

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-03T08:25:51.850
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4090527406850443648
 2Mass ID (if available) : 18164240-2217517

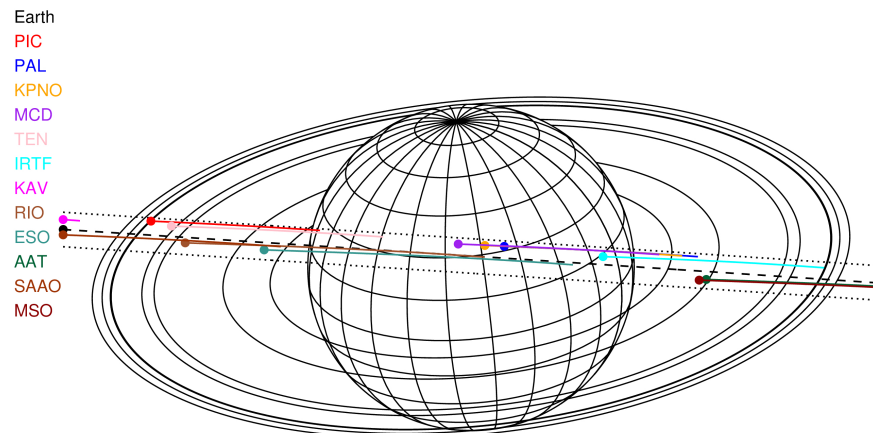
Saturn 2047-04-03T08:25:51 K8.08 G14.39 PgtRgt

ICRS Star Coord at Epoch: 18h 16m 42.38996s -22:17:52.23095s

RUWE (>1.4 is poor) : 1.16
 K magnitude : 8.076
 G magnitude : 14.391
 RP magnitude : 12.778
 BP magnitude : 17.689
 DUPflag : 0
 Distance (au) : 9.840
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.91
 Sun-Target sep (deg) : 98.99
 Sun-Moon sep (deg) : 173.94
 B (ring opening deg) : 26.05
 PA of pole (deg) : 5.82



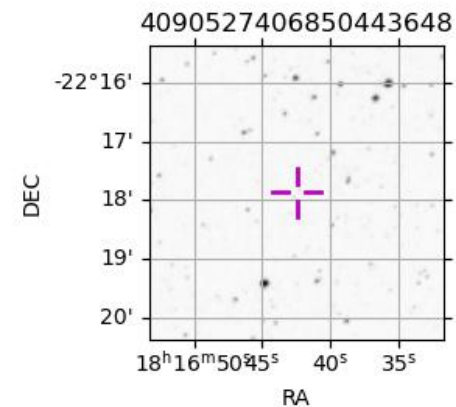
2047-04-03T08:25:51.8500 α: 18 16 42.3900 δ: -22 17 52.231 C/A 0.594° PA 176.25 deg v_sky + 4.91 km/s D 09.84 AU
 Credit: Styled after SORA/Lucky Star



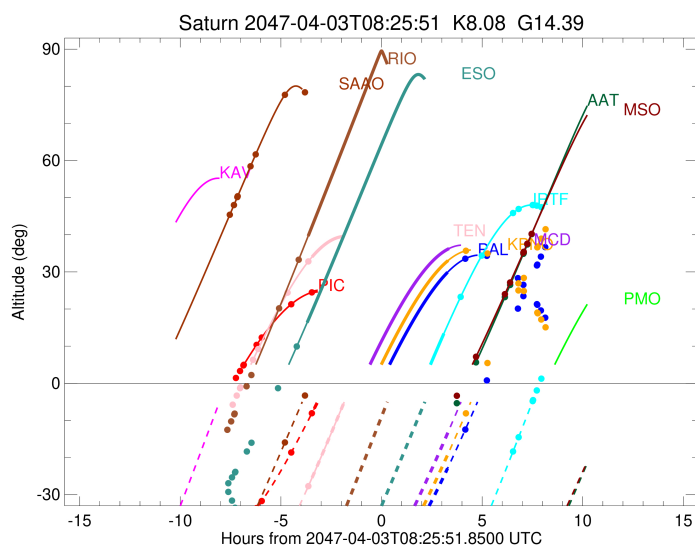
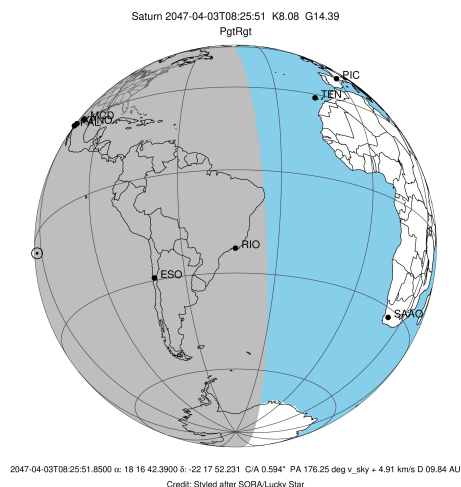
#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring

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	OEncode
PIC	Pic du Midi	42.9	0.1	+	+	+	APR 03 02:13 - APR 03 05:05	PinRin
PAL	Palomar Mt (20	33.4	243.1		+	+	APR 03 11:42 - APR 03 12:35	PneRne
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4		+	+	APR 03 11:44 - APR 03 12:37	PneRne
MCD	McDonald Obs.	30.7	256.0		+		APR 03 11:47 - APR 03 11:47	PneRnn
TEN	Teide Obs./Ten	28.3	343.5	+	+	+	APR 03 02:03 - APR 03 04:58	PinRin
IRTF	Mauna Kea/IRTF	19.8	204.5		+	+	APR 03 11:32 - APR 03 15:14	PneRne
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+	+		APR 03 03:20 - APR 03 04:47	PinRin
ESO	European South	-29.3	289.3		+		APR 03 04:13 - APR 03 04:44	PinRin
AAT	Siding Spring	-31.3	149.1			+	APR 03 13:07 - APR 03 15:53	PnnRne
SAAO	So. Afr. Astro	-32.4	20.8	+	+	+	APR 03 00:53 - APR 03 03:38	PnnRin
MSO	Mt. Stromlo Ob	-35.3	149.0			+	APR 03 13:07 - APR 03 15:53	PnnRne



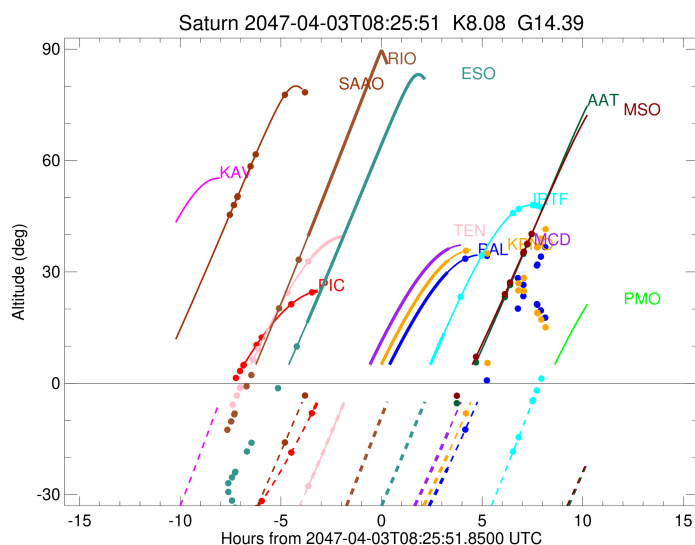
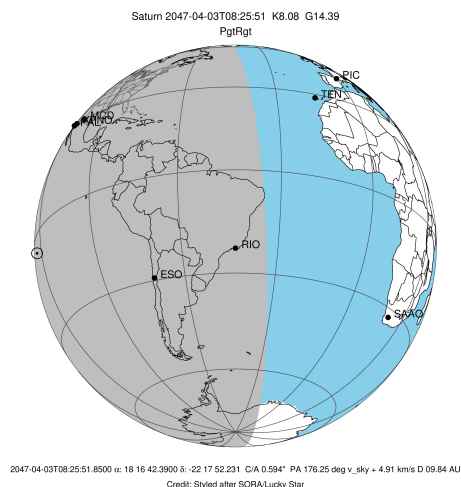
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-03T08:39:23.100
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 4090527406850443648
 2Mass ID (if available) : 18164240-2217517
 ICRS Star Coord at Epoch: 18h 16m 42.38996s -22:17:52.23095s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 8.076
 G magnitude : 14.391
 RP magnitude : 12.778
 BP magnitude : 17.689
 DUPflag : 0
 Distance (au) : 9.840
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.91
 Sun-Target sep (deg) : 98.99
 Sun-Moon sep (deg) : 173.70
 B (ring opening deg) : 26.05
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.291
 C/A sky separation (km) : 9213.0
 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_itr93_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	2047-04-03T01:11:59.225		1.46x	-39.53	140461.00	-5.03		
A (OER)	I	2047-04-03T01:24:13.445		3.33x	-38.60	136774.40	-5.01		
Encke (OEG)	I	2047-04-03T01:34:19.227		4.84x	-37.73	133744.89	-4.99		
Encke (IEG)	I	2047-04-03T01:35:23.656		5.00x	-37.63	133423.31	-4.99		
A (IER)	I	2047-04-03T02:13:37.721		10.36	-33.60	122050.38	-4.93		
B (OER)	I	2047-04-03T02:28:49.269		12.33	-31.72	117571.16	-4.90		
B (IER)	I	2047-04-03T03:56:57.347		21.30	-18.61	91984.69	-4.78		
C (IER)	I	2047-04-03T04:58:29.300		24.49	-8.04	74490.58	-4.70		
Saturn	I	2047-04-03T05:05:34.664		24.67	-6.77	60147.96		17.12	20.70
Saturn	E	2047-04-03T12:06:57.740		-21.16x	52.64x	60266.24		-2.04	-2.51
C (IER)	E	2047-04-03T12:53:01.278		-29.56x	51.03x	74490.58	5.13		
B (IER)	E	2047-04-03T13:49:14.808		-39.89x	45.85x	91984.69	5.24		
B (OER)	E	2047-04-03T15:09:55.563		-54.24x	34.36x	117571.16	5.32		
A (IER)	E	2047-04-03T15:23:56.593		-56.57x	32.07x	122050.38	5.33		
Encke (IEG)	E	2047-04-03T15:59:27.917		-62.02x	26.01x	133423.31	5.34		
Encke (OEG)	E	2047-04-03T16:00:28.129		-62.16x	25.84x	133744.89	5.34		
A (OER)	E	2047-04-03T16:09:55.307		-63.45x	24.18x	136774.40	5.34		
F ring	E	2047-04-03T16:21:25.430		-64.91x	22.14x	140461.00	5.34		

