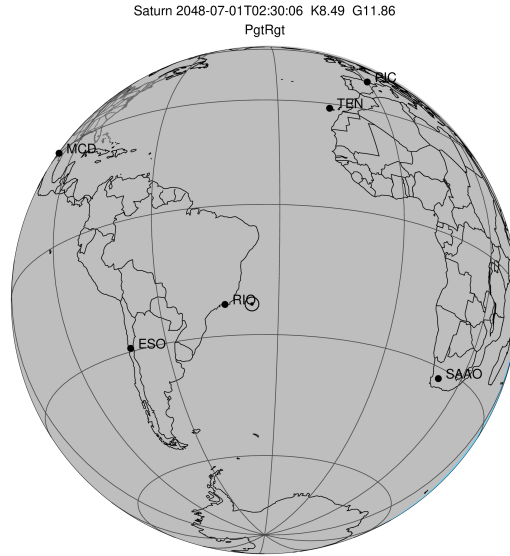


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-01T02:30:06.110
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4078734521786991872
 2Mass ID (if available) : 18525030-2219374

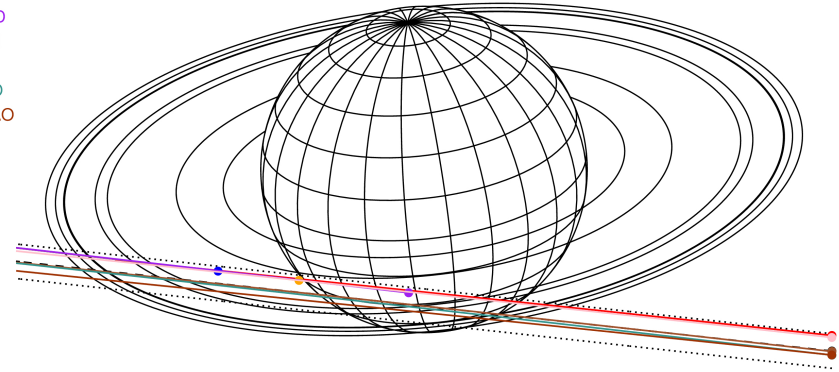
Saturn 2048-07-01T02:30:06 K8.49 G11.86 PgtRgt

ICRS Star Coord at Epoch: 18h 52m 50.28685s -22:19:37.73104s

RUWE (>1.4 is poor) : 0.91
 K magnitude : 8.489
 G magnitude : 11.856
 RP magnitude : 10.913
 BP magnitude : 12.782
 DUPflag : 0
 Distance (au) : 9.021
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.11
 Sun-Target sep (deg) : 177.02
 Sun-Moon sep (deg) : 64.41
 B (ring opening deg) : 25.19
 PA of pole (deg) : 6.38



Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 RIO
 ESO
 SAAO

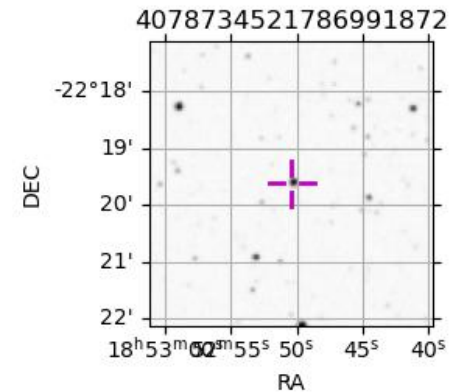


2048-07-01T02:30:06.1100 at: 18 52 50.28689 s: -22 19 37.731 C/A 7.667° PA 353.72 deg v_sky -20.11 km/s D 09.02 AU
 Credit: Styled after SORA/Lucky Star

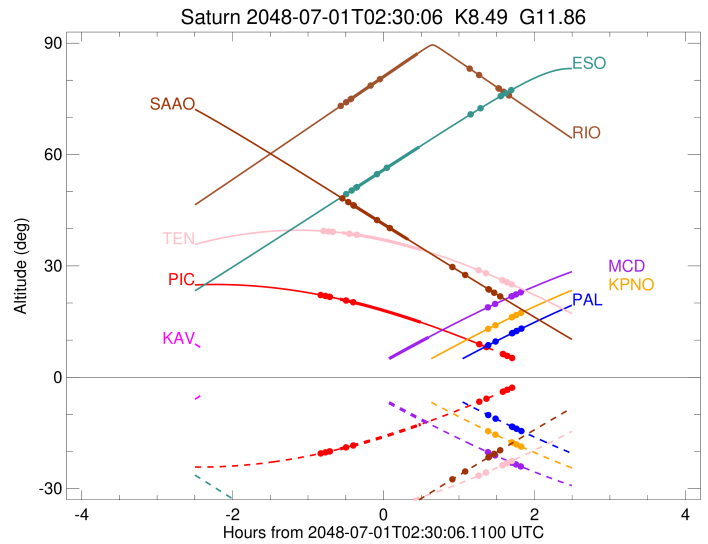
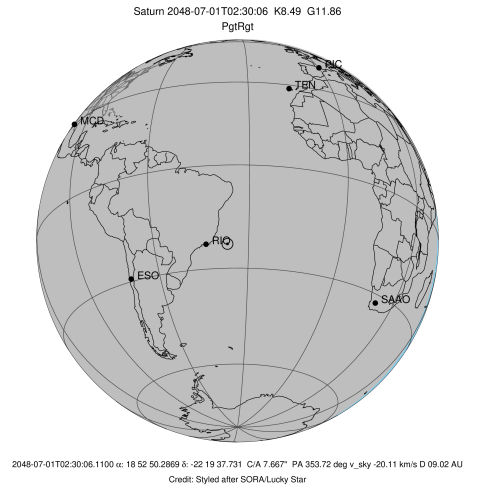
#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring

Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+	+	+	JUL 01 01:40 - JUL 01 03:52	PieRie
PAL	Palomar Mt (20	33.4	243.1				JUL 01 03:53 - JUL 01 04:19	PnnRne
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4				JUL 01 03:53 - JUL 01 04:19	PnnRne
MCD	McDonald Obs.	30.7	256.0		+		JUL 01 03:05 - JUL 01 04:19	PneRne
TEN	Teide Obs./Ten	28.3	343.5	+	+		JUL 01 01:42 - JUL 01 04:12	PieRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+	+		JUL 01 01:56 - JUL 01 04:09	PieRie
ESO	European South	-29.3	289.3	+	+		JUL 01 02:00 - JUL 01 04:11	PieRie
AAT	Siding Spring	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro	-32.4	20.8	+	+		JUL 01 01:57 - JUL 01 04:02	PieRie
MSO	Mt. Stromlo Ob	-35.3	149.0					PnnRnn



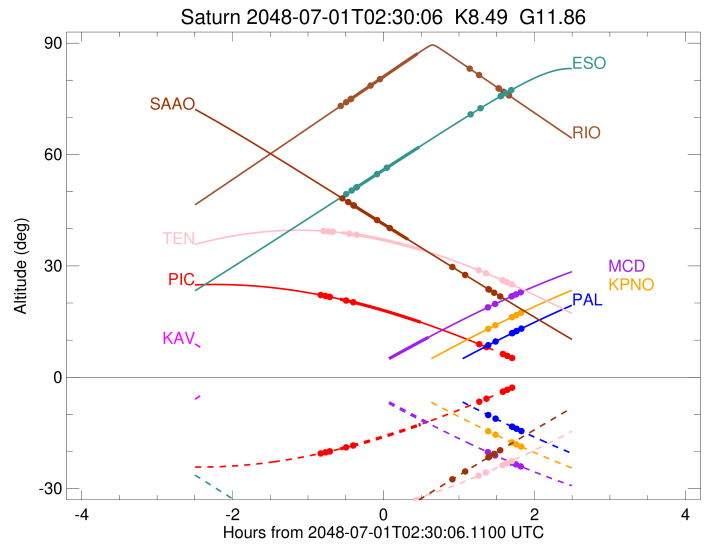
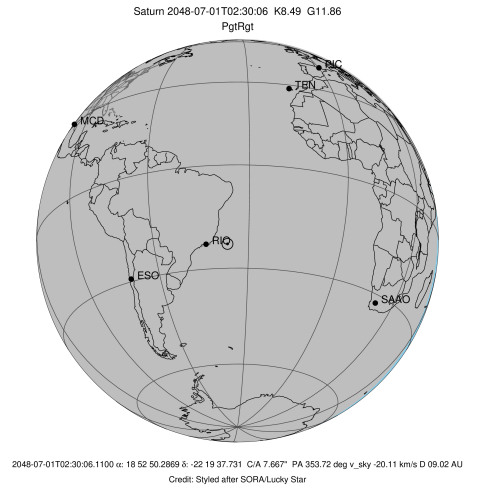
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-01T02:27:18.170
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 4078734521786991872
 2Mass ID (if available) : 18525030-2219374
 ICRS Star Coord at Epoch: 18h 52m 50.28685s -22:19:37.73104s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 8.489
 G magnitude : 11.856
 RP magnitude : 10.913
 BP magnitude : 12.782
 DUPflag : 0
 Distance (au) : 9.021
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.11
 Sun-Target sep (deg) : 177.02
 Sun-Moon sep (deg) : 64.45
 B (ring opening deg) : 25.19
 PA of pole (deg) : 6.38
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.878
 C/A sky separation (km) : 44999.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2048-07-01T01:40:11.047		22.15	-20.51	140461.00	-16.36		
A (OER)	I	2048-07-01T01:43:59.249		21.90	-20.23	136774.40	-15.95		
Encke (OEG)	I	2048-07-01T01:47:11.398		21.67	-19.98	133744.89	-15.58		
Encke (IEG)	I	2048-07-01T01:47:32.065		21.65	-19.95	133423.31	-15.54		
A (IER)	I	2048-07-01T02:00:26.047	b	20.67	-18.88	122050.38	-13.77		
B (OER)	I	2048-07-01T02:06:02.320	b	20.21	-18.38	117571.16	-12.85		
Saturn	I	2048-07-01T01:55:32.997		21.05	-19.30	59471.92		-52.71	-57.87
Saturn	E	2048-07-01T02:59:38.018		14.82	-12.69	59901.62		-32.47	-37.83
B (OER)	E	2048-07-01T03:46:23.809		8.89	-6.57	117571.16	12.80		
A (IER)	E	2048-07-01T03:52:01.489		8.11	-5.77	122050.38	13.71		
Encke (IEG)	E	2048-07-01T04:05:00.113		6.27	-3.89x	133423.31	15.43		
Encke (OEG)	E	2048-07-01T04:05:20.931		6.22	-3.84x	133744.89	15.47		
A (OER)	E	2048-07-01T04:08:34.540		5.75	-3.36x	136774.40	15.82		
F ring	E	2048-07-01T04:12:24.620		5.19	-2.79x	140461.00	16.22		

