

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-01T07:06:34.270
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4090521561319462912
 2Mass ID (if available) : 18163273-2218070

Saturn 2047-04-01T07:06:34 K7.30 G13.36 PgtRgt

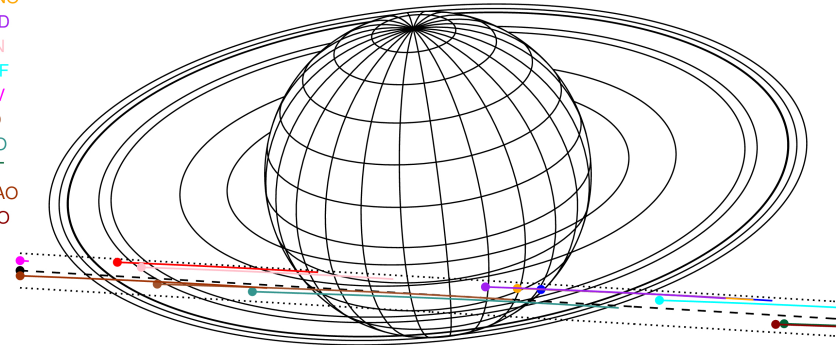
ICRS Star Coord at Epoch: 18h 16m 32.73047s -22:18:07.34205s

RUWE (>1.4 is poor) : 0.97
 K magnitude : 7.301
 G magnitude : 13.359
 RP magnitude : 11.895
 BP magnitude : 16.281
 DUPflag : 0
 Distance (au) : 9.874
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 5.94
 Sun-Target sep (deg) : 97.00
 Sun-Moon sep (deg) : 160.00
 B (ring opening deg) : 26.06
 PA of pole (deg) : 5.82
 # a(km) ring



2047-04-01T07:06:34.2700 α: 18 16 32.7305 δ: -22 18 07.342 C/A 6.177° PA 356.62 deg v_sky + 5.94 km/s D 09.87 AU
 Credit: Styled after SORA/Lucky Star

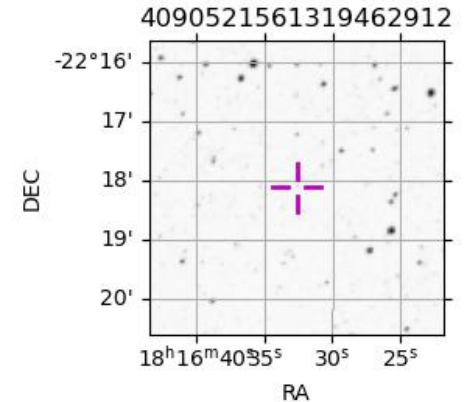
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 IRTF
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



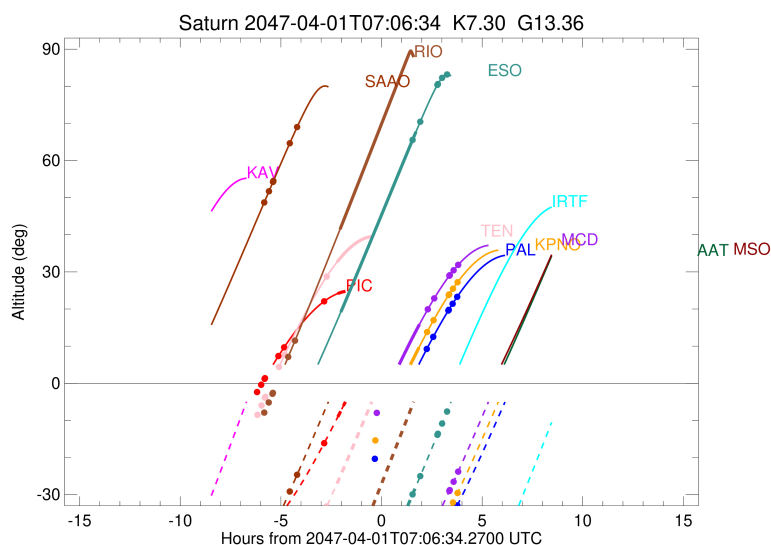
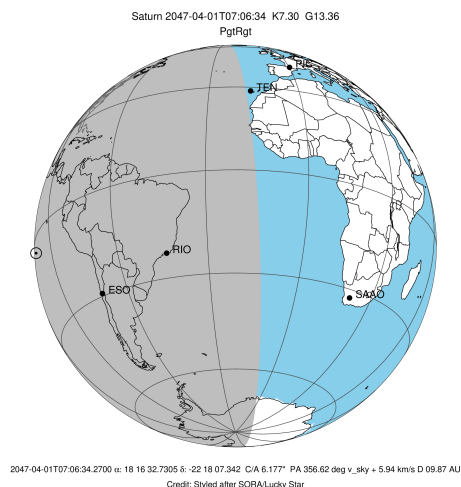
- 1 74490.6 C (IER)
- 2 91984.7 B (IER)
- 3 117571.2 B (OER)
- 4 122050.4 A (IER)
- 5 133423.3 Encke (IEG)
- 6 133744.9 Encke (OEG)
- 7 136774.4 A (OER)
- 8 140461.0 F ring

