

## EPHEMERIS FOR PHYSICAL OBSERVATIONS OF SATURN (0<sup>h</sup> UT) 2010

UT Date	Elong	Ph	Vis	Semi-Diameter(")				B	B'	CMI	CMI I	CMI II	RA	Dec
<u>yyyy-mm-dd</u>	<u>°</u>	<u>°</u>	<u>Mag</u>	<u>Globe</u>		<u>Rings</u>		<u>°</u>	<u>°</u>	<u>°</u>	<u>°</u>	<u>°</u>	<u>hh:mm</u>	<u>°</u>
			<u>m<sub>v</sub></u>	<u>Eq</u>	<u>Po</u>	<u>Maj</u>	<u>Min</u>							
2010-Jan-01	095.8W	05.9	0.9	08.9	7.9	20.1	1.7	04.8	02.1	353.8	337.4	186.3	12:20	00.3
2010-Jan-02	096.8W	05.9	0.9	08.9	7.9	20.1	1.7	04.8	02.1	118.2	069.5	277.2	12:20	00.3
2010-Jan-03	097.8W	05.9	0.9	08.9	7.9	20.2	1.7	04.8	02.1	242.5	161.5	008.0	12:20	00.3
2010-Jan-04	098.8W	05.9	0.9	08.9	8.0	20.2	1.7	04.8	02.2	006.9	253.6	098.9	12:20	00.3
2010-Jan-05	099.8W	05.9	0.9	08.9	8.0	20.3	1.7	04.8	02.2	131.3	345.6	189.7	12:20	00.3
2010-Jan-06	100.8W	05.8	0.9	08.9	8.0	20.3	1.7	04.8	02.2	255.6	077.7	280.6	12:20	00.3
2010-Jan-07	101.8W	05.8	0.9	09.0	8.0	20.3	1.7	04.8	02.2	020.0	169.8	011.4	12:21	00.2
2010-Jan-08	102.8W	05.8	0.9	09.0	8.0	20.4	1.7	04.8	02.2	144.4	261.8	102.3	12:21	00.2
2010-Jan-09	103.8W	05.8	0.9	09.0	8.0	20.4	1.7	04.8	02.2	268.7	353.9	193.1	12:21	00.2
2010-Jan-10	104.8W	05.8	0.9	09.0	8.0	20.4	1.7	04.8	02.2	033.1	086.0	284.0	12:21	00.3
2010-Jan-11	105.9W	05.7	0.9	09.0	8.0	20.5	1.7	04.8	02.3	157.5	178.0	014.9	12:21	00.3
2010-Jan-12	106.9W	05.7	0.9	09.0	8.1	20.5	1.7	04.8	02.3	281.8	270.1	105.7	12:21	00.3
2010-Jan-13	107.9W	05.7	0.8	09.1	8.1	20.5	1.7	04.8	02.3	046.2	002.2	196.6	12:21	00.3
2010-Jan-14	108.9W	05.6	0.8	09.1	8.1	20.6	1.7	04.8	02.3	170.6	094.2	287.5	12:21	00.3
2010-Jan-15	109.9W	05.6	0.8	09.1	8.1	20.6	1.7	04.8	02.3	295.0	186.3	018.3	12:21	00.3
2010-Jan-16	110.9W	05.6	0.8	09.1	8.1	20.6	1.7	04.8	02.3	059.3	278.4	109.2	12:21	00.3
2010-Jan-17	112.0W	05.5	0.8	09.1	8.1	20.7	1.7	04.8	02.4	183.7	010.5	200.1	12:21	00.3
2010-Jan-18	113.0W	05.5	0.8	09.1	8.1	20.7	1.7	04.8	02.4	308.1	102.5	290.9	12:21	00.3
2010-Jan-19	114.0W	05.4	0.8	09.1	8.2	20.7	1.7	04.8	02.4	072.5	194.6	021.8	12:21	00.3
2010-Jan-20	115.0W	05.4	0.8	09.2	8.2	20.8	1.7	04.8	02.4	196.9	286.7	112.7	12:21	00.3
2010-Jan-21	116.1W	05.3	0.8	09.2	8.2	20.8	1.7	04.8	02.4	321.2	018.8	203.5	12:21	00.3
2010-Jan-22	117.1W	05.3	0.8	09.2	8.2	20.9	1.7	04.8	02.4	085.6	110.8	294.4	12:21	00.3
2010-Jan-23	118.1W	05.2	0.8	09.2	8.2	20.9	1.7	04.7	02.4	210.0	202.9	025.3	12:21	00.3
2010-Jan-24	119.2W	05.2	0.8	09.2	8.2	20.9	1.7	04.7	02.5	334.4	295.0	116.2	12:20	00.3
2010-Jan-25	120.2W	05.1	0.8	09.2	8.2	21.0	1.7	04.7	02.5	098.8	027.1	207.0	12:20	00.4
2010-Jan-26	121.2W	05.1	0.8	09.3	8.3	21.0	1.7	04.7	02.5	223.2	119.2	297.9	12:20	00.4
2010-Jan-27	122.3W	05.0	0.8	09.3	8.3	21.0	1.7	04.7	02.5	347.5	211.3	028.8	12:20	00.4
2010-Jan-28	123.3W	05.0	0.8	09.3	8.3	21.1	1.7	04.7	02.5	111.9	303.3	119.7	12:20	00.4
2010-Jan-29	124.4W	04.9	0.8	09.3	8.3	21.1	1.7	04.7	02.5	236.3	035.4	210.6	12:20	00.4
2010-Jan-30	125.4W	04.9	0.8	09.3	8.3	21.1	1.7	04.6	02.5	000.7	127.5	301.4	12:20	00.4
2010-Jan-31	126.4W	04.8	0.8	09.3	8.3	21.1	1.7	04.6	02.6	125.1	219.6	032.3	12:20	00.4
2010-Feb-01	127.5W	04.7	0.8	09.3	8.3	21.2	1.7	04.6	02.6	249.5	311.7	123.2	12:20	00.5
2010-Feb-02	128.5W	04.7	0.7	09.3	8.3	21.2	1.7	04.6	02.6	013.9	043.8	214.1	12:20	00.5
2010-Feb-03	129.6W	04.6	0.7	09.4	8.4	21.2	1.7	04.6	02.6	138.3	135.9	305.0	12:20	00.5
2010-Feb-04	130.6W	04.5	0.7	09.4	8.4	21.3	1.7	04.5	02.6	262.7	228.0	035.9	12:19	00.5
2010-Feb-05	131.7W	04.4	0.7	09.4	8.4	21.3	1.7	04.5	02.6	027.1	320.1	126.7	12:19	00.5
2010-Feb-06	132.7W	04.4	0.7	09.4	8.4	21.3	1.7	04.5	02.7	151.5	052.1	217.6	12:19	00.5
2010-Feb-07	133.8W	04.3	0.7	09.4	8.4	21.4	1.7	04.5	02.7	275.9	144.2	308.5	12:19	00.6
2010-Feb-08	134.8W	04.2	0.7	09.4	8.4	21.4	1.7	04.5	02.7	040.2	236.3	039.4	12:19	00.6
2010-Feb-09	135.9W	04.1	0.7	09.4	8.4	21.4	1.7	04.4	02.7	164.6	328.4	130.3	12:19	00.6
2010-Feb-10	136.9W	04.1	0.7	09.5	8.4	21.4	1.7	04.4	02.7	289.0	060.5	221.2	12:19	00.6
2010-Feb-11	138.0W	04.0	0.7	09.5	8.4	21.5	1.6	04.4	02.7	053.4	152.6	312.1	12:18	00.7
2010-Feb-12	139.1W	03.9	0.7	09.5	8.5	21.5	1.6	04.4	02.7	177.8	244.7	042.9	12:18	00.7
2010-Feb-13	140.1W	03.8	0.7	09.5	8.5	21.5	1.6	04.3	02.8	302.2	336.8	133.8	12:18	00.7
2010-Feb-14	141.2W	03.7	0.7	09.5	8.5	21.6	1.6	04.3	02.8	066.6	068.9	224.7	12:18	00.7
2010-Feb-15	142.2W	03.6	0.7	09.5	8.5	21.6	1.6	04.3	02.8	191.0	161.0	315.6	12:18	00.7
2010-Feb-16	143.3W	03.6	0.7	09.5	8.5	21.6	1.6	04.3	02.8	315.4	253.1	046.5	12:17	00.8
2010-Feb-17	144.4W	03.5	0.7	09.5	8.5	21.6	1.6	04.2	02.8	079.8	345.2	137.4	12:17	00.8
2010-Feb-18	145.4W	03.4	0.7	09.5	8.5	21.7	1.6	04.2	02.8	204.2	077.3	228.3	12:17	00.8