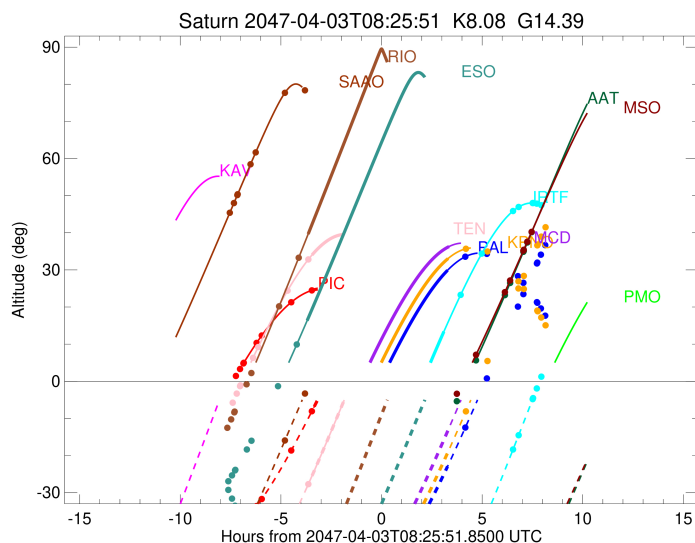
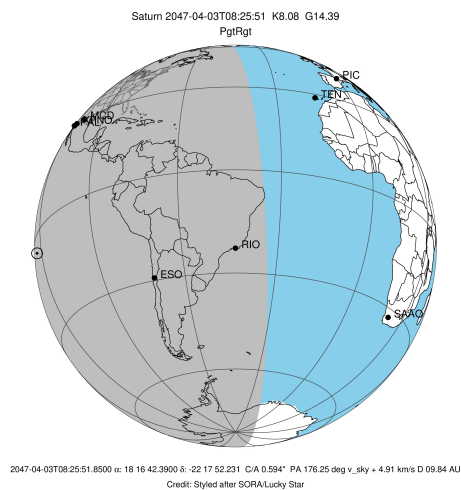
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-03T08:08:16.870
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4090527406850443648
 2Mass ID (if available) : 18164240-2217517
 ICRS Star Coord at Epoch: 18h 16m 42.38996s -22:17:52.23095s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 8.076
 G magnitude : 14.391
 RP magnitude : 12.778
 BP magnitude : 17.689
 DUPflag : 0
 Distance (au) : 9.841
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.91
 Sun-Target sep (deg) : 98.99
 Sun-Moon sep (deg) : 174.82
 B (ring opening deg) : 26.05
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.156
 C/A sky separation (km) : 8253.4
 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	2047-04-03T01:14:59.070	-79.00x	10.33x	140461.00	-5.72			
A (OER)	I	2047-04-03T01:25:44.747	-79.06x	8.08x	136774.40	-5.70			
Encke (OEG)	I	2047-04-03T01:34:36.355	-78.73x	6.23x	133744.89	-5.69			
Encke (IEG)	I	2047-04-03T01:35:32.841	-78.67x	6.03x	133423.31	-5.69			
A (IER)	I	2047-04-03T02:08:58.482	-74.88x	-0.93x	122050.38	-5.65			
B (OER)	I	2047-04-03T02:22:13.193	-72.73x	-3.68x	117571.16	-5.63			
B (IER)	I	2047-04-03T03:39:02.218	-57.80x	-19.22	91984.69	-5.47			
C (IER)	I	2047-04-03T04:33:07.391	-46.53x	-29.48	74490.58	-5.31			
Saturn	I	2047-04-03T04:50:42.501	-42.84x	-32.61	60185.51			14.12	17.16
Saturn	E	2047-04-03T11:42:59.144	29.91	-22.90	60267.91			-0.47	-0.58
C (IER)	E	2047-04-03T12:35:36.288	33.55	-12.50	74490.58	4.51			
B (IER)	E	2047-04-03T13:39:55.719	34.33	0.73x	91984.69	4.56			
B (OER)	E	2047-04-03T15:12:40.274	28.32	20.12x	117571.16	4.65			
A (IER)	E	2047-04-03T15:28:42.395	26.54	23.44x	122050.38	4.67			
Encke (IEG)	E	2047-04-03T16:09:06.516	21.34	31.70x	133423.31	4.72			
Encke (OEG)	E	2047-04-03T16:10:14.651	21.18	31.93x	133744.89	4.72			
A (OER)	E	2047-04-03T16:20:55.403	19.64	34.07x	136774.40	4.74			
F ring	E	2047-04-03T16:33:52.324	17.70	36.64x	140461.00	4.75			