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	+++	+		APR 01 01:59 - APR 01 04:56	PinRin
PAL	Palomar Mt (20	33.4	243.1		+	+++++	APR 01 08:58 - APR 01 10:52	PneRne
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4		+	+++++	APR 01 08:58 - APR 01 10:53	PneRne
MCD	McDonald Obs.	30.7	256.0		+	+++++	APR 01 08:59 - APR 01 10:55	PneRne
TEN	Teide Obs./Ten	28.3	343.5	++	+		APR 01 02:17 - APR 01 04:53	PinRin
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	++	+		APR 01 02:28 - APR 01 05:02	PinRin
ESO	European South	-29.3	289.3		++	+++++	APR 01 05:05 - APR 01 10:22	PieRne
AAT	Siding Spring	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro	-32.4	20.8	+++++			APR 01 01:16 - APR 01 02:54	PnnRin
MSO	Mt. Stromlo Ob	-35.3	149.0					PnnRnn



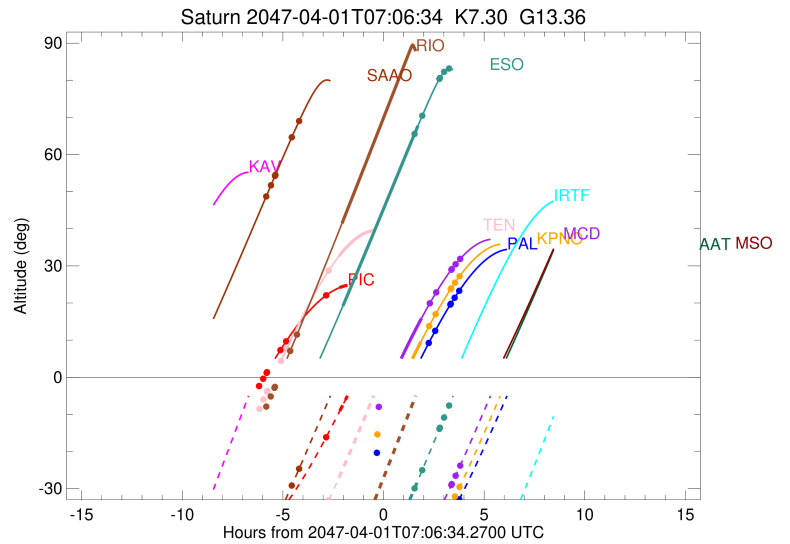
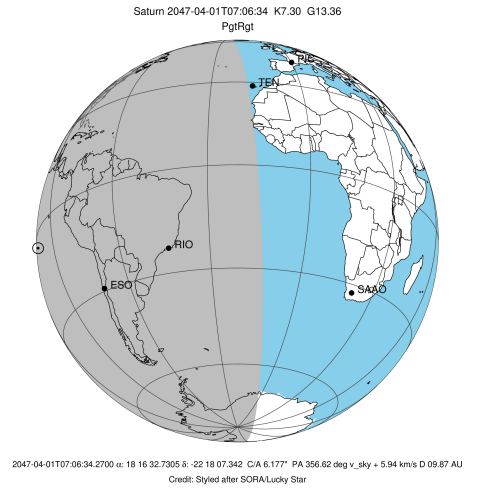
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-01T07:11:17.590
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 4090521561319462912
 2Mass ID (if available) : 18163273-2218070
 ICRS Star Coord at Epoch: 18h 16m 32.73047s -22:18:07.34205s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 7.301
 G magnitude : 13.359
 RP magnitude : 11.895
 BP magnitude : 16.281
 DUPflag : 0
 Distance (au) : 9.874
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 5.94
 Sun-Target sep (deg) : 97.00
 Sun-Moon sep (deg) : 160.51
 B (ring opening deg) : 26.06
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.408
 C/A sky separation (km) : 38728.5
 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