2010-Feb-19 146.5W 03.3 0.7 09.6 8.5 21.7 1.6 04.2 02.9 328.6 169.4 319.2 12:17 00.9  
2010-Feb-20 147.6W 03.2 0.7 09.6 8.5 21.7 1.6 04.1 02.9 093.0 261.4 050.0 12:17 00.9  
2010-Feb-21 148.6W 03.1 0.6 09.6 8.5 21.7 1.6 04.1 02.9 217.4 353.5 140.9 12:16 00.9  
2010-Feb-22 149.7W 03.0 0.6 09.6 8.6 21.7 1.5 04.1 02.9 341.8 085.6 231.8 12:16 00.9  
2010-Feb-23 150.8W 02.9 0.6 09.6 8.6 21.8 1.5 04.0 02.9 106.2 177.7 322.7 12:16 01.0  
2010-Feb-24 151.8W 02.8 0.6 09.6 8.6 21.8 1.5 04.0 02.9 230.6 269.8 053.6 12:16 01.0  
2010-Feb-25 152.9W 02.7 0.6 09.6 8.6 21.8 1.5 04.0 02.9 355.0 001.9 144.5 12:16 01.0  
2010-Feb-26 153.9W 02.6 0.6 09.6 8.6 21.8 1.5 03.9 03.0 119.4 094.0 235.4 12:15 01.0  
2010-Feb-27 155.0W 02.5 0.6 09.6 8.6 21.8 1.5 03.9 03.0 243.7 186.1 326.2 12:15 01.1  
2010-Feb-28 156.1W 02.4 0.6 09.6 8.6 21.9 1.5 03.9 03.0 008.1 278.2 057.1 12:15 01.1

2010-Mar-01 157.1W 02.3 0.6 09.6 8.6 21.9 1.5 03.8 03.0 132.5 010.3 148.0 12:15 01.1  
2010-Mar-02 158.2W 02.2 0.6 09.6 8.6 21.9 1.5 03.8 03.0 256.9 102.4 238.9 12:14 01.2  
2010-Mar-03 159.3W 02.1 0.6 09.7 8.6 21.9 1.4 03.8 03.0 021.3 194.5 329.8 12:14 01.2  
2010-Mar-04 160.3W 02.0 0.6 09.7 8.6 21.9 1.4 03.7 03.0 145.7 286.5 060.7 12:14 01.2  
2010-Mar-05 161.4W 01.9 0.6 09.7 8.6 21.9 1.4 03.7 03.1 270.1 018.6 151.5 12:14 01.3  
2010-Mar-06 162.5W 01.8 0.6 09.7 8.6 21.9 1.4 03.7 03.1 034.5 110.7 242.4 12:13 01.3  
2010-Mar-07 163.5W 01.7 0.6 09.7 8.6 22.0 1.4 03.6 03.1 158.9 202.8 333.3 12:13 01.3  
2010-Mar-08 164.6W 01.6 0.6 09.7 8.6 22.0 1.4 03.6 03.1 283.3 294.9 064.2 12:13 01.3  
2010-Mar-09 165.6W 01.5 0.6 09.7 8.6 22.0 1.4 03.6 03.1 047.6 027.0 155.1 12:12 01.4  
2010-Mar-10 166.7W 01.4 0.6 09.7 8.6 22.0 1.4 03.5 03.1 172.0 119.1 245.9 12:12 01.4  
2010-Mar-11 167.8W 01.3 0.6 09.7 8.7 22.0 1.3 03.5 03.2 296.4 211.1 336.8 12:12 01.4  
2010-Mar-12 168.8W 01.2 0.6 09.7 8.7 22.0 1.3 03.5 03.2 060.8 303.2 067.7 12:12 01.5  
2010-Mar-13 169.8W 01.1 0.6 09.7 8.7 22.0 1.3 03.4 03.2 185.2 035.3 158.6 12:11 01.5  
2010-Mar-14 170.9W 00.9 0.6 09.7 8.7 22.0 1.3 03.4 03.2 309.6 127.4 249.4 12:11 01.5  
2010-Mar-15 171.9W 00.8 0.6 09.7 8.7 22.0 1.3 03.3 03.2 073.9 219.5 340.3 12:11 01.6  
2010-Mar-16 172.9W 00.7 0.5 09.7 8.7 22.0 1.3 03.3 03.2 198.3 311.5 071.2 12:11 01.6  
2010-Mar-17 173.9W 00.6 0.5 09.7 8.7 22.0 1.3 03.3 03.2 322.7 043.6 162.1 12:10 01.6  
2010-Mar-18 174.9W 00.5 0.5 09.7 8.7 22.0 1.2 03.2 03.3 087.1 135.7 252.9 12:10 01.7  
2010-Mar-19 175.8W 00.4 0.5 09.7 8.7 22.0 1.2 03.2 03.3 211.4 227.8 343.8 12:10 01.7  
2010-Mar-20 176.5W 00.4 0.5 09.7 8.7 22.0 1.2 03.2 03.3 335.8 319.8 074.7 12:09 01.7  
2010-Mar-21 177.1W 00.3 0.5 09.7 8.7 22.0 1.2 03.1 03.3 100.2 051.9 165.5 12:09 01.8  
2010-Mar-22 177.4W 00.3 0.5 09.7 8.7 22.0 1.2 03.1 03.3 224.5 144.0 256.4 12:09 01.8  
2010-Mar-23 177.3E 00.3 0.5 09.7 8.7 22.0 1.2 03.1 03.3 348.9 236.0 347.2 12:09 01.8  
2010-Mar-24 176.8E 00.3 0.5 09.7 8.7 22.0 1.2 03.0 03.3 113.3 328.1 078.1 12:08 01.9  
2010-Mar-25 176.0E 00.4 0.5 09.7 8.7 22.0 1.1 03.0 03.4 237.6 060.2 169.0 12:08 01.9  
2010-Mar-26 175.2E 00.5 0.6 09.7 8.7 22.0 1.1 03.0 03.4 002.0 152.2 259.8 12:08 01.9  
2010-Mar-27 174.2E 00.6 0.6 09.7 8.7 22.0 1.1 02.9 03.4 126.4 244.3 350.7 12:07 01.9  
2010-Mar-28 173.2E 00.7 0.6 09.7 8.7 22.0 1.1 02.9 03.4 250.7 336.4 081.5 12:07 02.0  
2010-Mar-29 172.2E 00.8 0.6 09.7 8.7 22.0 1.1 02.8 03.4 015.1 068.4 172.4 12:07 02.0  
2010-Mar-30 171.2E 00.9 0.6 09.7 8.7 22.0 1.1 02.8 03.4 139.4 160.5 263.2 12:07 02.0  
2010-Mar-31 170.2E 01.0 0.6 09.7 8.7 22.0 1.1 02.8 03.5 263.8 252.5 354.1 12:06 02.1