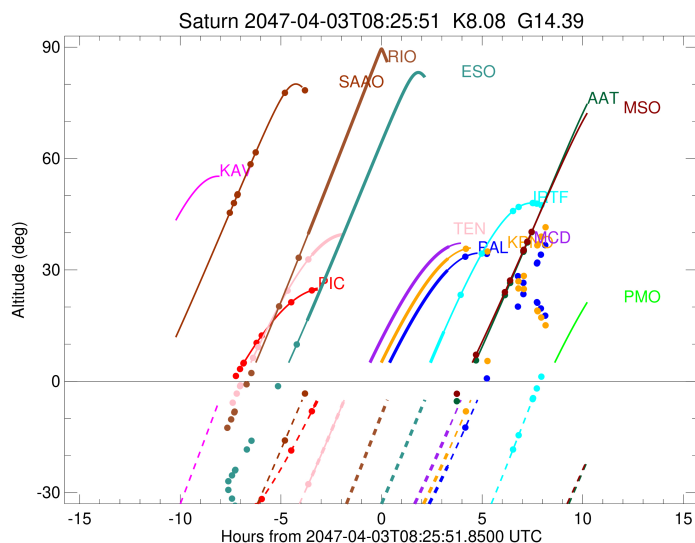
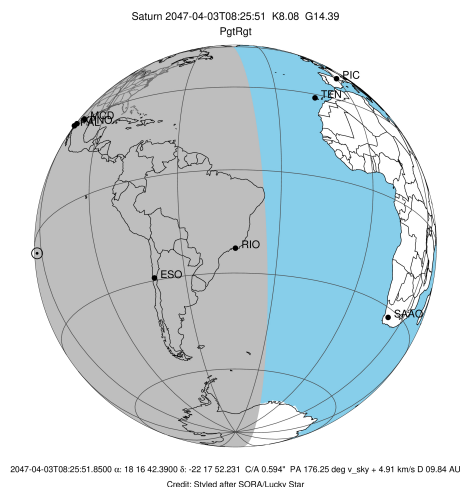
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-03T08:08:27.490
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 4090527406850443648
 2Mass ID (if available) : 18164240-2217517
 ICRS Star Coord at Epoch: 18h 16m 42.38996s -22:17:52.23095s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 8.076
 G magnitude : 14.391
 RP magnitude : 12.778
 BP magnitude : 17.689
 DUPflag : 0
 Distance (au) : 9.841
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.91
 Sun-Target sep (deg) : 98.99
 Sun-Moon sep (deg) : 174.81
 B (ring opening deg) : 26.05
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.166
 C/A sky separation (km) : 8320.5
 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	2047-04-03T01:13:09.730	-80.09x	6.26x	140461.00	-5.71			
A (OER)	I	2047-04-03T01:23:55.945	-79.16x	3.97x	136774.40	-5.70			
Encke (OEG)	I	2047-04-03T01:32:48.142	-78.09x	2.09x	133744.89	-5.69			
Encke (IEG)	I	2047-04-03T01:33:44.698	-77.96x	1.89x	133423.31	-5.69			
A (IER)	I	2047-04-03T02:07:13.808	-72.38x	-5.16	122050.38	-5.63			
B (OER)	I	2047-04-03T02:20:30.418	-69.84x	-7.93	117571.16	-5.61			
B (IER)	I	2047-04-03T03:37:36.350	-53.89x	-23.58	91984.69	-5.44			
C (IER)	I	2047-04-03T04:31:59.408	-42.32x	-33.79	74490.58	-5.27			
Saturn	I	2047-04-03T04:49:35.858	-38.57x	-36.85	60185.21			14.15	17.19
Saturn	E	2047-04-03T11:44:36.202	33.08	-18.95	60267.89			-0.51	-0.63
C (IER)	E	2047-04-03T12:37:21.738	35.69	-8.14	74490.58	4.50			
B (IER)	E	2047-04-03T13:41:41.406	34.96	5.42x	91984.69	4.56			
B (OER)	E	2047-04-03T15:14:07.428	26.92	25.01x	117571.16	4.67			
A (IER)	E	2047-04-03T15:30:04.419	24.87	28.34x	122050.38	4.69			
Encke (IEG)	E	2047-04-03T16:10:13.625	19.05	36.58x	133423.31	4.75			
Encke (OEG)	E	2047-04-03T16:11:21.304	18.88	36.81x	133744.89	4.75			
A (OER)	E	2047-04-03T16:21:57.686	17.20	38.93x	136774.40	4.77			
F ring	E	2047-04-03T16:34:49.115	15.11	41.46x	140461.00	4.79			