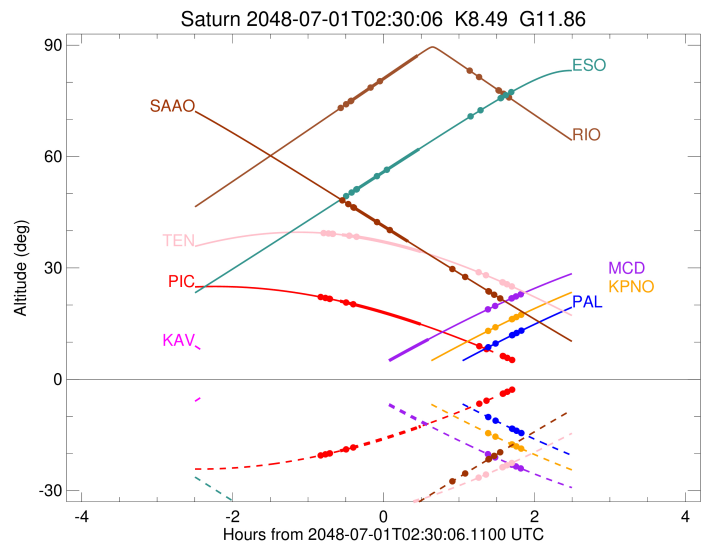
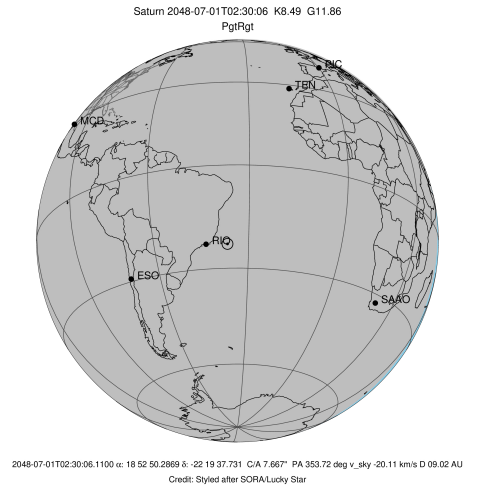
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-01T02:34:23.160
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4078734521786991872
 2Mass ID (if available) : 18525030-2219374
 ICRS Star Coord at Epoch: 18h 52m 50.28685s -22:19:37.73104s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 8.489
 G magnitude : 11.856
 RP magnitude : 10.913
 BP magnitude : 12.782
 DUPflag : 0
 Distance (au) : 9.021
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.11
 Sun-Target sep (deg) : 177.02
 Sun-Moon sep (deg) : 64.60
 B (ring opening deg) : 25.19
 PA of pole (deg) : 6.38
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.044
 C/A sky separation (km) : 46085.2
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2048-07-01T01:49:59.720		-14.73x	12.64x	140461.00	-16.03		
A (OER)	I	2048-07-01T01:53:52.705		-13.95x	11.88x	136774.40	-15.61		
Encke (OEG)	I	2048-07-01T01:57:09.067		-13.30x	11.23x	133744.89	-15.24		
Encke (IEG)	I	2048-07-01T01:57:30.199		-13.23x	11.16x	133423.31	-15.20		
A (IER)	I	2048-07-01T02:10:43.918	b	-10.60x	8.58x	122050.38	-13.38		
B (OER)	I	2048-07-01T02:16:30.886	b	-9.46x	7.46x	117571.16	-12.42		
Saturn	I	2048-07-01T02:03:21.229		-12.06x	10.02x	59438.26		-54.34	-59.38
Saturn	E	2048-07-01T03:05:54.997		0.03x	-1.83x	59885.52		-33.27	-38.68
B (OER)	E	2048-07-01T03:53:32.393		8.65	-10.20	117571.16	12.54		
A (IER)	E	2048-07-01T03:59:15.923		9.64	-11.16	122050.38	13.52		
Encke (IEG)	E	2048-07-01T04:12:21.146		11.87	-13.31	133423.31	15.37		
Encke (OEG)	E	2048-07-01T04:12:42.041		11.93	-13.36	133744.89	15.41		
A (OER)	E	2048-07-01T04:15:56.169		12.47	-13.88	136774.40	15.80		
F ring	E	2048-07-01T04:19:46.435		13.10	-14.50	140461.00	16.22		