2010-Apr-01 169.2E 01.1 0.6 09.7 8.7 22.0 1.1 02.7 03.5 028.2 344.6 084.9 12:06 02.1  
2010-Apr-02 168.2E 01.2 0.6 09.7 8.7 22.0 1.0 02.7 03.5 152.5 076.6 175.8 12:06 02.1  
2010-Apr-03 167.1E 01.3 0.6 09.7 8.6 22.0 1.0 02.7 03.5 276.9 168.7 266.6 12:05 02.2  
2010-Apr-04 166.1E 01.4 0.6 09.7 8.6 22.0 1.0 02.6 03.5 041.2 260.7 357.5 12:05 02.2  
2010-Apr-05 165.0E 01.6 0.6 09.7 8.6 22.0 1.0 02.6 03.5 165.6 352.8 088.3 12:05 02.2  
2010-Apr-06 164.0E 01.7 0.6 09.7 8.6 22.0 1.0 02.6 03.5 289.9 084.8 179.2 12:05 02.2  
2010-Apr-07 162.9E 01.8 0.6 09.7 8.6 21.9 1.0 02.5 03.6 054.2 176.9 270.0 12:04 02.3  
2010-Apr-08 161.9E 01.9 0.6 09.7 8.6 21.9 1.0 02.5 03.6 178.6 268.9 000.8 12:04 02.3  
2010-Apr-09 160.9E 02.0 0.7 09.7 8.6 21.9 0.9 02.5 03.6 302.9 001.0 091.7 12:04 02.3  
2010-Apr-10 159.8E 02.1 0.7 09.7 8.6 21.9 0.9 02.4 03.6 067.3 093.0 182.5 12:04 02.4  
2010-Apr-11 158.8E 02.2 0.7 09.6 8.6 21.9 0.9 02.4 03.6 191.6 185.0 273.3 12:03 02.4  
2010-Apr-12 157.7E 02.3 0.7 09.6 8.6 21.9 0.9 02.4 03.6 315.9 277.1 004.2 12:03 02.4

2010-Apr-13 156.7E 02.4 0.7 09.6 8.6 21.9 0.9 02.3 03.6 080.3 009.1 095.0 12:03 02.4  
2010-Apr-14 155.6E 02.5 0.7 09.6 8.6 21.8 0.9 02.3 03.7 204.6 101.1 185.8 12:03 02.5  
2010-Apr-15 154.6E 02.6 0.7 09.6 8.6 21.8 0.9 02.3 03.7 328.9 193.2 276.6 12:02 02.5  
2010-Apr-16 153.6E 02.7 0.7 09.6 8.6 21.8 0.9 02.3 03.7 093.2 285.2 007.4 12:02 02.5  
2010-Apr-17 152.5E 02.8 0.7 09.6 8.6 21.8 0.8 02.2 03.7 217.6 017.2 098.3 12:02 02.5  
2010-Apr-18 151.5E 02.9 0.7 09.6 8.6 21.8 0.8 02.2 03.7 341.9 109.2 189.1 12:02 02.6  
2010-Apr-19 150.4E 03.0 0.7 09.6 8.6 21.7 0.8 02.2 03.7 106.2 201.3 279.9 12:01 02.6  
2010-Apr-20 149.4E 03.1 0.7 09.6 8.5 21.7 0.8 02.1 03.8 230.5 293.3 010.7 12:01 02.6  
2010-Apr-21 148.4E 03.2 0.7 09.6 8.5 21.7 0.8 02.1 03.8 354.8 025.3 101.5 12:01 02.6  
2010-Apr-22 147.3E 03.3 0.8 09.6 8.5 21.7 0.8 02.1 03.8 119.1 117.3 192.3 12:01 02.7  
2010-Apr-23 146.3E 03.4 0.8 09.5 8.5 21.7 0.8 02.1 03.8 243.4 209.3 283.1 12:00 02.7  
2010-Apr-24 145.3E 03.4 0.8 09.5 8.5 21.6 0.8 02.0 03.8 007.7 301.3 013.9 12:00 02.7  
2010-Apr-25 144.3E 03.5 0.8 09.5 8.5 21.6 0.8 02.0 03.8 132.1 033.3 104.7 12:00 02.7  
2010-Apr-26 143.2E 03.6 0.8 09.5 8.5 21.6 0.7 02.0 03.8 256.4 125.3 195.5 12:00 02.7  
2010-Apr-27 142.2E 03.7 0.8 09.5 8.5 21.6 0.7 02.0 03.9 020.7 217.3 286.3 12:00 02.8  
2010-Apr-28 141.2E 03.8 0.8 09.5 8.5 21.5 0.7 01.9 03.9 145.0 309.3 017.1 11:59 02.8  
2010-Apr-29 140.2E 03.9 0.8 09.5 8.5 21.5 0.7 01.9 03.9 269.2 041.3 107.9 11:59 02.8  
2010-Apr-30 139.1E 04.0 0.8 09.5 8.4 21.5 0.7 01.9 03.9 033.5 133.3 198.7 11:59 02.8

2010-May-01 138.1E 04.1 0.8 09.5 8.4 21.5 0.7 01.9 03.9 157.8 225.3 289.5 11:59 02.8  
2010-May-02 137.1E 04.1 0.8 09.4 8.4 21.4 0.7 01.9 03.9 282.1 317.3 020.3 11:59 02.8  
2010-May-03 136.1E 04.2 0.8 09.4 8.4 21.4 0.7 01.8 03.9 046.4 049.3 111.0 11:58 02.9  
2010-May-04 135.1E 04.3 0.8 09.4 8.4 21.4 0.7 01.8 04.0 170.7 141.3 201.8 11:58 02.9  
2010-May-05 134.1E 04.4 0.8 09.4 8.4 21.3 0.7 01.8 04.0 295.0 233.3 292.6 11:58 02.9  
2010-May-06 133.1E 04.4 0.9 09.4 8.4 21.3 0.7 01.8 04.0 059.2 325.2 023.4 11:58 02.9  
2010-May-07 132.1E 04.5 0.9 09.4 8.4 21.3 0.7 01.8 04.0 183.5 057.2 114.1 11:58 02.9  
2010-May-08 131.1E 04.6 0.9 09.4 8.4 21.3 0.7 01.8 04.0 307.8 149.2 204.9 11:58 02.9  
2010-May-09 130.1E 04.7 0.9 09.4 8.3 21.2 0.6 01.7 04.0 072.1 241.2 295.7 11:58 02.9  
2010-May-10 129.0E 04.7 0.9 09.3 8.3 21.2 0.6 01.7 04.0 196.3 333.1 026.5 11:57 03.0  
2010-May-11 128.1E 04.8 0.9 09.3 8.3 21.2 0.6 01.7 04.1 320.6 065.1 117.2 11:57 03.0  
2010-May-12 127.1E 04.9 0.9 09.3 8.3 21.1 0.6 01.7 04.1 084.9 157.1 208.0 11:57 03.0  
2010-May-13 126.1E 04.9 0.9 09.3 8.3 21.1 0.6 01.7 04.1 209.1 249.0 298.7 11:57 03.0  
2010-May-14 125.1E 05.0 0.9 09.3 8.3 21.1 0.6 01.7 04.1 333.4 341.0 029.5 11:57 03.0  
2010-May-15 124.1E 05.0 0.9 09.3 8.3 21.0 0.6 01.7 04.1 097.7 073.0 120.3 11:57 03.0  
2010-May-16 123.1E 05.1 0.9 09.3 8.3 21.0 0.6 01.7 04.1 221.9 164.9 211.0 11:57 03.0  
2010-May-17 122.1E 05.2 0.9 09.2 8.2 21.0 0.6 01.7 04.2 346.2 256.9 301.8 11:57 03.0  
2010-May-18 121.1E 05.2 0.9 09.2 8.2 20.9 0.6 01.6 04.2 110.4 348.8 032.5 11:57 03.0  
2010-May-19 120.1E 05.3 0.9 09.2 8.2 20.9 0.6 01.6 04.2 234.7 080.8 123.3 11:56 03.0  
2010-May-20 119.1E 05.3 0.9 09.2 8.2 20.9 0.6 01.6 04.2 358.9 172.7 214.0 11:56 03.0  
2010-May-21 118.2E 05.4 1.0 09.2 8.2 20.8 0.6 01.6 04.2 123.2 264.7 304.7 11:56 03.0  
2010-May-22 117.2E 05.4 1.0 09.2 8.2 20.8 0.6 01.6 04.2 247.4 356.6 035.5 11:56 03.0  
2010-May-23 116.2E 05.5 1.0 09.2 8.2 20.8 0.6 01.6 04.2 011.7 088.6 126.2 11:56 03.0  
2010-May-24 115.2E 05.5 1.0 09.1 8.2 20.7 0.6 01.6 04.3 135.9 180.5 217.0 11:56 03.0  
2010-May-25 114.3E 05.6 1.0 09.1 8.1 20.7 0.6 01.6 04.3 260.1 272.5 307.7 11:56 03.0  
2010-May-26 113.3E 05.6 1.0 09.1 8.1 20.7 0.6 01.6 04.3 024.4 004.4 038.4 11:56 03.0  
2010-May-27 112.3E 05.6 1.0 09.1 8.1 20.6 0.6 01.6 04.3 148.6 096.3 129.2 11:56 03.0  
2010-May-28 111.4E 05.7 1.0 09.1 8.1 20.6 0.6 01.6 04.3 272.8 188.3 219.9 11:56 03.0  
2010-May-29 110.4E 05.7 1.0 09.1 8.1 20.6 0.6 01.6 04.3 037.1 280.2 310.6 11:56 03.0  
2010-May-30 109.5E 05.8 1.0 09.0 8.1 20.5 0.6 01.6 04.3 161.3 012.1 041.3 11:56 03.0  
2010-May-31 108.5E 05.8 1.0 09.0 8.1 20.5 0.6 01.6 04.4 285.5 104.1 132.1 11:56 03.0