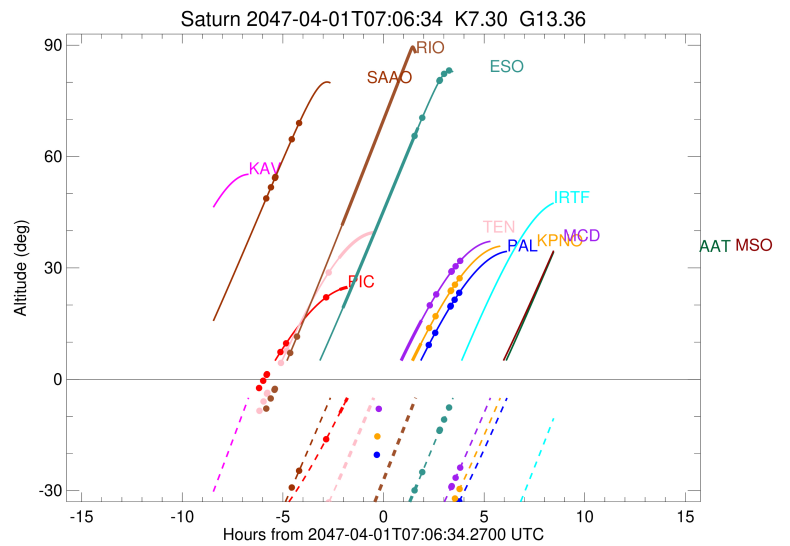
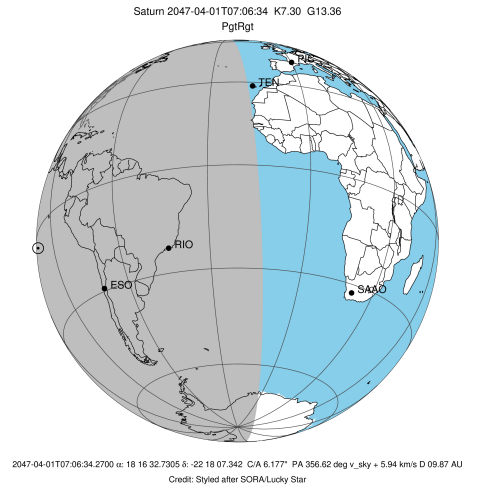
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-04-01T00:55:27.137		-2.38x	-41.36	140461.00	-5.07		
A (OER)	I	2047-04-01T01:07:40.487		-0.43x	-40.61	136774.40	-4.98		
Encke (OEG)	I	2047-04-01T01:17:53.383		1.18x	-39.87	133744.89	-4.90		
Encke (IEG)	I	2047-04-01T01:18:59.025		1.35x	-39.79	133423.31	-4.89		
A (IER)	I	2047-04-01T01:59:06.433		7.31	-36.01	122050.38	-4.54		
B (OER)	I	2047-04-01T02:15:51.278		9.63	-34.07	117571.16	-4.37		
B (IER)	I	2047-04-01T04:15:21.649		22.05	-16.20	91984.69	-2.57		
Saturn	I	2047-04-01T04:56:23.271		24.17	-9.05	59977.55		-27.31	-32.27
Saturn	E	2047-04-01T09:24:11.101		7.02	38.09x	59607.49		-44.04	-49.62
B (IER)	E	2047-04-01T07:47:32.173	b	18.67	22.06x	91984.69	2.56		
B (OER)	E	2047-04-01T09:47:21.274		3.63x	41.41x	117571.16	4.36		
A (IER)	E	2047-04-01T10:04:08.950		1.06x	43.61x	122050.38	4.53		
Encke (IEG)	E	2047-04-01T10:44:26.399		-5.44x	48.04x	133423.31	4.87		
Encke (OEG)	E	2047-04-01T10:45:32.399		-5.62x	48.14x	133744.89	4.88		
A (OER)	E	2047-04-01T10:55:48.896		-7.34x	49.03x	136774.40	4.95		
F ring	E	2047-04-01T11:08:07.214		-9.43x	49.95x	140461.00	5.03		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-01T06:55:11.120
 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 : 4090521561319462912
 2Mass ID (if available) : 18163273-2218070
 ICRS Star Coord at Epoch: 18h 16m 32.73047s -22:18:07.34205s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 7.301
 G magnitude : 13.359
 RP magnitude : 11.895
 BP magnitude : 16.281
 DUPflag : 0
 Distance (au) : 9.875
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 5.94
 Sun-Target sep (deg) : 97.00
 Sun-Moon sep (deg) : 159.31
 B (ring opening deg) : 26.06
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.722
 C/A sky separation (km) : 40982.3
 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	2047-04-01T01:18:43.150	-78.85x	9.26x	140461.00	-5.09			
A (OER)	I	2047-04-01T01:30:54.050	-79.10x	6.71x	136774.40	-4.99			
Encke (OEG)	I	2047-04-01T01:41:06.606	-78.79x	4.58x	133744.89	-4.90			
Encke (IEG)	I	2047-04-01T01:42:12.321	-78.74x	4.35x	133423.31	-4.89			
A (IER)	I	2047-04-01T02:22:42.987	-73.93x	-4.09x	122050.38	-4.45			
B (OER)	I	2047-04-01T02:39:54.542	-70.97x	-7.63	117571.16	-4.23			
B (IER)	I	2047-04-01T05:05:29.960	b	-41.35x	-35.61	91984.69	-1.32		
Saturn	I	2047-04-01T04:55:50.571	-43.38x	-33.95	59895.75			-31.33	-36.62
Saturn	E	2047-04-01T08:58:01.951	5.08	-49.07	59597.19			-44.48	-50.05
B (IER)	E	2047-04-01T06:46:06.399	b	-20.48x	-49.25	91984.69	1.28		
B (OER)	E	2047-04-01T09:21:40.416		9.26	-46.59	117571.16	3.84		
A (IER)	E	2047-04-01T09:40:39.456		12.48	-44.21	122050.38	4.02		
Encke (IEG)	E	2047-04-01T10:25:48.302		19.58	-37.43	133423.31	4.36		
Encke (OEG)	E	2047-04-01T10:27:01.977		19.76	-37.23	133744.89	4.37		
A (OER)	E	2047-04-01T10:38:29.734		21.40	-35.30	136774.40	4.44		
F ring	E	2047-04-01T10:52:12.583		23.28	-32.92	140461.00	4.52		

