8	-17.95
11/14/2009	2455149.5	2090	305.35	2.96	21.64	32.333	15:17.9	-18.21
11/15/2009	2455150.5	2090	292.17	2.84	21.37	32.340	15:22.0	-18.47
11/16/2009	2455151.5	2090	278.98	2.72	21.09	32.348	15:26.1	-18.72
11/17/2009	2455152.5	2090	265.86	2.60	20.80	32.355	15:30.2	-18.97
11/18/2009	2455153.5	2090	252.67	2.49	20.51	32.362	15:34.4	-19.21
11/19/2009	2455154.5	2090	239.49	2.37	20.21	32.368	15:38.5	-19.45
11/20/2009	2455155.5	2090	226.30	2.24	19.90	32.375	15:42.7	-19.68
11/21/2009	2455156.5	2090	213.12	2.12	19.58	32.382	15:46.9	-19.90
11/22/2009	2455157.5	2090	199.94	2.00	19.26	32.388	15:51.1	-20.12
11/23/2009	2455158.5	2090	186.75	1.88	18.93	32.395	15:55.3	-20.33
11/24/2009	2455159.5	2090	173.57	1.75	18.59	32.401	15:59.5	-20.54

11/25/2009	2455160.5	2090	160.38	1.63	18.25	32.407	16: 3.7	-20.74
11/26/2009	2455161.5	2090	147.20	1.51	17.90	32.413	16: 8.0	-20.93
11/27/2009	2455162.5	2090	134.02	1.38	17.54	32.419	16:12.3	-21.12
11/28/2009	2455163.5	2090	120.84	1.25	17.18	32.425	16:16.5	-21.30
11/29/2009	2455164.5	2090	107.65	1.13	16.81	32.430	16:20.8	-21.47
11/30/2009	2455165.5	2090	94.47	1.00	16.43	32.436	16:25.1	-21.63
12/ 1/2009	2455166.5	2090	81.29	0.88	16.05	32.441	16:29.4	-21.79
12/ 2/2009	2455167.5	2090	68.11	0.75	15.66	32.446	16:33.7	-21.95
12/ 3/2009	2455168.5	2090	54.92	0.62	15.27	32.451	16:38.1	-22.09
12/ 4/2009	2455169.5	2090	41.74	0.49	14.87	32.456	16:42.4	-22.23
12/ 5/2009	2455170.5	2090	28.56	0.37	14.46	32.461	16:46.8	-22.36
12/ 6/2009	2455171.5	2090	15.38	0.24	14.05	32.465	16:51.1	-22.49
12/ 7/2009	2455172.5	2090	2.26	0.11	13.64	32.470	16:55.5	-22.60
12/ 8/2009	2455173.5	2091	349.08	-0.02	13.22	32.474	16:59.9	-22.71
12/ 9/2009	2455174.5	2091	335.90	-0.15	12.79	32.478	17: 4.2	-22.81
12/10/2009	2455175.5	2091	322.72	-0.27	12.36	32.483	17: 8.6	-22.91
12/11/2009	2455176.5	2091	309.54	-0.40	11.93	32.486	17:13.0	-22.99
12/12/2009	2455177.5	2091	296.36	-0.53	11.49	32.490	17:17.4	-23.07
12/13/2009	2455178.5	2091	283.18	-0.66	11.05	32.494	17:21.8	-23.15
12/14/2009	2455179.5	2091	270.00	-0.79	10.60	32.497	17:26.3	-23.21
12/15/2009	2455180.5	2091	256.83	-0.91	10.15	32.500	17:30.7	-23.27
12/16/2009	2455181.5	2091	243.65	-1.04	9.69	32.503	17:35.1	-23.31
12/17/2009	2455182.5	2091	230.47	-1.17	9.23	32.506	17:39.5	-23.35
12/18/2009	2455183.5	2091	217.29	-1.29	8.77	32.509	17:44.0	-23.39
12/19/2009	2455184.5	2091	204.11	-1.42	8.31	32.512	17:48.4	-23.41
12/20/2009	2455185.5	2091	190.94	-1.55	7.84	32.514	17:52.8	-23.43
12/21/2009	2455186.5	2091	177.76	-1.67	7.37	32.517	17:57.3	-23.44
12/22/2009	2455187.5	2091	164.58	-1.80	6.90	32.519	18: 1.7	-23.44
12/23/2009	2455188.5	2091	151.40	-1.92	6.43	32.521	18: 6.1	-23.44
12/24/2009	2455189.5	2091	138.23	-2.04	5.95	32.523	18:10.6	-23.42
12/25/2009	2455190.5	2091	125.05	-2.17	5.47	32.524	18:15.0	-23.40
12/26/2009	2455191.5	2091	111.88	-2.29	4.99	32.526	18:19.4	-23.37
12/27/2009	2455192.5	2091	98.70	-2.41	4.51	32.527	18:23.9	-23.33
12/28/2009	2455193.5	2091	85.59	-2.53	4.03	32.528	18:28.3	-23.29
12/29/2009	2455194.5	2091	72.41	-2.65	3.55	32.529	18:32.7	-23.23
12/30/2009	2455195.5	2091	59.24	-2.77	3.06	32.530	18:37.2	-23.17
12/31/2009	2455196.5	2091	46.06	-2.89	2.58	32.530	18:41.6	-23.11
1/ 1/2010	2455197.5	2091	32.89	-3.01	2.10	32.531	18:46.0	-23.03
1/ 2/2010	2455198.5	2091	19.71	-3.12	1.61	32.531	18:50.4	-22.95
1/ 3/2010	2455199.5	2091	6.54	-3.24	1.13	32.531	18:54.8	-22.85