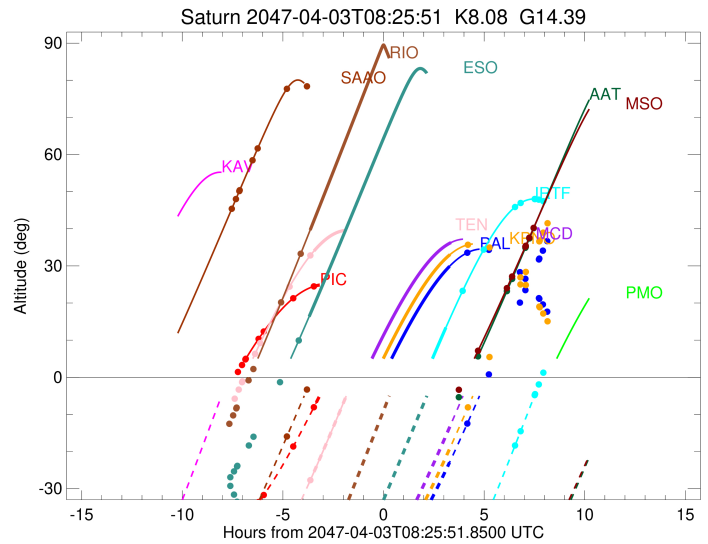
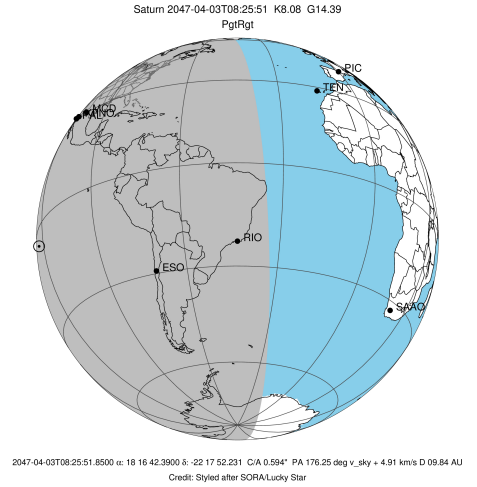
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-03T08:09:11.630
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 4090527406850443648
 2Mass ID (if available) : 18164240-2217517
 ICRS Star Coord at Epoch: 18h 16m 42.38996s -22:17:52.23095s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 8.076
 G magnitude : 14.391
 RP magnitude : 12.778
 BP magnitude : 17.689
 DUPflag : 0
 Distance (au) : 9.841
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.91
 Sun-Target sep (deg) : 98.99
 Sun-Moon sep (deg) : 174.79
 B (ring opening deg) : 26.05
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.186
 C/A sky separation (km) : 8463.9
 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_itr93_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	2047-04-03T01:10:46.460	-77.77x	0.20x	140461.00	-5.70			
A (OER)	I	2047-04-03T01:21:34.548	-75.89x	-2.11x	136774.40	-5.68			
Encke (OEG)	I	2047-04-03T01:30:28.503	-74.22x	-4.00x	133744.89	-5.67			
Encke (IEG)	I	2047-04-03T01:31:25.257	-74.04x	-4.20x	133423.31	-5.67			
A (IER)	I	2047-04-03T02:05:02.831	-67.27x	-11.31	122050.38	-5.61			
B (OER)	I	2047-04-03T02:18:23.564	-64.47x	-14.10	117571.16	-5.58			
B (IER)	I	2047-04-03T03:36:01.960	-47.81x	-29.69	91984.69	-5.39			
C (IER)	I	2047-04-03T04:30:56.505	-35.98x	-39.61	74490.58	-5.22			
Saturn	I	2047-04-03T04:48:20.497	-32.25x	-42.44	60183.94			14.26	17.32
Saturn	E	2047-04-03T11:47:10.310	36.29	-12.58	60267.86			-0.57	-0.70
C (IER)	E	2047-04-03T12:40:01.221	37.15	-1.39x	74490.58	4.50			
B (IER)	E	2047-04-03T13:44:12.219	34.16	12.42x	91984.69	4.58			
B (OER)	E	2047-04-03T15:16:00.173	23.58	32.02x	117571.16	4.71			
A (IER)	E	2047-04-03T15:31:48.223	21.21	35.30x	122050.38	4.74			
Encke (IEG)	E	2047-04-03T16:11:32.721	14.73	43.35x	133423.31	4.80			
Encke (OEG)	E	2047-04-03T16:12:39.668	14.54	43.57x	133744.89	4.80			
A (OER)	E	2047-04-03T16:23:09.083	12.72	45.62x	136774.40	4.82			
F ring	E	2047-04-03T16:35:51.884	10.47	48.04x	140461.00	4.84			