2010-Jun-01 107.5E 05.8 1.0 09.0 8.0 20.5 0.6 01.6 04.4 049.7 196.0 222.8 11:56 03.0  
2010-Jun-02 106.6E 05.9 1.0 09.0 8.0 20.4 0.6 01.6 04.4 174.0 287.9 313.5 11:56 03.0  
2010-Jun-03 105.6E 05.9 1.0 09.0 8.0 20.4 0.6 01.6 04.4 298.2 019.8 044.2 11:56 03.0  
2010-Jun-04 104.7E 05.9 1.0 09.0 8.0 20.3 0.6 01.6 04.4 062.4 111.8 134.9 11:56 03.0

2010-Jun-05 103.7E 05.9 1.0 09.0 8.0 20.3 0.6 01.7 04.4 186.6 203.7 225.6 11:56 03.0  
2010-Jun-06 102.8E 06.0 1.0 08.9 8.0 20.3 0.6 01.7 04.5 310.8 295.6 316.3 11:56 03.0  
2010-Jun-07 101.8E 06.0 1.0 08.9 8.0 20.2 0.6 01.7 04.5 075.0 027.5 047.1 11:56 03.0  
2010-Jun-08 100.9E 06.0 1.0 08.9 7.9 20.2 0.6 01.7 04.5 199.2 119.4 137.8 11:56 03.0  
2010-Jun-09 100.0E 06.0 1.0 08.9 7.9 20.2 0.6 01.7 04.5 323.5 211.3 228.5 11:56 03.0  
2010-Jun-10 099.0E 06.0 1.1 08.9 7.9 20.1 0.6 01.7 04.5 087.7 303.3 319.2 11:56 03.0  
2010-Jun-11 098.1E 06.1 1.1 08.9 7.9 20.1 0.6 01.7 04.5 211.9 035.2 049.9 11:56 03.0  
2010-Jun-12 097.1E 06.1 1.1 08.8 7.9 20.1 0.6 01.7 04.5 336.1 127.1 140.6 11:56 02.9  
2010-Jun-13 096.2E 06.1 1.1 08.8 7.9 20.0 0.6 01.7 04.6 100.3 219.0 231.3 11:56 02.9  
2010-Jun-14 095.3E 06.1 1.1 08.8 7.9 20.0 0.6 01.7 04.6 224.5 310.9 322.0 11:57 02.9  
2010-Jun-15 094.4E 06.1 1.1 08.8 7.8 20.0 0.6 01.8 04.6 348.7 042.8 052.7 11:57 02.9  
2010-Jun-16 093.4E 06.1 1.1 08.8 7.8 19.9 0.6 01.8 04.6 112.9 134.7 143.4 11:57 02.9  
2010-Jun-17 092.5E 06.1 1.1 08.8 7.8 19.9 0.6 01.8 04.6 237.1 226.6 234.1 11:57 02.9  
2010-Jun-18 091.6E 06.1 1.1 08.8 7.8 19.9 0.6 01.8 04.6 001.3 318.5 324.8 11:57 02.9  
2010-Jun-19 090.6E 06.1 1.1 08.7 7.8 19.8 0.6 01.8 04.6 125.5 050.4 055.4 11:57 02.8  
2010-Jun-20 089.7E 06.1 1.1 08.7 7.8 19.8 0.6 01.8 04.7 249.7 142.3 146.1 11:57 02.8  
2010-Jun-21 088.8E 06.1 1.1 08.7 7.8 19.7 0.6 01.9 04.7 013.8 234.2 236.8 11:57 02.8  
2010-Jun-22 087.9E 06.1 1.1 08.7 7.8 19.7 0.6 01.9 04.7 138.0 326.1 327.5 11:57 02.8  
2010-Jun-23 087.0E 06.1 1.1 08.7 7.7 19.7 0.7 01.9 04.7 262.2 057.9 058.2 11:57 02.8  
2010-Jun-24 086.1E 06.1 1.1 08.7 7.7 19.6 0.7 01.9 04.7 026.4 149.8 148.9 11:58 02.8  
2010-Jun-25 085.1E 06.1 1.1 08.6 7.7 19.6 0.7 01.9 04.7 150.6 241.7 239.6 11:58 02.7  
2010-Jun-26 084.2E 06.1 1.1 08.6 7.7 19.6 0.7 02.0 04.7 274.8 333.6 330.2 11:58 02.7  
2010-Jun-27 083.3E 06.1 1.1 08.6 7.7 19.5 0.7 02.0 04.8 039.0 065.5 060.9 11:58 02.7  
2010-Jun-28 082.4E 06.1 1.1 08.6 7.7 19.5 0.7 02.0 04.8 163.1 157.4 151.6 11:58 02.7  
2010-Jun-29 081.5E 06.1 1.1 08.6 7.7 19.5 0.7 02.0 04.8 287.3 249.3 242.3 11:58 02.7  
2010-Jun-30 080.6E 06.0 1.1 08.6 7.6 19.4 0.7 02.1 04.8 051.5 341.1 332.9 11:59 02.6