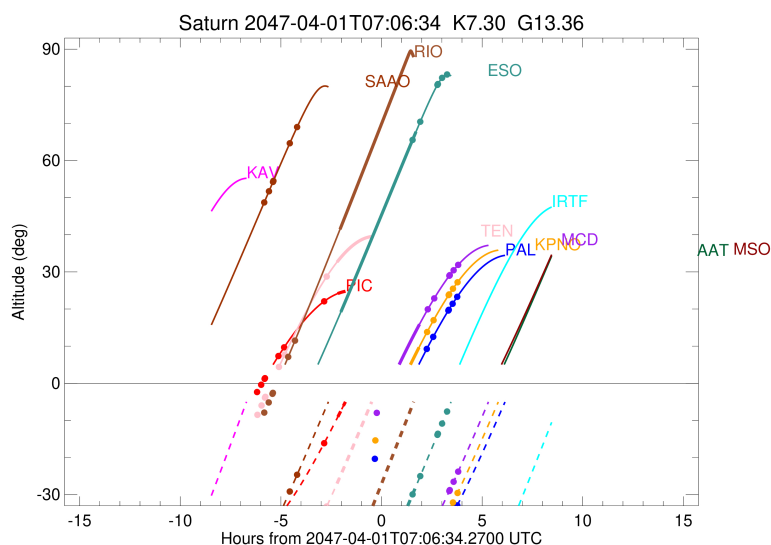
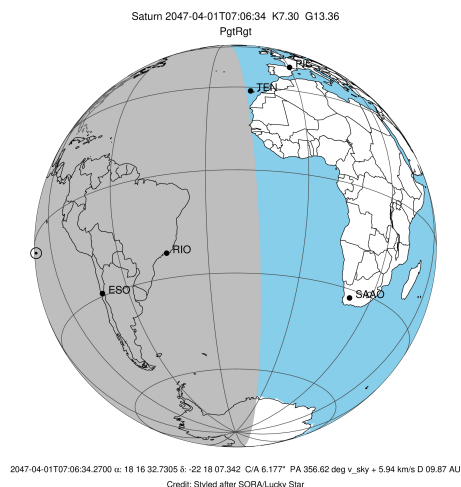
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-01T06:54:52.000
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 4090521561319462912
 2Mass ID (if available) : 18163273-2218070
 ICRS Star Coord at Epoch: 18h 16m 32.73047s -22:18:07.34205s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 7.301
 G magnitude : 13.359
 RP magnitude : 11.895
 BP magnitude : 16.281
 DUPflag : 0
 Distance (au) : 9.875
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 5.94
 Sun-Target sep (deg) : 97.00
 Sun-Moon sep (deg) : 159.32
 B (ring opening deg) : 26.06
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.713
 C/A sky separation (km) : 40914.2
 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	2047-04-01T01:17:48.625		-80.26x	4.99x	140461.00	-5.10		
A (OER)	I	2047-04-01T01:29:58.674		-79.34x	2.41x	136774.40	-5.00		
Encke (OEG)	I	2047-04-01T01:40:10.583		-78.14x	0.25x	133744.89	-4.90		
Encke (IEG)	I	2047-04-01T01:41:16.231		-77.99x	0.02x	133423.31	-4.89		
A (IER)	I	2047-04-01T02:21:44.776		-71.09x	-8.49	122050.38	-4.45		
B (OER)	I	2047-04-01T02:38:55.520		-67.71x	-12.06	117571.16	-4.23		
B (IER)	I	2047-04-01T05:03:45.012	b	-37.21x	-39.69	91984.69	-1.35		
Saturn	I	2047-04-01T04:54:48.869		-39.10x	-38.20	59896.45		-31.30	-36.59
Saturn	E	2047-04-01T08:58:35.572		9.67	-47.99	59598.60		-44.42	-49.99
B (IER)	E	2047-04-01T06:47:38.344	b	-15.52x	-52.28	91984.69	1.31		
B (OER)	E	2047-04-01T09:22:38.644		13.83	-44.85	117571.16	3.84		
A (IER)	E	2047-04-01T09:41:38.774		16.96	-42.03	122050.38	4.02		
Encke (IEG)	E	2047-04-01T10:26:49.815		23.75	-34.44	133423.31	4.36		
Encke (OEG)	E	2047-04-01T10:28:03.534		23.92	-34.22	133744.89	4.37		
A (OER)	E	2047-04-01T10:39:31.646		25.46	-32.14	136774.40	4.44		
F ring	E	2047-04-01T10:53:14.777		27.20	-29.58	140461.00	4.52		