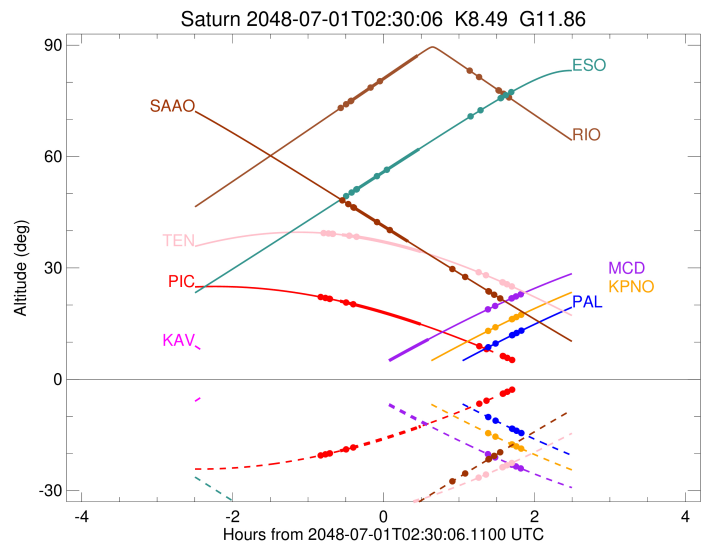
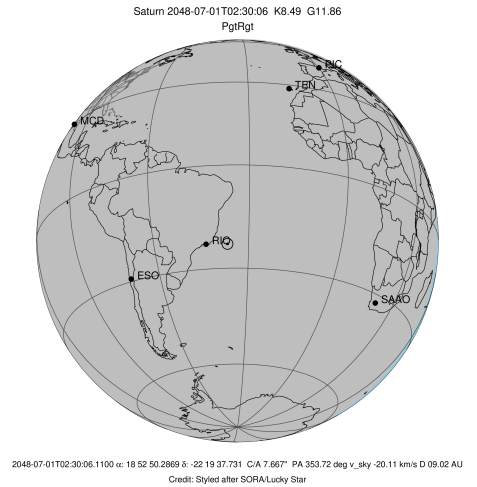
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-01T02:34:21.940
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 4078734521786991872
 2Mass ID (if available) : 18525030-2219374
 ICRS Star Coord at Epoch: 18h 52m 50.28685s -22:19:37.73104s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 8.489
 G magnitude : 11.856
 RP magnitude : 10.913
 BP magnitude : 12.782
 DUPflag : 0
 Distance (au) : 9.021
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.11
 Sun-Target sep (deg) : 177.02
 Sun-Moon sep (deg) : 64.67
 B (ring opening deg) : 25.19
 PA of pole (deg) : 6.38
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.033
 C/A sky separation (km) : 46016.9
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