2010-Jul-01 079.7E 06.0 1.1 08.6 7.6 19.4 0.7 02.1 04.8 175.7 073.0 063.6 11:59 02.6  
2010-Jul-02 078.8E 06.0 1.1 08.5 7.6 19.4 0.7 02.1 04.8 299.8 164.9 154.3 11:59 02.6  
2010-Jul-03 077.9E 06.0 1.1 08.5 7.6 19.3 0.7 02.1 04.9 064.0 256.8 245.0 11:59 02.6  
2010-Jul-04 077.0E 06.0 1.1 08.5 7.6 19.3 0.7 02.2 04.9 188.2 348.7 335.6 11:59 02.5  
2010-Jul-05 076.1E 05.9 1.1 08.5 7.6 19.3 0.7 02.2 04.9 312.4 080.5 066.3 12:00 02.5  
2010-Jul-06 075.2E 05.9 1.1 08.5 7.6 19.3 0.8 02.2 04.9 076.5 172.4 157.0 12:00 02.5  
2010-Jul-07 074.3E 05.9 1.1 08.5 7.6 19.2 0.8 02.3 04.9 200.7 264.3 247.6 12:00 02.5  
2010-Jul-08 073.4E 05.9 1.1 08.5 7.5 19.2 0.8 02.3 04.9 324.9 356.2 338.3 12:00 02.4  
2010-Jul-09 072.5E 05.8 1.1 08.4 7.5 19.2 0.8 02.3 04.9 089.0 088.0 069.0 12:00 02.4  
2010-Jul-10 071.6E 05.8 1.1 08.4 7.5 19.1 0.8 02.4 05.0 213.2 179.9 159.6 12:01 02.4  
2010-Jul-11 070.8E 05.8 1.1 08.4 7.5 19.1 0.8 02.4 05.0 337.4 271.8 250.3 12:01 02.4  
2010-Jul-12 069.9E 05.7 1.1 08.4 7.5 19.1 0.8 02.4 05.0 101.6 003.6 341.0 12:01 02.3  
2010-Jul-13 069.0E 05.7 1.1 08.4 7.5 19.0 0.8 02.5 05.0 225.7 095.5 071.6 12:01 02.3  
2010-Jul-14 068.1E 05.7 1.1 08.4 7.5 19.0 0.8 02.5 05.0 349.9 187.4 162.3 12:02 02.3  
2010-Jul-15 067.2E 05.6 1.1 08.4 7.5 19.0 0.8 02.5 05.0 114.0 279.2 253.0 12:02 02.2  
2010-Jul-16 066.3E 05.6 1.1 08.4 7.5 18.9 0.8 02.6 05.0 238.2 011.1 343.6 12:02 02.2  
2010-Jul-17 065.5E 05.6 1.1 08.3 7.4 18.9 0.9 02.6 05.1 002.4 103.0 074.3 12:02 02.2  
2010-Jul-18 064.6E 05.5 1.1 08.3 7.4 18.9 0.9 02.6 05.1 126.5 194.8 164.9 12:03 02.1  
2010-Jul-19 063.7E 05.5 1.1 08.3 7.4 18.9 0.9 02.7 05.1 250.7 286.7 255.6 12:03 02.1  
2010-Jul-20 062.8E 05.4 1.1 08.3 7.4 18.8 0.9 02.7 05.1 014.9 018.6 346.3 12:03 02.1  
2010-Jul-21 061.9E 05.4 1.1 08.3 7.4 18.8 0.9 02.7 05.1 139.0 110.4 076.9 12:03 02.0  
2010-Jul-22 061.1E 05.3 1.1 08.3 7.4 18.8 0.9 02.8 05.1 263.2 202.3 167.6 12:04 02.0  
2010-Jul-23 060.2E 05.3 1.1 08.3 7.4 18.7 0.9 02.8 05.1 027.3 294.2 258.2 12:04 02.0  
2010-Jul-24 059.3E 05.3 1.1 08.3 7.4 18.7 0.9 02.9 05.2 151.5 026.0 348.9 12:04 01.9  
2010-Jul-25 058.5E 05.2 1.1 08.2 7.4 18.7 0.9 02.9 05.2 275.7 117.9 079.5 12:05 01.9  
2010-Jul-26 057.6E 05.2 1.1 08.2 7.3 18.7 1.0 02.9 05.2 039.8 209.7 170.2 12:05 01.9  
2010-Jul-27 056.7E 05.1 1.1 08.2 7.3 18.6 1.0 03.0 05.2 164.0 301.6 260.8 12:05 01.8  
2010-Jul-28 055.8E 05.0 1.1 08.2 7.3 18.6 1.0 03.0 05.2 288.1 033.5 351.5 12:05 01.8

2010-Jul-29 055.0E 05.0 1.1 08.2 7.3 18.6 1.0 03.1 05.2 052.3 125.3 082.2 12:06 01.8  
2010-Jul-30 054.1E 04.9 1.1 08.2 7.3 18.6 1.0 03.1 05.2 176.4 217.2 172.8 12:06 01.7  
2010-Jul-31 053.2E 04.9 1.1 08.2 7.3 18.5 1.0 03.2 05.3 300.6 309.0 263.5 12:06 01.7

2010-Aug-01 052.4E 04.8 1.1 08.2 7.3 18.5 1.0 03.2 05.3 064.8 040.9 354.1 12:07 01.6  
2010-Aug-02 051.5E 04.8 1.1 08.2 7.3 18.5 1.0 03.2 05.3 188.9 132.8 084.8 12:07 01.6  
2010-Aug-03 050.7E 04.7 1.1 08.1 7.3 18.5 1.1 03.3 05.3 313.1 224.6 175.4 12:07 01.6  
2010-Aug-04 049.8E 04.7 1.1 08.1 7.3 18.4 1.1 03.3 05.3 077.2 316.5 266.1 12:08 01.5  
2010-Aug-05 048.9E 04.6 1.1 08.1 7.2 18.4 1.1 03.4 05.3 201.4 048.3 356.7 12:08 01.5  
2010-Aug-06 048.1E 04.5 1.1 08.1 7.2 18.4 1.1 03.4 05.4 325.5 140.2 087.4 12:08 01.4  
2010-Aug-07 047.2E 04.5 1.1 08.1 7.2 18.4 1.1 03.5 05.4 089.7 232.0 178.0 12:09 01.4  
2010-Aug-08 046.3E 04.4 1.1 08.1 7.2 18.4 1.1 03.5 05.4 213.8 323.9 268.7 12:09 01.4  
2010-Aug-09 045.5E 04.3 1.1 08.1 7.2 18.3 1.1 03.6 05.4 338.0 055.8 359.3 12:10 01.3  
2010-Aug-10 044.6E 04.3 1.1 08.1 7.2 18.3 1.2 03.6 05.4 102.2 147.6 090.0 12:10 01.3  
2010-Aug-11 043.8E 04.2 1.1 08.1 7.2 18.3 1.2 03.7 05.4 226.3 239.5 180.6 12:10 01.2  
2010-Aug-12 042.9E 04.1 1.1 08.1 7.2 18.3 1.2 03.7 05.4 350.5 331.3 271.3 12:11 01.2  
2010-Aug-13 042.1E 04.1 1.1 08.0 7.2 18.3 1.2 03.8 05.5 114.6 063.2 001.9 12:11 01.2  
2010-Aug-14 041.2E 04.0 1.1 08.0 7.2 18.2 1.2 03.8 05.5 238.8 155.0 092.6 12:11 01.1  
2010-Aug-15 040.3E 03.9 1.1 08.0 7.2 18.2 1.2 03.9 05.5 002.9 246.9 183.2 12:12 01.1  
2010-Aug-16 039.5E 03.9 1.1 08.0 7.2 18.2 1.2 03.9 05.5 127.1 338.8 273.9 12:12 01.0  
2010-Aug-17 038.6E 03.8 1.1 08.0 7.1 18.2 1.3 04.0 05.5 251.3 070.6 004.5 12:12 01.0  
2010-Aug-18 037.8E 03.7 1.1 08.0 7.1 18.2 1.3 04.0 05.5 015.4 162.5 095.2 12:13 00.9  
2010-Aug-19 036.9E 03.6 1.1 08.0 7.1 18.1 1.3 04.1 05.5 139.6 254.3 185.8 12:13 00.9  
2010-Aug-20 036.1E 03.6 1.1 08.0 7.1 18.1 1.3 04.1 05.6 263.7 346.2 276.5 12:14 00.9  
2010-Aug-21 035.2E 03.5 1.1 08.0 7.1 18.1 1.3 04.2 05.6 027.9 078.1 007.2 12:14 00.8  
2010-Aug-22 034.4E 03.4 1.1 08.0 7.1 18.1 1.3 04.2 05.6 152.0 169.9 097.8 12:14 00.8  
2010-Aug-23 033.5E 03.3 1.1 08.0 7.1 18.1 1.3 04.3 05.6 276.2 261.8 188.5 12:15 00.7  
2010-Aug-24 032.7E 03.3 1.1 08.0 7.1 18.1 1.4 04.3 05.6 040.4 353.6 279.1 12:15 00.7  
2010-Aug-25 031.8E 03.2 1.1 08.0 7.1 18.0 1.4 04.4 05.6 164.5 085.5 009.8 12:16 00.6  
2010-Aug-26 031.0E 03.1 1.1 07.9 7.1 18.0 1.4 04.4 05.6 288.7 177.4 100.4 12:16 00.6  
2010-Aug-27 030.1E 03.0 1.0 07.9 7.1 18.0 1.4 04.5 05.7 052.8 269.2 191.1 12:16 00.5  
2010-Aug-28 029.3E 03.0 1.0 07.9 7.1 18.0 1.4 04.5 05.7 177.0 001.1 281.7 12:17 00.5  
2010-Aug-29 028.4E 02.9 1.0 07.9 7.1 18.0 1.4 04.6 05.7 301.1 092.9 012.4 12:17 00.4  
2010-Aug-30 027.6E 02.8 1.0 07.9 7.1 18.0 1.4 04.6 05.7 065.3 184.8 103.0 12:18 00.4  
2010-Aug-31 026.7E 02.7 1.0 07.9 7.1 18.0 1.5 04.7 05.7 189.5 276.7 193.7 12:18 00.4