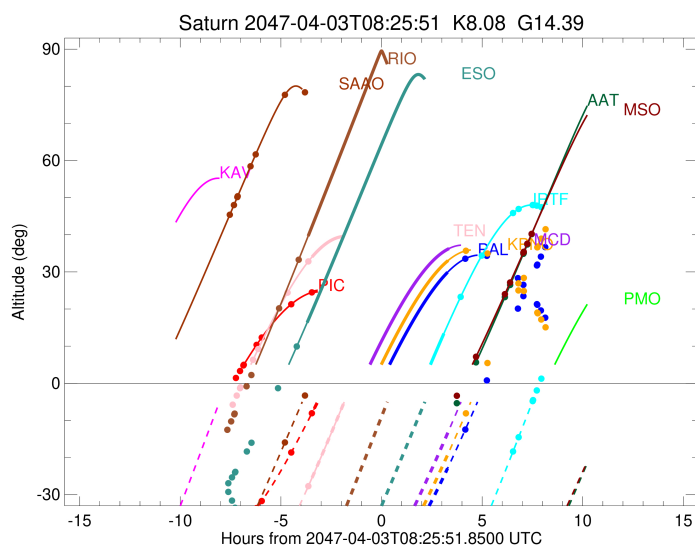
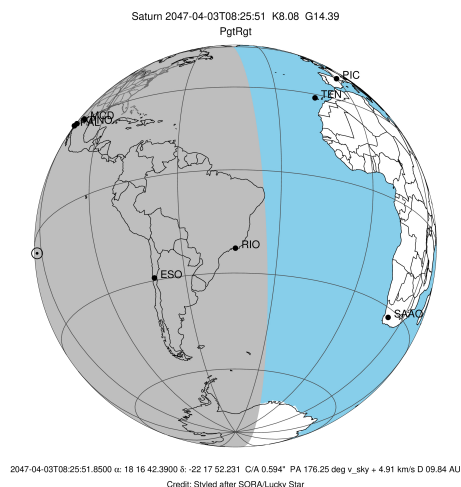
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-03T08:37:00.100
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 4090527406850443648
 2Mass ID (if available) : 18164240-2217517
 ICRS Star Coord at Epoch: 18h 16m 42.38996s -22:17:52.23095s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 8.076
 G magnitude : 14.391
 RP magnitude : 12.778
 BP magnitude : 17.689
 DUPflag : 0
 Distance (au) : 9.840
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.91
 Sun-Target sep (deg) : 98.99
 Sun-Moon sep (deg) : 173.81
 B (ring opening deg) : 26.05
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.216
 C/A sky separation (km) : 8678.8
 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	2047-04-03T01:02:23.252		-5.73x	-56.61	140461.00	-5.12		
A (OER)	I	2047-04-03T01:14:24.817		-3.29x	-56.63	136774.40	-5.09		
Encke (OEG)	I	2047-04-03T01:24:20.857		-1.28x	-56.45	133744.89	-5.07		
Encke (IEG)	I	2047-04-03T01:25:24.289		-1.07x	-56.42	133423.31	-5.07		
A (IER)	I	2047-04-03T02:03:07.958		6.35	-54.20	122050.38	-4.98		
B (OER)	I	2047-04-03T02:18:10.359		9.22	-52.73	117571.16	-4.95		
B (IER)	I	2047-04-03T03:46:01.432		24.44	-39.60	91984.69	-4.77		
C (IER)	I	2047-04-03T04:47:57.937		32.85	-27.67	74490.58	-4.65		
Saturn	I	2047-04-03T04:58:40.075		34.02	-25.49	60158.48		16.33	19.77
Saturn	E	2047-04-03T12:10:23.722		-4.54x	63.33x	60264.94		-2.69	-3.30
C (IER)	E	2047-04-03T12:56:26.128		-14.08x	67.08x	74490.58	5.08		
B (IER)	E	2047-04-03T13:53:02.602		-26.15x	65.01x	91984.69	5.21		
B (OER)	E	2047-04-03T15:13:46.342		-43.78x	52.74x	117571.16	5.34		
A (IER)	E	2047-04-03T15:27:44.083		-46.86x	50.08x	122050.38	5.35		
Encke (IEG)	E	2047-04-03T16:03:02.067		-54.66x	42.99x	133423.31	5.38		
Encke (OEG)	E	2047-04-03T16:04:01.799		-54.88x	42.78x	133744.89	5.38		
A (OER)	E	2047-04-03T16:13:24.185		-56.95x	40.83x	136774.40	5.39		
F ring	E	2047-04-03T16:24:47.818		-59.47x	38.44x	140461.00	5.40		