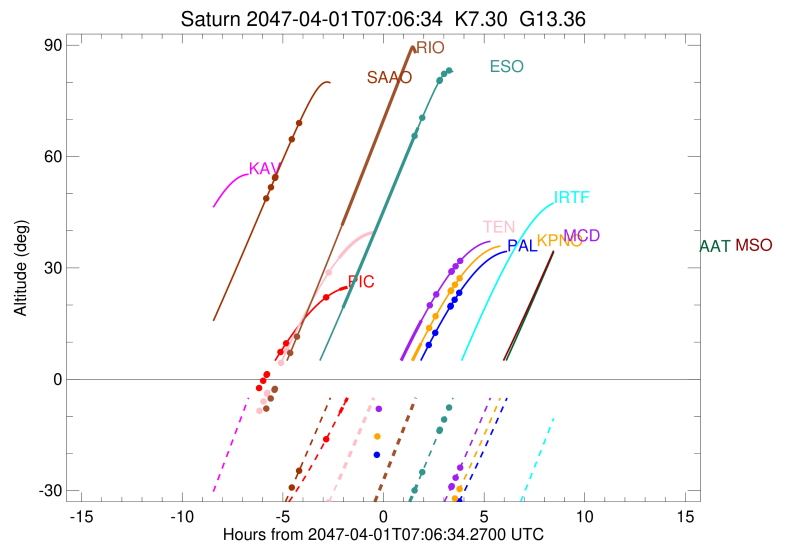
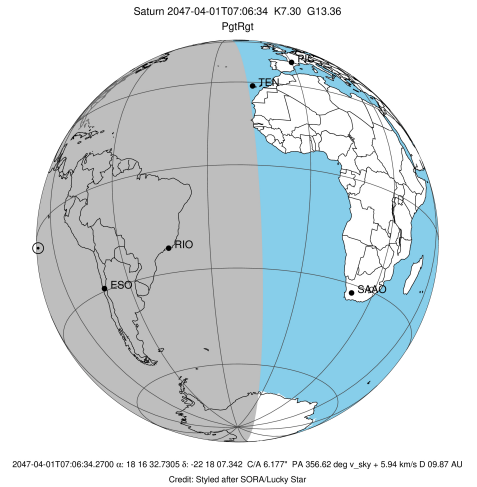
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-01T06:54:41.650
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 4090521561319462912
 2Mass ID (if available) : 18163273-2218070
 ICRS Star Coord at Epoch: 18h 16m 32.73047s -22:18:07.34205s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 7.301
 G magnitude : 13.359
 RP magnitude : 11.895
 BP magnitude : 16.281
 DUPflag : 0
 Distance (au) : 9.875
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 5.94
 Sun-Target sep (deg) : 97.00
 Sun-Moon sep (deg) : 159.36
 B (ring opening deg) : 26.06
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.690
 C/A sky separation (km) : 40751.3
 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



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	2047-04-01T01:16:09.037		-78.15x	-1.21x	140461.00	-5.11		
A (OER)	I	2047-04-01T01:28:17.439		-76.07x	-3.81x	136774.40	-5.01		
Encke (OEG)	I	2047-04-01T01:38:27.982		-74.17x	-5.98	133744.89	-4.91		
Encke (IEG)	I	2047-04-01T01:39:33.483		-73.96x	-6.21	133423.31	-4.90		
A (IER)	I	2047-04-01T02:19:56.269		-65.77x	-14.72	122050.38	-4.47		
B (OER)	I	2047-04-01T02:37:04.078		-62.15x	-18.28	117571.16	-4.25		
B (IER)	I	2047-04-01T04:59:31.007	b	-31.51x	-44.68	91984.69	-1.45		
Saturn	I	2047-04-01T04:53:21.485		-32.83x	-43.74	59899.52		-31.15	-36.43
Saturn	E	2047-04-01T08:59:52.782		15.88	-44.70	59601.57		-44.29	-49.87
B (IER)	E	2047-04-01T06:51:56.737	b	-8.10x	-54.90	91984.69	1.40		
B (OER)	E	2047-04-01T09:24:41.339		19.94	-40.73	117571.16	3.85		
A (IER)	E	2047-04-01T09:43:39.318		22.85	-37.46	122050.38	4.02		
Encke (IEG)	E	2047-04-01T10:28:45.756		28.96	-29.04	133423.31	4.37		
Encke (OEG)	E	2047-04-01T10:29:59.342		29.10	-28.80	133744.89	4.37		
A (OER)	E	2047-04-01T10:41:26.171		30.43	-26.56	136774.40	4.45		
F ring	E	2047-04-01T10:55:07.630		31.88	-23.83	140461.00	4.53		