2010-Sep-01 025.9E 02.6 1.0 07.9 7.1 17.9 1.5 04.7 05.7 313.6 008.5 284.4 12:19 00.3  
2010-Sep-02 025.0E 02.6 1.0 07.9 7.1 17.9 1.5 04.8 05.7 077.8 100.4 015.0 12:19 00.3  
2010-Sep-03 024.2E 02.5 1.0 07.9 7.0 17.9 1.5 04.8 05.8 202.0 192.3 105.7 12:19 00.2  
2010-Sep-04 023.3E 02.4 1.0 07.9 7.0 17.9 1.5 04.9 05.8 326.1 284.1 196.3 12:20 00.2  
2010-Sep-05 022.5E 02.3 1.0 07.9 7.0 17.9 1.5 04.9 05.8 090.3 016.0 287.0 12:20 00.1  
2010-Sep-06 021.6E 02.2 1.0 07.9 7.0 17.9 1.6 05.0 05.8 214.5 107.9 017.7 12:21 00.1  
2010-Sep-07 020.8E 02.1 1.0 07.9 7.0 17.9 1.6 05.1 05.8 338.6 199.7 108.3 12:21 00.0  
2010-Sep-08 019.9E 02.1 1.0 07.9 7.0 17.9 1.6 05.1 05.8 102.8 291.6 199.0 12:22-00.0  
2010-Sep-09 019.1E 02.0 1.0 07.9 7.0 17.9 1.6 05.2 05.9 227.0 023.5 289.6 12:22-00.1  
2010-Sep-10 018.2E 01.9 1.0 07.9 7.0 17.9 1.6 05.2 05.9 351.1 115.3 020.3 12:22-00.1  
2010-Sep-11 017.4E 01.8 1.0 07.9 7.0 17.8 1.6 05.3 05.9 115.3 207.2 111.0 12:23-00.2  
2010-Sep-12 016.5E 01.7 1.0 07.9 7.0 17.8 1.7 05.3 05.9 239.5 299.1 201.6 12:23-00.2  
2010-Sep-13 015.7E 01.6 1.0 07.9 7.0 17.8 1.7 05.4 05.9 003.6 030.9 292.3 12:24-00.3  
2010-Sep-14 014.8E 01.5 1.0 07.9 7.0 17.8 1.7 05.4 05.9 127.8 122.8 023.0 12:24-00.3  
2010-Sep-15 014.0E 01.5 1.0 07.9 7.0 17.8 1.7 05.5 05.9 252.0 214.7 113.6 12:25-00.4  
2010-Sep-16 013.2E 01.4 1.0 07.8 7.0 17.8 1.7 05.5 06.0 016.1 306.6 204.3 12:25-00.4  
2010-Sep-17 012.3E 01.3 1.0 07.8 7.0 17.8 1.7 05.6 06.0 140.3 038.4 295.0 12:26-00.5  
2010-Sep-18 011.5E 01.2 0.9 07.8 7.0 17.8 1.8 05.7 06.0 264.5 130.3 025.6 12:26-00.5  
2010-Sep-19 010.6E 01.1 0.9 07.8 7.0 17.8 1.8 05.7 06.0 028.7 222.2 116.3 12:26-00.5

2010-Sep-20 009.8E 01.0 0.9 07.8 7.0 17.8 1.8 05.8 06.0 152.8 314.1 207.0 12:27-00.6  
2010-Sep-21 009.0E 00.9 0.9 07.8 7.0 17.8 1.8 05.8 06.0 277.0 045.9 297.6 12:27-00.6  
2010-Sep-22 008.2E 00.9 0.9 07.8 7.0 17.8 1.8 05.9 06.0 041.2 137.8 028.3 12:28-00.7  
2010-Sep-23 007.3E 00.8 0.9 07.8 7.0 17.8 1.8 05.9 06.1 165.4 229.7 119.0 12:28-00.7  
2010-Sep-24 006.5E 00.7 0.9 07.8 7.0 17.8 1.9 06.0 06.1 289.6 321.6 209.7 12:29-00.8  
2010-Sep-25 005.7E 00.6 0.9 07.8 7.0 17.8 1.9 06.0 06.1 053.7 053.5 300.3 12:29-00.8  
2010-Sep-26 004.9E 00.5 0.9 07.8 7.0 17.8 1.9 06.1 06.1 177.9 145.3 031.0 12:30-00.9  
2010-Sep-27 004.2E 00.4 0.9 07.8 7.0 17.8 1.9 06.2 06.1 302.1 237.2 121.7 12:30-00.9  
2010-Sep-28 003.5E 00.4 0.9 07.8 7.0 17.8 1.9 06.2 06.1 066.3 329.1 212.4 12:30-01.0  
2010-Sep-29 002.9E 00.3 0.9 07.8 7.0 17.8 1.9 06.3 06.1 190.5 061.0 303.1 12:31-01.0  
2010-Sep-30 002.4E 00.3 0.9 07.8 7.0 17.8 2.0 06.3 06.2 314.7 152.9 033.7 12:31-01.1