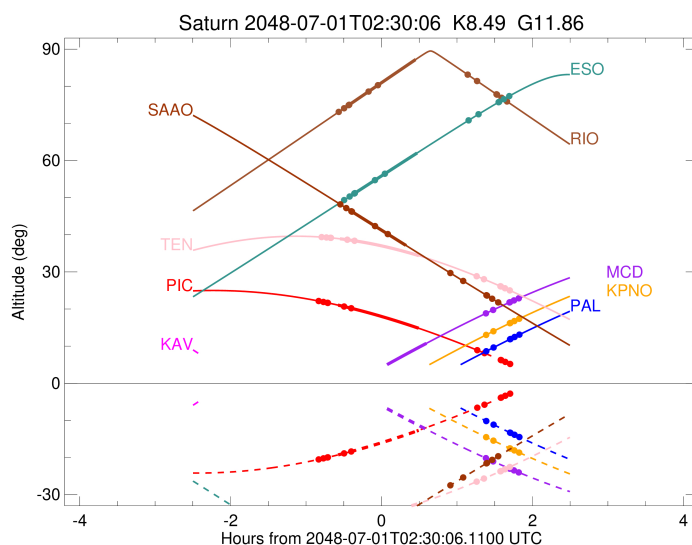
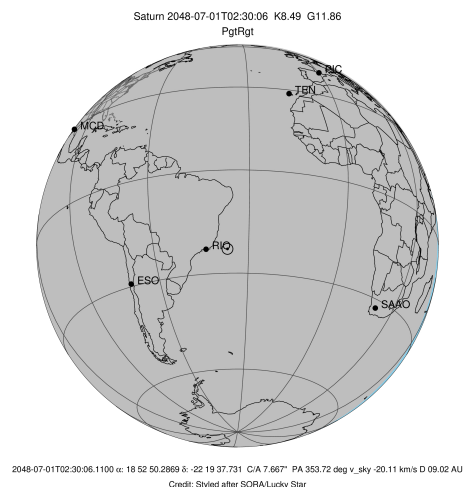
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2048-07-01T01:49:53.661		-10.10x	8.02x	140461.00	-16.08		
A (OER)	I	2048-07-01T01:53:45.912		-9.32x	7.26x	136774.40	-15.66		
Encke (OEG)	I	2048-07-01T01:57:01.630		-8.67x	6.62x	133744.89	-15.29		
Encke (IEG)	I	2048-07-01T01:57:22.692		-8.60x	6.55x	133423.31	-15.25		
A (IER)	I	2048-07-01T02:10:33.488	b	-5.99x	3.99x	122050.38	-13.43		
B (OER)	I	2048-07-01T02:16:18.945	b	-4.86x	2.88x	117571.16	-12.48		
Saturn	I	2048-07-01T02:03:19.178		-7.42x	5.39x	59439.90		-54.26	-59.31
Saturn	E	2048-07-01T03:05:54.493		4.59x	-6.35	59887.05		-33.19	-38.60
B (OER)	E	2048-07-01T03:53:27.115		13.06	-14.54	117571.16	12.60		
A (IER)	E	2048-07-01T03:59:09.291		14.02	-15.47	122050.38	13.57		
Encke (IEG)	E	2048-07-01T04:12:12.012		16.18	-17.54	133423.31	15.41		
Encke (OEG)	E	2048-07-01T04:12:32.848		16.24	-17.60	133744.89	15.45		
A (OER)	E	2048-07-01T04:15:46.451		16.76	-18.10	136774.40	15.84		
F ring	E	2048-07-01T04:19:36.129		17.38	-18.68	140461.00	16.26		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-01T02:34:13.230
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 4078734521786991872
 2Mass ID (if available) : 18525030-2219374
 ICRS Star Coord at Epoch: 18h 52m 50.28685s -22:19:37.73104s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 8.489
 G magnitude : 11.856
 RP magnitude : 10.913
 BP magnitude : 12.782
 DUPflag : 0
 Distance (au) : 9.021
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.11
 Sun-Target sep (deg) : 177.02
 Sun-Moon sep (deg) : 64.76
 B (ring opening deg) : 25.19
 PA of pole (deg) : 6.38
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.012
 C/A sky separation (km) : 45878.0
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



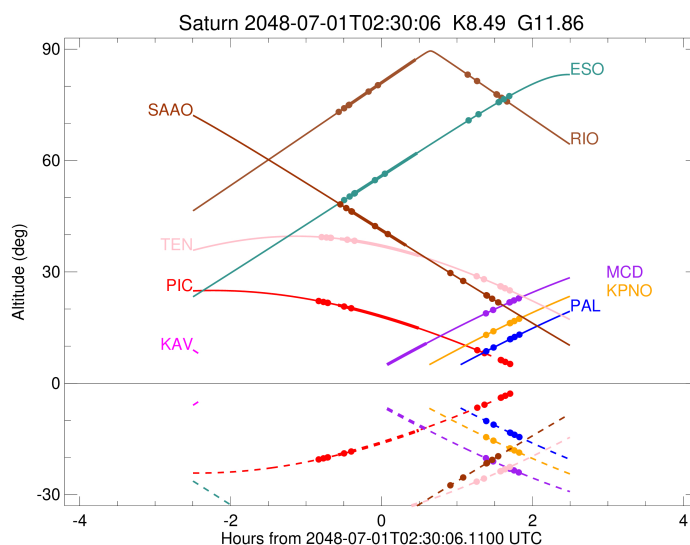
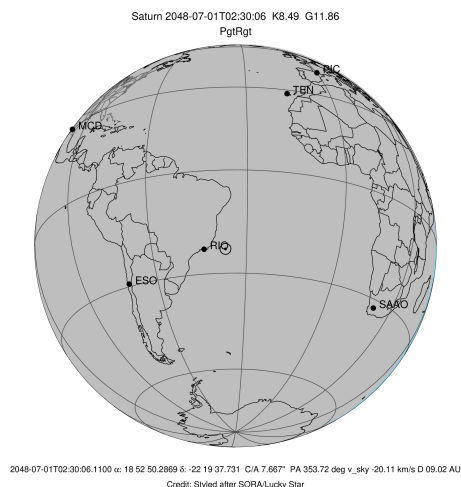
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2048-07-01T01:49:31.844	-3.67x	1.64x	140461.00	-16.16			
A (OER)	I	2048-07-01T01:53:22.909	-2.91x	0.90x	136774.40	-15.75			
Encke (OEG)	I	2048-07-01T01:56:37.580	-2.28x	0.28x	133744.89	-15.37			
Encke (IEG)	I	2048-07-01T01:56:58.525	-2.21x	0.21x	133423.31	-15.33			
A (IER)	I	2048-07-01T02:10:04.442	b	0.35x	-2.29x	122050.38	-13.53		
B (OER)	I	2048-07-01T02:15:47.307	b	1.45x	-3.37x	117571.16	-12.58		
Saturn	I	2048-07-01T02:03:06.720	-1.01x	-0.97x	59443.25			-54.10	-59.16
Saturn	E	2048-07-01T03:05:49.422	10.76	-12.42	59890.16			-33.04	-38.44
B (OER)	E	2048-07-01T03:53:16.174	18.86	-20.19	117571.16	12.69			
A (IER)	E	2048-07-01T03:58:56.038	19.76	-21.06	122050.38	13.65			
Encke (IEG)	E	2048-07-01T04:11:54.636	21.78	-22.97	133423.31	15.48			
Encke (OEG)	E	2048-07-01T04:12:15.379	21.83	-23.02	133744.89	15.52			
A (OER)	E	2048-07-01T04:15:28.145	22.32	-23.48	136774.40	15.90			
F ring	E	2048-07-01T04:19:16.900	22.89	-24.02	140461.00	16.32			