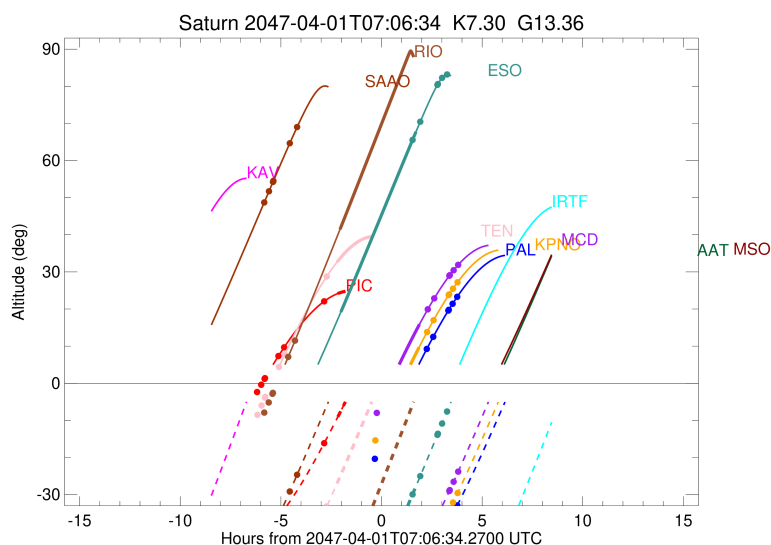
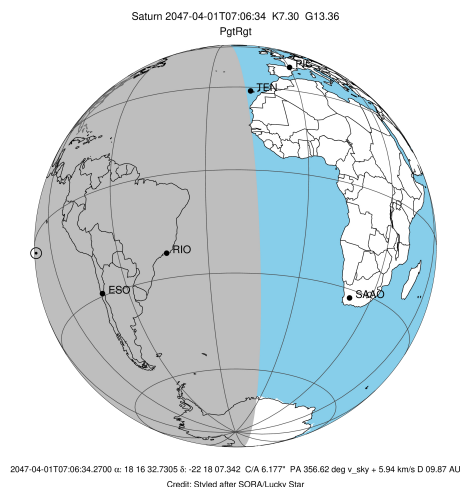
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-01T07:08:05.660
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 4090521561319462912
 2Mass ID (if available) : 18163273-2218070
 ICRS Star Coord at Epoch: 18h 16m 32.73047s -22:18:07.34205s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 7.301
 G magnitude : 13.359
 RP magnitude : 11.895
 BP magnitude : 16.281
 DUPflag : 0
 Distance (au) : 9.874
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 5.94
 Sun-Target sep (deg) : 97.00
 Sun-Moon sep (deg) : 160.40
 B (ring opening deg) : 26.06
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.498
 C/A sky separation (km) : 39375.8
 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