2010-Oct-01 002.2E 00.2 0.9 07.8 7.0 17.8 2.0 06.4 06.2 078.9 244.8 124.4 12:32-01.1  
2010-Oct-02 002.3W 00.2 0.9 07.8 7.0 17.8 2.0 06.4 06.2 203.0 336.7 215.1 12:32-01.2  
2010-Oct-03 002.7W 00.3 0.9 07.8 7.0 17.8 2.0 06.5 06.2 327.2 068.6 305.8 12:33-01.2  
2010-Oct-04 003.3W 00.3 0.9 07.8 7.0 17.8 2.0 06.5 06.2 091.4 160.4 036.5 12:33-01.3  
2010-Oct-05 003.9W 00.4 0.9 07.8 7.0 17.8 2.0 06.6 06.2 215.6 252.3 127.2 12:34-01.3  
2010-Oct-06 004.7W 00.5 0.9 07.8 7.0 17.8 2.1 06.6 06.2 339.8 344.2 217.8 12:34-01.4  
2010-Oct-07 005.5W 00.6 0.9 07.8 7.0 17.8 2.1 06.7 06.3 104.0 076.1 308.5 12:35-01.4  
2010-Oct-08 006.3W 00.7 0.9 07.8 7.0 17.8 2.1 06.8 06.3 228.2 168.0 039.2 12:35-01.5  
2010-Oct-09 007.1W 00.7 0.9 07.8 7.0 17.8 2.1 06.8 06.3 352.4 259.9 129.9 12:35-01.5  
2010-Oct-10 007.9W 00.8 0.9 07.8 7.0 17.8 2.1 06.9 06.3 116.6 351.8 220.6 12:36-01.6  
2010-Oct-11 008.8W 00.9 0.9 07.8 7.0 17.8 2.1 06.9 06.3 240.8 083.7 311.3 12:36-01.6  
2010-Oct-12 009.6W 01.0 0.9 07.8 7.0 17.8 2.2 07.0 06.3 005.0 175.6 042.0 12:37-01.7  
2010-Oct-13 010.4W 01.1 0.9 07.8 7.0 17.8 2.2 07.0 06.3 129.2 267.5 132.7 12:37-01.7  
2010-Oct-14 011.3W 01.2 0.9 07.8 7.0 17.8 2.2 07.1 06.4 253.4 359.4 223.4 12:38-01.7  
2010-Oct-15 012.1W 01.3 0.9 07.8 7.0 17.8 2.2 07.1 06.4 017.6 091.3 314.1 12:38-01.8  
2010-Oct-16 013.0W 01.3 0.9 07.8 7.0 17.8 2.2 07.2 06.4 141.8 183.2 044.8 12:39-01.8  
2010-Oct-17 013.9W 01.4 0.9 07.9 7.0 17.8 2.2 07.2 06.4 266.0 275.1 135.5 12:39-01.9  
2010-Oct-18 014.7W 01.5 0.9 07.9 7.0 17.8 2.3 07.3 06.4 030.2 007.1 226.2 12:40-01.9  
2010-Oct-19 015.6W 01.6 0.9 07.9 7.0 17.8 2.3 07.3 06.4 154.5 099.0 316.9 12:40-02.0  
2010-Oct-20 016.4W 01.7 0.9 07.9 7.0 17.8 2.3 07.4 06.4 278.7 190.9 047.6 12:40-02.0  
2010-Oct-21 017.3W 01.8 0.9 07.9 7.0 17.8 2.3 07.4 06.5 042.9 282.8 138.3 12:41-02.1  
2010-Oct-22 018.2W 01.9 0.9 07.9 7.0 17.8 2.3 07.5 06.5 167.1 014.7 229.0 12:41-02.1  
2010-Oct-23 019.1W 01.9 0.9 07.9 7.0 17.9 2.3 07.5 06.5 291.3 106.6 319.7 12:42-02.2  
2010-Oct-24 019.9W 02.0 0.9 07.9 7.0 17.9 2.4 07.6 06.5 055.5 198.5 050.4 12:42-02.2  
2010-Oct-25 020.8W 02.1 0.9 07.9 7.0 17.9 2.4 07.6 06.5 179.8 290.5 141.2 12:43-02.3  
2010-Oct-26 021.7W 02.2 0.9 07.9 7.0 17.9 2.4 07.7 06.5 304.0 022.4 231.9 12:43-02.3  
2010-Oct-27 022.5W 02.3 0.9 07.9 7.0 17.9 2.4 07.8 06.5 068.2 114.3 322.6 12:43-02.3  
2010-Oct-28 023.4W 02.4 0.9 07.9 7.0 17.9 2.4 07.8 06.6 192.4 206.2 053.3 12:44-02.4  
2010-Oct-29 024.3W 02.4 0.9 07.9 7.0 17.9 2.4 07.9 06.6 316.6 298.1 144.0 12:44-02.4  
2010-Oct-30 025.2W 02.5 0.9 07.9 7.1 17.9 2.5 07.9 06.6 080.9 030.1 234.7 12:45-02.5  
2010-Oct-31 026.1W 02.6 0.9 07.9 7.1 17.9 2.5 07.9 06.6 205.1 122.0 325.5 12:45-02.5

2010-Nov-01 026.9W 02.7 0.9 07.9 7.1 18.0 2.5 08.0 06.6 329.3 213.9 056.2 12:46-02.6  
2010-Nov-02 027.8W 02.8 0.9 07.9 7.1 18.0 2.5 08.0 06.6 093.6 305.9 146.9 12:46-02.6  
2010-Nov-03 028.7W 02.9 0.9 07.9 7.1 18.0 2.5 08.1 06.7 217.8 037.8 237.6 12:46-02.6  
2010-Nov-04 029.6W 02.9 0.9 07.9 7.1 18.0 2.5 08.1 06.7 342.0 129.7 328.4 12:47-02.7  
2010-Nov-05 030.5W 03.0 0.9 07.9 7.1 18.0 2.6 08.2 06.7 106.3 221.7 059.1 12:47-02.7  
2010-Nov-06 031.4W 03.1 0.9 07.9 7.1 18.0 2.6 08.2 06.7 230.5 313.6 149.8 12:48-02.8  
2010-Nov-07 032.3W 03.2 0.9 08.0 7.1 18.0 2.6 08.3 06.7 354.8 045.5 240.6 12:48-02.8  
2010-Nov-08 033.2W 03.2 0.9 08.0 7.1 18.1 2.6 08.3 06.7 119.0 137.5 331.3 12:49-02.9  
2010-Nov-09 034.0W 03.3 0.9 08.0 7.1 18.1 2.6 08.4 06.7 243.2 229.4 062.0 12:49-02.9  
2010-Nov-10 034.9W 03.4 0.9 08.0 7.1 18.1 2.6 08.4 06.8 007.5 321.4 152.8 12:49-02.9  
2010-Nov-11 035.8W 03.5 0.9 08.0 7.1 18.1 2.7 08.5 06.8 131.7 053.3 243.5 12:50-03.0

2010-Nov-12 036.7W 03.5 0.9 08.0 7.1 18.1 2.7 08.5 06.8 256.0 145.3 334.3 12:50-03.0  
2010-Nov-13 037.6W 03.6 0.9 08.0 7.1 18.1 2.7 08.6 06.8 020.2 237.2 065.0 12:51-03.0  
2010-Nov-14 038.5W 03.7 0.9 08.0 7.1 18.2 2.7 08.6 06.8 144.5 329.2 155.7 12:51-03.1  
2010-Nov-15 039.4W 03.8 0.9 08.0 7.1 18.2 2.7 08.6 06.8 268.7 061.1 246.5 12:51-03.1  
2010-Nov-16 040.3W 03.8 0.9 08.0 7.2 18.2 2.7 08.7 06.8 033.0 153.1 337.2 12:52-03.2  
2010-Nov-17 041.2W 03.9 0.9 08.0 7.2 18.2 2.8 08.7 06.9 157.3 245.0 068.0 12:52-03.2  
2010-Nov-18 042.1W 04.0 0.9 08.0 7.2 18.2 2.8 08.8 06.9 281.5 337.0 158.7 12:52-03.2  
2010-Nov-19 043.0W 04.0 0.9 08.0 7.2 18.3 2.8 08.8 06.9 045.8 068.9 249.5 12:53-03.3  
2010-Nov-20 044.0W 04.1 0.9 08.1 7.2 18.3 2.8 08.8 06.9 170.0 160.9 340.2 12:53-03.3  
2010-Nov-21 044.9W 04.2 0.9 08.1 7.2 18.3 2.8 08.9 06.9 294.3 252.9 071.0 12:54-03.3  
2010-Nov-22 045.8W 04.2 0.9 08.1 7.2 18.3 2.8 08.9 06.9 058.6 344.8 161.8 12:54-03.4  
2010-Nov-23 046.7W 04.3 0.9 08.1 7.2 18.3 2.9 09.0 06.9 182.8 076.8 252.5 12:54-03.4  
2010-Nov-24 047.6W 04.4 0.9 08.1 7.2 18.4 2.9 09.0 07.0 307.1 168.8 343.3 12:55-03.5  
2010-Nov-25 048.5W 04.4 0.9 08.1 7.2 18.4 2.9 09.0 07.0 071.4 260.7 074.0 12:55-03.5  
2010-Nov-26 049.4W 04.5 0.9 08.1 7.2 18.4 2.9 09.1 07.0 195.7 352.7 164.8 12:55-03.5  
2010-Nov-27 050.3W 04.5 0.9 08.1 7.2 18.4 2.9 09.1 07.0 319.9 084.7 255.6 12:56-03.6  
2010-Nov-28 051.3W 04.6 0.9 08.1 7.3 18.5 2.9 09.2 07.0 084.2 176.7 346.3 12:56-03.6  
2010-Nov-29 052.2W 04.7 0.9 08.1 7.3 18.5 3.0 09.2 07.0 208.5 268.6 077.1 12:56-03.6  
2010-Nov-30 053.1W 04.7 0.9 08.2 7.3 18.5 3.0 09.2 07.0 332.8 000.6 167.9 12:57-03.6