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-01T02:28:10.180
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 4078734521786991872
 2Mass ID (if available) : 18525030-2219374
 ICRS Star Coord at Epoch: 18h 52m 50.28685s -22:19:37.73104s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 8.489
 G magnitude : 11.856
 RP magnitude : 10.913
 BP magnitude : 12.782
 DUPflag : 0
 Distance (au) : 9.021
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.11
 Sun-Target sep (deg) : 177.02
 Sun-Moon sep (deg) : 64.77
 B (ring opening deg) : 25.19
 PA of pole (deg) : 6.38
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.962
 C/A sky separation (km) : 45552.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2048-07-01T01:42:33.153		39.37	-38.21	140461.00	-16.28		
A (OER)	I	2048-07-01T01:46:22.535		39.28	-38.06	136774.40	-15.86		
Encke (OEG)	I	2048-07-01T01:49:35.894		39.18	-37.92	133744.89	-15.47		
Encke (IEG)	I	2048-07-01T01:49:56.704		39.17	-37.91	133423.31	-15.43		
A (IER)	I	2048-07-01T02:02:58.468	b	38.66	-37.23	122050.38	-13.58		
B (OER)	I	2048-07-01T02:08:40.165	b	38.38	-36.88	117571.16	-12.62		
Saturn	I	2048-07-01T01:57:07.634		38.92	-37.56	59458.98		-53.33	-58.45
Saturn	E	2048-07-01T02:59:46.759		34.38	-32.36	59887.94		-33.15	-38.56
B (OER)	E	2048-07-01T03:45:54.549		28.82	-26.48	117571.16	12.58		
A (IER)	E	2048-07-01T03:51:37.485		28.02	-25.66	122050.38	13.53		
Encke (IEG)	E	2048-07-01T04:04:43.446		26.13	-23.70	133423.31	15.33		
Encke (OEG)	E	2048-07-01T04:05:04.394		26.07	-23.65	133744.89	15.37		
A (OER)	E	2048-07-01T04:08:19.093		25.59	-23.15	136774.40	15.74		
F ring	E	2048-07-01T04:12:10.207		25.00	-22.55	140461.00	16.15		