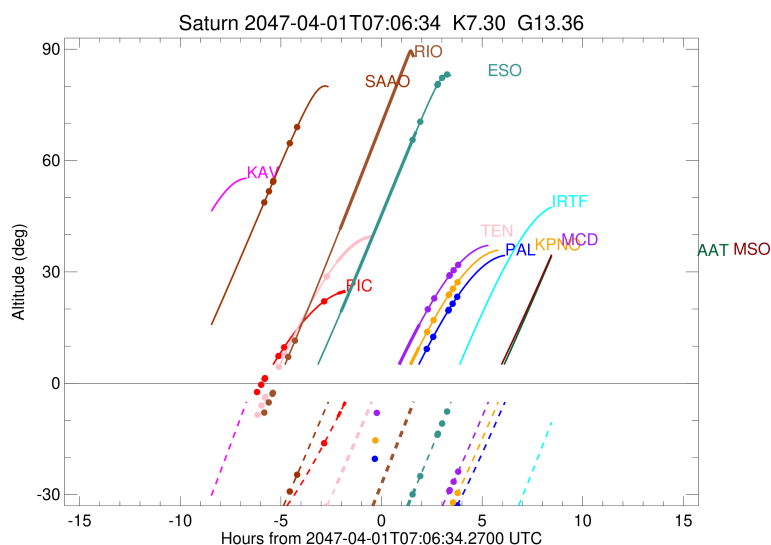
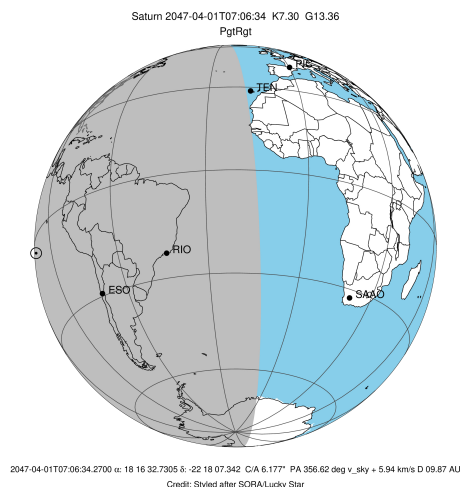
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-04-01T00:56:30.401		-8.53x	-57.26	140461.00	-5.06		
A (OER)	I	2047-04-01T01:08:45.534		-6.01x	-57.42	136774.40	-4.97		
Encke (OEG)	I	2047-04-01T01:19:00.881		-3.92x	-57.34	133744.89	-4.88		
Encke (IEG)	I	2047-04-01T01:20:06.841		-3.69x	-57.32	133423.31	-4.87		
A (IER)	I	2047-04-01T02:00:34.559		4.36x	-55.19	122050.38	-4.49		
B (OER)	I	2047-04-01T02:17:33.877		7.64	-53.55	117571.16	-4.30		
B (IER)	I	2047-04-01T04:22:51.217		28.70	-33.26	91984.69	-2.30		
Saturn	I	2047-04-01T04:53:38.605		32.61	-27.08	59956.38		-28.38	-33.44
Saturn	E	2047-04-01T09:21:41.537		27.22	31.07x	59594.75		-44.58	-50.15
B (IER)	E	2047-04-01T07:35:06.816	b	38.26	7.71x	91984.69	2.27		
B (OER)	E	2047-04-01T09:42:34.160		24.09	35.54x	117571.16	4.21		
A (IER)	E	2047-04-01T09:59:55.419		21.31	39.20x	122050.38	4.39		
Encke (IEG)	E	2047-04-01T10:41:20.698		14.16	47.63x	133423.31	4.75		
Encke (OEG)	E	2047-04-01T10:42:28.333		13.96	47.86x	133744.89	4.76		
A (OER)	E	2047-04-01T10:52:59.609		12.04	49.90x	136774.40	4.84		
F ring	E	2047-04-01T11:05:34.491		9.70	52.28x	140461.00	4.93		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-01T07:00:54.200
 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 : 4090521561319462912
 2Mass ID (if available) : 18163273-2218070
 ICRS Star Coord at Epoch: 18h 16m 32.73047s -22:18:07.34205s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 7.301
 G magnitude : 13.359
 RP magnitude : 11.895
 BP magnitude : 16.281
 DUPflag : 0
 Distance (au) : 9.875
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 5.94
 Sun-Target sep (deg) : 97.00
 Sun-Moon sep (deg) : 160.00
 B (ring opening deg) : 26.06
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.189
 C/A sky separation (km) : 44322.0
 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	2047-04-01T01:16:46.932		-7.95x	-59.68	140461.00	-4.69		
A (OER)	I	2047-04-01T01:30:04.510		-5.22x	-62.18	136774.40	-4.56		
Encke (OEG)	I	2047-04-01T01:41:18.245		-2.89x	-64.16	133744.89	-4.44		
Encke (IEG)	I	2047-04-01T01:42:30.830		-2.64x	-64.37	133423.31	-4.42		
A (IER)	I	2047-04-01T02:28:06.449		7.03	-70.44	122050.38	-3.87		
B (OER)	I	2047-04-01T02:48:06.077		11.37	-71.60	117571.16	-3.59		
Saturn	I	2047-04-01T05:02:42.120		41.43	-54.52	59820.33		-34.80	-40.29
Saturn	E	2047-04-01T09:00:07.659		83.85	-0.98x	59487.57		-49.18	-54.57
B (OER)	E	2047-04-01T08:55:09.489	b	84.99	-2.12x	117571.16	3.41		
A (IER)	E	2047-04-01T09:16:15.278		80.12	2.72x	122050.38	3.66		
Encke (IEG)	E	2047-04-01T10:04:37.424		68.95	13.74x	133423.31	4.16		
Encke (OEG)	E	2047-04-01T10:05:54.695		68.65	14.03x	133744.89	4.17		
A (OER)	E	2047-04-01T10:17:52.510		65.89	16.73x	136774.40	4.27		
F ring	E	2047-04-01T10:32:03.576		62.62	19.91x	140461.00	4.39		

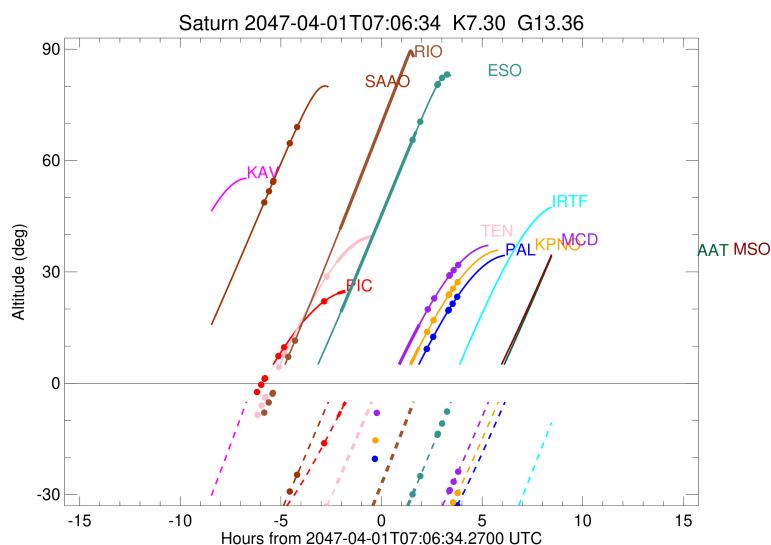
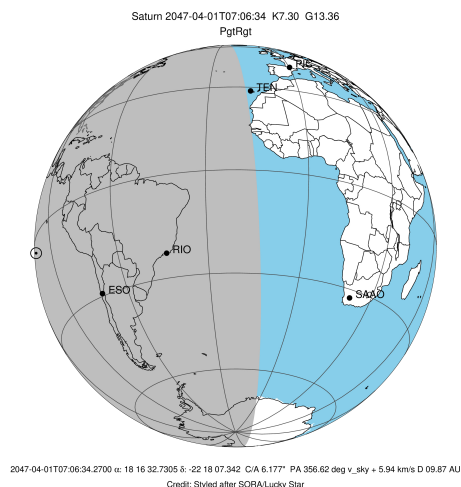
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-01T06:56:22.500
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4090521561319462912
 2Mass ID (if available) : 18163273-2218070
 ICRS Star Coord at Epoch: 18h 16m 32.73047s -22:18:07.34205s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 7.301
 G magnitude : 13.359
 RP magnitude : 11.895
 BP magnitude : 16.281
 DUPflag : 0
 Distance (au) : 9.875
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 5.94
 Sun-Target sep (deg) : 97.00
 Sun-Moon sep (deg) : 159.63
 B (ring opening deg) : 26.06
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.357
 C/A sky separation (km) : 45525.3
 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