2010-Dec-01 054.0W 04.8 0.9 08.2 7.3 18.5 3.0 09.3 07.1 097.0 092.6 258.7 12:57-03.7  
2010-Dec-02 054.9W 04.8 0.9 08.2 7.3 18.5 3.0 09.3 07.1 221.3 184.6 349.4 12:57-03.7  
2010-Dec-03 055.9W 04.9 0.9 08.2 7.3 18.6 3.0 09.3 07.1 345.6 276.6 080.2 12:58-03.7  
2010-Dec-04 056.8W 04.9 0.9 08.2 7.3 18.6 3.0 09.4 07.1 109.9 008.5 171.0 12:58-03.8  
2010-Dec-05 057.7W 05.0 0.9 08.2 7.3 18.6 3.0 09.4 07.1 234.2 100.5 261.8 12:58-03.8  
2010-Dec-06 058.7W 05.0 0.9 08.2 7.3 18.7 3.1 09.4 07.1 358.5 192.5 352.6 12:59-03.8  
2010-Dec-07 059.6W 05.1 0.9 08.2 7.3 18.7 3.1 09.5 07.1 122.8 284.5 083.3 12:59-03.9  
2010-Dec-08 060.5W 05.1 0.9 08.2 7.4 18.7 3.1 09.5 07.2 247.1 016.5 174.1 12:59-03.9  
2010-Dec-09 061.5W 05.2 0.9 08.3 7.4 18.7 3.1 09.5 07.2 011.4 108.5 264.9 13:00-03.9  
2010-Dec-10 062.4W 05.2 0.9 08.3 7.4 18.8 3.1 09.6 07.2 135.7 200.5 355.7 13:00-03.9  
2010-Dec-11 063.3W 05.3 0.9 08.3 7.4 18.8 3.1 09.6 07.2 260.0 292.5 086.5 13:00-04.0  
2010-Dec-12 064.3W 05.3 0.9 08.3 7.4 18.8 3.1 09.6 07.2 024.3 024.5 177.3 13:01-04.0  
2010-Dec-13 065.2W 05.3 0.9 08.3 7.4 18.8 3.2 09.6 07.2 148.6 116.5 268.1 13:01-04.0  
2010-Dec-14 066.2W 05.4 0.9 08.3 7.4 18.9 3.2 09.7 07.2 272.9 208.5 358.9 13:01-04.0  
2010-Dec-15 067.1W 05.4 0.9 08.3 7.4 18.9 3.2 09.7 07.3 037.2 300.5 089.7 13:01-04.1  
2010-Dec-16 068.1W 05.5 0.8 08.3 7.4 18.9 3.2 09.7 07.3 161.5 032.5 180.5 13:02-04.1  
2010-Dec-17 069.0W 05.5 0.8 08.4 7.5 19.0 3.2 09.7 07.3 285.8 124.5 271.3 13:02-04.1  
2010-Dec-18 070.0W 05.5 0.8 08.4 7.5 19.0 3.2 09.8 07.3 050.1 216.5 002.1 13:02-04.1  
2010-Dec-19 070.9W 05.6 0.8 08.4 7.5 19.0 3.2 09.8 07.3 174.4 308.5 092.9 13:02-04.1  
2010-Dec-20 071.9W 05.6 0.8 08.4 7.5 19.0 3.2 09.8 07.3 298.8 040.5 183.7 13:03-04.2  
2010-Dec-21 072.8W 05.6 0.8 08.4 7.5 19.1 3.3 09.8 07.3 063.1 132.6 274.5 13:03-04.2  
2010-Dec-22 073.8W 05.6 0.8 08.4 7.5 19.1 3.3 09.9 07.4 187.4 224.6 005.3 13:03-04.2  
2010-Dec-23 074.7W 05.7 0.8 08.4 7.5 19.1 3.3 09.9 07.4 311.7 316.6 096.1 13:03-04.2  
2010-Dec-24 075.7W 05.7 0.8 08.5 7.5 19.2 3.3 09.9 07.4 076.0 048.6 186.9 13:04-04.2  
2010-Dec-25 076.7W 05.7 0.8 08.5 7.6 19.2 3.3 09.9 07.4 200.4 140.6 277.8 13:04-04.3  
2010-Dec-26 077.6W 05.7 0.8 08.5 7.6 19.2 3.3 09.9 07.4 324.7 232.7 008.6 13:04-04.3  
2010-Dec-27 078.6W 05.8 0.8 08.5 7.6 19.3 3.3 10.0 07.4 089.0 324.7 099.4 13:04-04.3  
2010-Dec-28 079.5W 05.8 0.8 08.5 7.6 19.3 3.3 10.0 07.4 213.3 056.7 190.2 13:04-04.3  
2010-Dec-29 080.5W 05.8 0.8 08.5 7.6 19.3 3.4 10.0 07.5 337.7 148.7 281.0 13:05-04.3  
2010-Dec-30 081.5W 05.8 0.8 08.5 7.6 19.4 3.4 10.0 07.5 102.0 240.8 011.9 13:05-04.3

### GLOSSARY OF TERMS IN HEADING

UT Date:	Universal Dates starting with January 1st and ending December 31st of each year.
Elong:	Geocentric elongation West (W) or East (E) of the Sun in degrees.
Ph:	The fraction of the area of the apparent disk that is illuminated by the Sun.
Vis Mag:	Geocentric apparent Visual Magnitude.
Semi-Diameter:	Apparent angular semi-diameter (seconds of arc) of the Equatorial (Eq) and Polar (Po) Globe and the Major (Maj) and Minor (Min) axis of the Rings of Saturn.
B:	Sub-Earth point (Planetocentric Declination of Earth) as seen from Earth with respect to Saturn in degrees.
B':	Sub-Solar point (Planetocentric Declination of Sun) as seen from Sun with respect to Saturn in degrees.
CM:	CMI, CMII, CMIII Planetographic longitude of the central meridians of Saturn(degrees). <i>(the Central Meridian (CM) is an imaginary line passing through the planetary poles of rotation and bisecting the planetary disk. This line is used to define what Saturnigraphic longitudes are present on the disk during an observing session)</i>
RA:	The Geocentric Right Ascension of the center of Saturn in hours and minutes (hh:mm).
Dec:	The Declination of the center of Saturn in degrees.

***Credits: Ephemerides generated using WIMP v6.2 courtesy of Jeffery D. Beish of Lake Placid, FL***



The tabulated values for the Central Meridian are listed for 0<sup>h</sup> UT in the Ephemeris  
 (Add the values below to the listed Central Meridian)

**Change in Longitude in Intervals of Mean Time for System I**

System I (NEBs, EZ, SEBn)

h	°	m	°	m	°
1	35.2	10	5.9	1	0.6
2	70.4	20	11.7	2	1.2
3	105.5	30	17.6	3	1.8
4	140.7	40	23.5	4	2.3
5	175.9	50	29.3	5	2.9
6	211.1	60	35.2	6	3.5
7	246.3			7	4.1
8	281.4			8	4.7
9	316.6			9	5.3
10	351.8			10	5.9

**Change in Longitude in Intervals of Mean Time for System II**

System II (Areas N or S of System I)

h	°	m	°	m	°
1	33.8	10	5.6	1	0.6
2	67.7	20	11.3	2	1.1
3	101.5	30	16.9	3	1.7
4	135.3	40	22.6	4	2.3
5	169.2	50	28.2	5	2.8
6	203.0	60	33.8	6	3.4
7	236.8			7	3.9
8	270.7			8	4.5
9	304.5			9	5.1
10	338.3			10	5.6

**Change in Longitude in Intervals of Mean Time for System III**

System III (Origin of Radio Emissions)

h	°	m	°	m	°
1	33.8	10	5.6	1	0.6
2	67.6	20	11.3	2	1.1
3	101.3	30	16.9	3	1.7
4	135.1	40	22.5	4	2.3
5	168.9	50	28.2	5	2.8
6	202.7	60	33.8	6	3.4
7	236.5			7	3.9
8	270.3			8	4.5
9	304.0			9	5.1
10	337.8			10	5.6