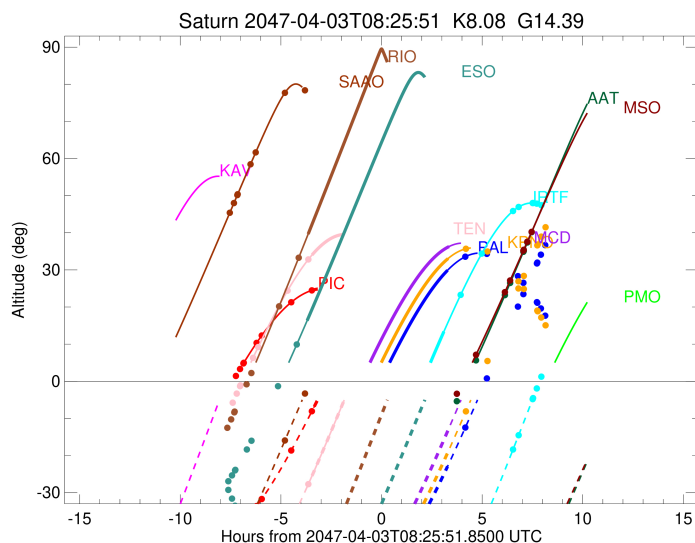
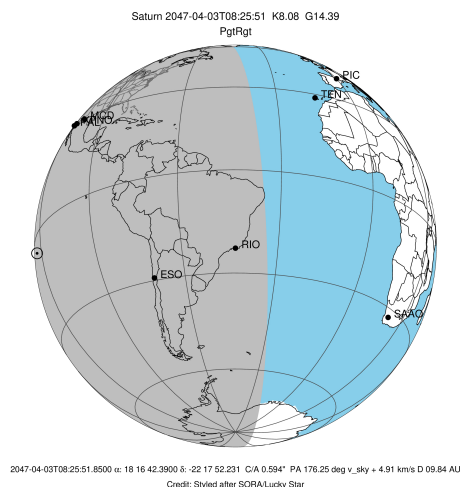
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-03T08:07:22.720
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 4090527406850443648
 2Mass ID (if available) : 18164240-2217517
 ICRS Star Coord at Epoch: 18h 16m 42.38996s -22:17:52.23095s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 8.076
 G magnitude : 14.391
 RP magnitude : 12.778
 BP magnitude : 17.689
 DUPflag : 0
 Distance (au) : 9.841
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.91
 Sun-Target sep (deg) : 98.99
 Sun-Moon sep (deg) : 174.73
 B (ring opening deg) : 26.05
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.782
 C/A sky separation (km) : 5583.7
 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	2047-04-03T01:23:17.447	-54.34x	44.36x	140461.00	-5.76			
A (OER)	I	2047-04-03T01:33:57.161	-56.81x	41.90x	136774.40	-5.76			
Encke (OEG)	I	2047-04-03T01:42:42.661	-58.84x	39.87x	133744.89	-5.77			
Encke (IEG)	I	2047-04-03T01:43:38.435	-59.06x	39.66x	133423.31	-5.77			
A (IER)	I	2047-04-03T02:16:30.792	-66.68x	32.00x	122050.38	-5.76			
B (OER)	I	2047-04-03T02:29:27.994	-69.69x	28.97x	117571.16	-5.76			
B (IER)	I	2047-04-03T03:43:45.864	-86.21x	11.50x	91984.69	-5.71			
C (IER)	I	2047-04-03T04:35:10.458	-80.40x	-0.57x	74490.58	-5.63			
Saturn	I	2047-04-03T04:58:06.171	-75.17x	-5.93	60207.12			12.09	14.74
Saturn	E	2047-04-03T11:32:08.709	13.44	-59.98	60266.12			-2.11	-2.59
C (IER)	E	2047-04-03T12:21:39.850	23.24	-51.89	74490.58	4.67			
B (IER)	E	2047-04-03T13:24:36.084	34.36	-39.22	91984.69	4.60			
B (OER)	E	2047-04-03T14:58:06.036	45.86	-18.37	117571.16	4.53			
A (IER)	E	2047-04-03T15:14:34.271	46.94	-14.58	122050.38	4.53			
Encke (IEG)	E	2047-04-03T15:56:24.986	48.01	-4.86x	133423.31	4.53			
Encke (OEG)	E	2047-04-03T15:57:35.952	48.01	-4.58x	133744.89	4.53			
A (OER)	E	2047-04-03T16:08:44.299	47.86	-1.98x	136774.40	4.53			
F ring	E	2047-04-03T16:22:16.927	47.44	1.20x	140461.00	4.54			

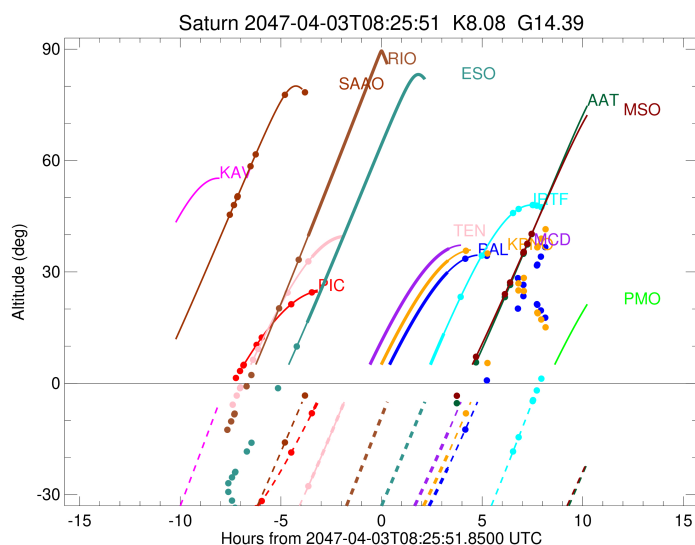
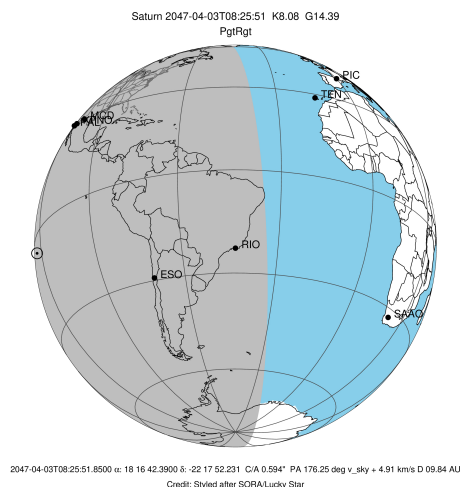
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-03T08:25:56.920
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 4090527406850443648
 2Mass ID (if available) : 18164240-2217517
 ICRS Star Coord at Epoch: 18h 16m 42.38996s -22:17:52.23095s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 8.076
 G magnitude : 14.391
 RP magnitude : 12.778
 BP magnitude : 17.689
 DUPflag : 0
 Distance (au) : 9.840
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.91
 Sun-Target sep (deg) : 98.99
 Sun-Moon sep (deg) : 174.04
 B (ring opening deg) : 26.05
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.587
 C/A sky separation (km) : 4193.0
 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_itr93_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	2047-04-03T00:46:24.647		-12.50x	-54.11	140461.00	-5.42		
A (OER)	I	2047-04-03T00:57:45.955		-10.24x	-56.47	136774.40	-5.40		
Encke (OEG)	I	2047-04-03T01:07:08.434		-8.34x	-58.37	133744.89	-5.37		
Encke (IEG)	I	2047-04-03T01:08:08.280		-8.14x	-58.57	133423.31	-5.37		
A (IER)	I	2047-04-03T01:43:42.595		-0.78x	-65.23	122050.38	-5.28		
B (OER)	I	2047-04-03T01:57:52.962		2.21x	-67.52	117571.16	-5.25		
B (IER)	I	2047-04-03T03:20:42.306		20.23	-71.52	91984.69	-5.05		
C (IER)	I	2047-04-03T04:19:13.364		33.32	-63.40	74490.58	-4.92		
Saturn	I	2047-04-03T04:47:09.445		39.65	-58.02	60211.86		11.61	14.15
Saturn	E	2047-04-03T12:07:59.199		38.90	40.21x	60252.22		-6.12	-7.50
C (IER)	E	2047-04-03T12:49:52.476		29.44	48.24x	74490.58	4.99		
B (IER)	E	2047-04-03T13:47:42.507		16.56	57.24x	91984.69	5.10		
B (OER)	E	2047-04-03T15:10:14.416		-1.22x	61.59x	117571.16	5.23		
A (IER)	E	2047-04-03T15:24:28.480		-4.19x	60.95x	122050.38	5.25		
Encke (IEG)	E	2047-04-03T16:00:22.650		-11.50x	57.70x	133423.31	5.30		
Encke (OEG)	E	2047-04-03T16:01:23.285		-11.70x	57.58x	133744.89	5.30		
A (OER)	E	2047-04-03T16:10:53.843		-13.58x	56.37x	136774.40	5.32		
F ring	E	2047-04-03T16:22:26.564		-15.84x	54.75x	140461.00	5.33		