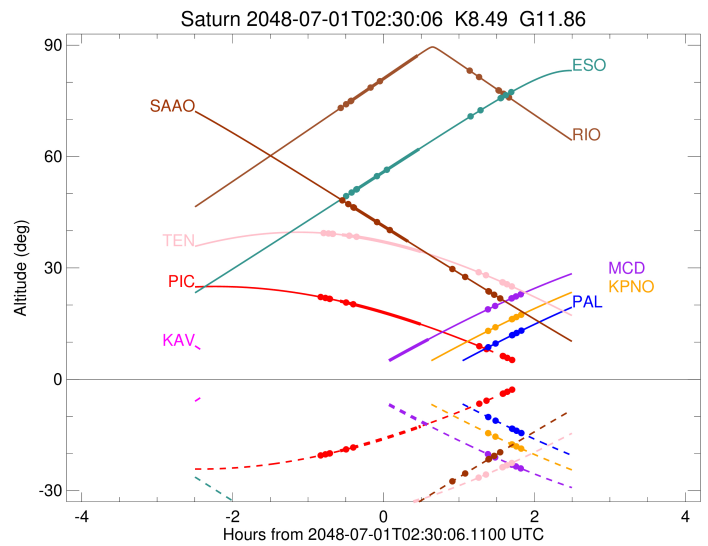
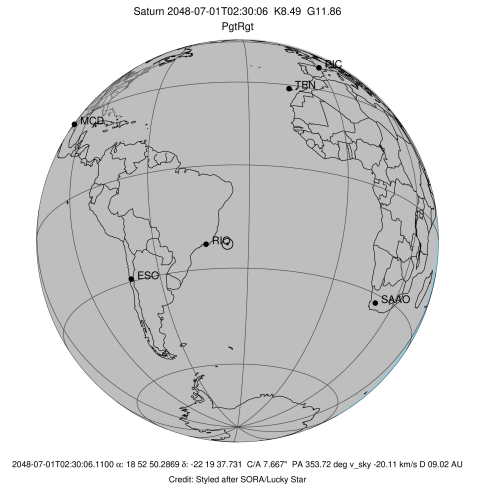
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-01T02:30:52.350
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 4078734521786991872
 2Mass ID (if available) : 18525030-2219374
 ICRS Star Coord at Epoch: 18h 52m 50.28685s -22:19:37.73104s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 8.489
 G magnitude : 11.856
 RP magnitude : 10.913
 BP magnitude : 12.782
 DUPflag : 0
 Distance (au) : 9.021
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.11
 Sun-Target sep (deg) : 177.02
 Sun-Moon sep (deg) : 65.33
 B (ring opening deg) : 25.19
 PA of pole (deg) : 6.38
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.663
 C/A sky separation (km) : 50136.5
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2048-07-01T01:56:08.964		73.11	-76.04	140461.00	-14.69		
A (OER)	I	2048-07-01T02:00:24.772		74.09	-77.02	136774.40	-14.12		
Encke (OEG)	I	2048-07-01T02:04:03.262		74.93	-77.86	133744.89	-13.60		
Encke (IEG)	I	2048-07-01T02:04:26.955		75.03	-77.95	133423.31	-13.54		
A (IER)	I	2048-07-01T02:19:52.974	b	78.59	-81.50	122050.38	-10.90		
B (OER)	I	2048-07-01T02:27:13.593	b	80.29	-83.19	117571.16	-9.40		
Saturn	I	2048-07-01T02:05:05.821		75.18	-78.10	59358.24		-58.39	-63.07
Saturn	E	2048-07-01T02:57:14.449		87.21	-89.68	59758.22		-39.37	-44.98
B (OER)	E	2048-07-01T03:38:50.692		83.09	-80.31	117571.16	9.40		
A (IER)	E	2048-07-01T03:46:11.284		81.39	-78.62	122050.38	10.90		
Encke (IEG)	E	2048-07-01T04:01:37.835		77.82	-75.07	133423.31	13.53		
Encke (OEG)	E	2048-07-01T04:02:01.558		77.73	-74.98	133744.89	13.58		
A (OER)	E	2048-07-01T04:05:40.376		76.89	-74.15	136774.40	14.10		
F ring	E	2048-07-01T04:09:56.677		75.90	-73.16	140461.00	14.66		