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	2047-04-01T01:27:10.457		-22.42x	-36.78	140461.00	-4.60		
A (OER)	I	2047-04-01T01:40:44.116		-20.25x	-39.59	136774.40	-4.46		
Encke (OEG)	I	2047-04-01T01:52:13.487		-18.35x	-41.93	133744.89	-4.33		
Encke (IEG)	I	2047-04-01T01:53:27.886		-18.14x	-42.18	133423.31	-4.32		
A (IER)	I	2047-04-01T02:40:37.230		-9.79x	-51.29	122050.38	-3.70		
B (OER)	I	2047-04-01T03:01:41.023		-5.84x	-54.99	117571.16	-3.38		
Saturn	I	2047-04-01T05:05:20.489		19.19	-65.03	59777.35		-36.72	-42.27
Saturn	E	2047-04-01T08:49:32.326		67.78	-27.71	59470.53		-49.92	-55.27
B (OER)	E	2047-04-01T08:39:18.242	b	65.58	-29.90	117571.16	3.15		
A (IER)	E	2047-04-01T09:01:59.055		70.43	-25.04	122050.38	3.43		
Encke (IEG)	E	2047-04-01T09:53:13.481		80.37	-13.91	133423.31	3.95		
Encke (OEG)	E	2047-04-01T09:54:34.786		80.58	-13.62	133744.89	3.96		
A (OER)	E	2047-04-01T10:07:09.141		82.26	-10.87	136774.40	4.07		
F ring	E	2047-04-01T10:22:01.652		83.18	-7.62	140461.00	4.19		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-01T07:13:59.700
 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 : 4090521561319462912
 2Mass ID (if available) : 18163273-2218070
 ICRS Star Coord at Epoch: 18h 16m 32.73047s -22:18:07.34205s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 7.301
 G magnitude : 13.359
 RP magnitude : 11.895
 BP magnitude : 16.281
 DUPflag : 0
 Distance (au) : 9.874
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 5.94
 Sun-Target sep (deg) : 97.00
 Sun-Moon sep (deg) : 160.66
 B (ring opening deg) : 26.06
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.445
 C/A sky separation (km) : 46157.4
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-04-01T01:16:41.426		48.67	-44.18	140461.00	-4.41		
A (OER)	I	2047-04-01T01:30:49.098		51.66	-41.53	136774.40	-4.28		
Encke (OEG)	I	2047-04-01T01:42:46.060		54.19	-39.23	133744.89	-4.17		
Encke (IEG)	I	2047-04-01T01:44:03.358		54.46	-38.98	133423.31	-4.15		
A (IER)	I	2047-04-01T02:32:47.602		64.59	-29.22	122050.38	-3.60		
B (OER)	I	2047-04-01T02:54:20.458		68.90	-24.77	117571.16	-3.32		
Saturn	I	2047-04-01T05:21:56.747		72.70	6.27x	59802.49		-35.60	-41.12
Saturn	E	2047-04-01T09:02:41.854		26.93	46.48x	59419.33		-52.17	-57.38
B (OER)	E	2047-04-01T08:40:08.271	b	31.65	43.41x	117571.16	3.37		
A (IER)	E	2047-04-01T09:01:20.507	b	27.21	46.31x	122050.38	3.67		
Encke (IEG)	E	2047-04-01T09:49:14.000		17.32	51.23x	133423.31	4.23		
Encke (OEG)	E	2047-04-01T09:50:29.932		17.06	51.33x	133744.89	4.24		
A (OER)	E	2047-04-01T10:02:14.271		14.68	52.09x	136774.40	4.36		
F ring	E	2047-04-01T10:16:07.272		11.88	52.74x	140461.00	4.49		