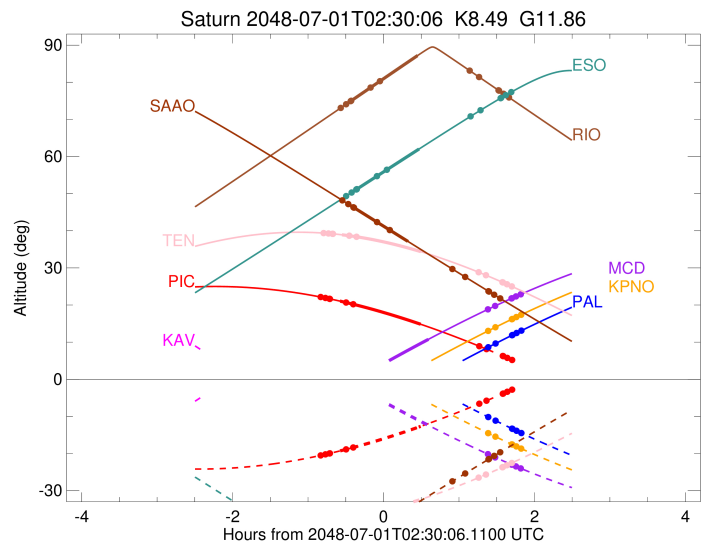
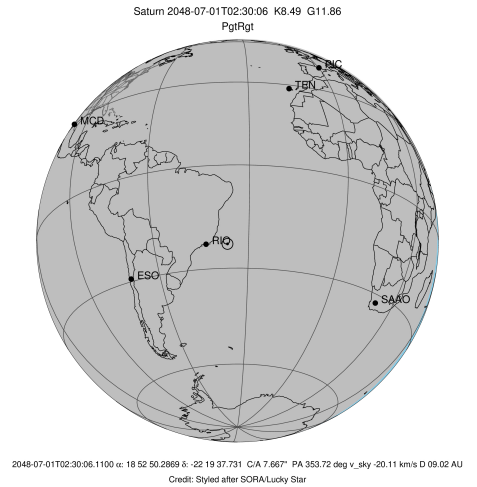
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-01T02:33:03.300
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4078734521786991872
 2Mass ID (if available) : 18525030-2219374
 ICRS Star Coord at Epoch: 18h 52m 50.28685s -22:19:37.73104s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 8.489
 G magnitude : 11.856
 RP magnitude : 10.913
 BP magnitude : 12.782
 DUPflag : 0
 Distance (au) : 9.021
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.11
 Sun-Target sep (deg) : 177.02
 Sun-Moon sep (deg) : 65.35
 B (ring opening deg) : 25.19
 PA of pole (deg) : 6.38
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.787
 C/A sky separation (km) : 50949.7
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2048-07-01T02:00:26.306		49.36	-52.35	140461.00	-14.38		
A (OER)	I	2048-07-01T02:04:48.048		50.31	-53.30	136774.40	-13.79		
Encke (OEG)	I	2048-07-01T02:08:32.179	b	51.13	-54.12	133744.89	-13.24		
Encke (IEG)	I	2048-07-01T02:08:56.520	b	51.22	-54.21	133423.31	-13.18		
A (IER)	I	2048-07-01T02:24:56.349	b	54.73	-57.70	122050.38	-10.39		
B (OER)	I	2048-07-01T02:32:43.166	b	56.43	-59.40	117571.16	-8.76		
Saturn	I	2048-07-01T02:08:15.683		51.07	-54.06	59339.62		-59.38	-63.95
Saturn	E	2048-07-01T02:58:26.403		62.04	-64.99	59735.26		-40.44	-46.06
B (OER)	E	2048-07-01T03:39:35.935		70.87	-73.76	117571.16	8.79		
A (IER)	E	2048-07-01T03:47:21.306		72.49	-75.36	122050.38	10.43		
Encke (IEG)	E	2048-07-01T04:03:17.644		75.73	-78.52	133423.31	13.23		
Encke (OEG)	E	2048-07-01T04:03:41.896		75.81	-78.59	133744.89	13.29		
A (OER)	E	2048-07-01T04:07:25.207		76.54	-79.29	136774.40	13.84		
F ring	E	2048-07-01T04:11:46.011		77.38	-80.08	140461.00	14.43		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-01T02:26:24.670
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : SAAO
 Location : So. Afr. Astro. Obs. (Sutherland)
 Latitude (deg) : -32.37953
 E. Longitude (deg) : 20.81070
 Altitude (km) : 1.768
 Gaia source ID : 4078734521786991872
 2Mass ID (if available) : 18525030-2219374
 ICRS Star Coord at Epoch: 18h 52m 50.28685s -22:19:37.73104s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 8.489
 G magnitude : 11.856
 RP magnitude : 10.913
 BP magnitude : 12.782
 DUPflag : 0
 Distance (au) : 9.021
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.11
 Sun-Target sep (deg) : 177.02
 Sun-Moon sep (deg) : 64.73
 B (ring opening deg) : 25.19
 PA of pole (deg) : 6.38
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 8.035
 C/A sky separation (km) : 52569.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2048-07-01T01:57:23.624		48.19	-45.86	140461.00	-13.34		
A (OER)	I	2048-07-01T02:02:07.123		47.18	-44.86	136774.40	-12.66		
Encke (OEG)	I	2048-07-01T02:06:12.516	b	46.32	-43.99	133744.89	-12.03		
Encke (IEG)	I	2048-07-01T02:06:39.337	b	46.22	-43.90	133423.31	-11.95		
A (IER)	I	2048-07-01T02:24:59.789	b	42.33	-40.03	122050.38	-8.57		
B (OER)	I	2048-07-01T02:34:57.880	b	40.22	-37.93	117571.16	-6.37		
Saturn	I	2048-07-01T02:03:55.105		46.80	-44.48	59313.86		-60.77	-65.19
Saturn	E	2048-07-01T02:49:33.657		37.13	-34.86	59668.20		-43.54	-49.13
B (OER)	E	2048-07-01T03:25:11.650		29.63	-27.42	117571.16	6.35		
A (IER)	E	2048-07-01T03:35:11.952		27.53	-25.35	122050.38	8.53		
Encke (IEG)	E	2048-07-01T03:53:38.451		23.70	-21.55	133423.31	11.87		
Encke (OEG)	E	2048-07-01T03:54:05.462		23.60	-21.46	133744.89	11.94		
A (OER)	E	2048-07-01T03:58:12.710		22.75	-20.62	136774.40	12.56		
F ring	E	2048-07-01T04:02:58.612		21.76	-19.64	140461.00	13.22		