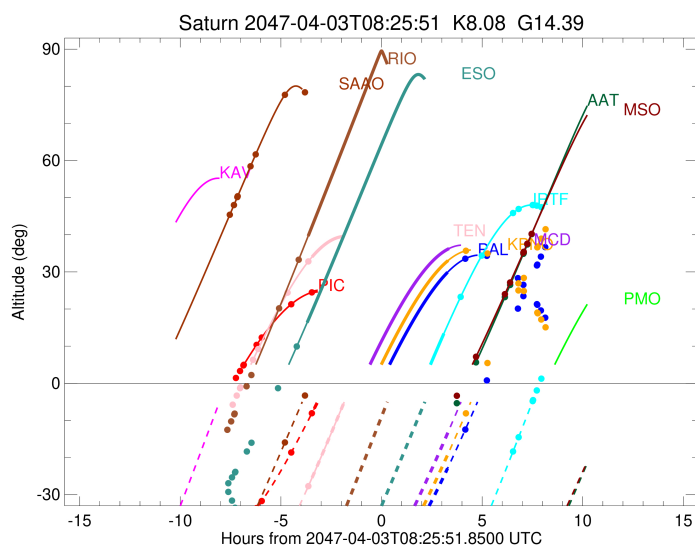
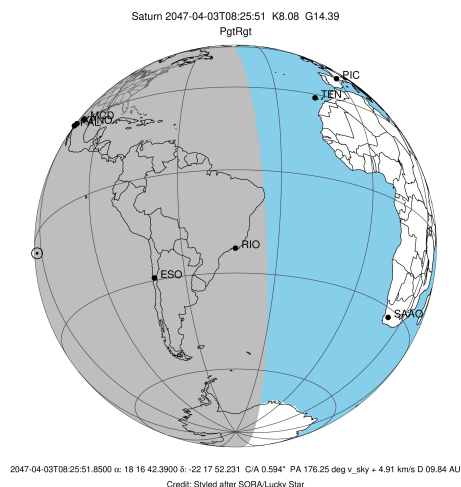
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-03T08:16:03.980
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4090527406850443648
 2Mass ID (if available) : 18164240-2217517
 ICRS Star Coord at Epoch: 18h 16m 42.38996s -22:17:52.23095s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 8.076
 G magnitude : 14.391
 RP magnitude : 12.778
 BP magnitude : 17.689
 DUPflag : 0
 Distance (au) : 9.841
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.91
 Sun-Target sep (deg) : 98.99
 Sun-Moon sep (deg) : 174.34
 B (ring opening deg) : 26.05
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.477
 C/A sky separation (km) : 3405.2
 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	2047-04-03T00:49:18.920	-26.91x	-29.30	140461.00	-5.61			
A (OER)	I	2047-04-03T01:00:17.441	-25.33x	-31.65	136774.40	-5.59			
Encke (OEG)	I	2047-04-03T01:09:20.468	-23.98x	-33.57	133744.89	-5.57			
Encke (IEG)	I	2047-04-03T01:10:18.211	-23.84x	-33.78	133423.31	-5.57			
A (IER)	I	2047-04-03T01:44:33.631	-18.35x	-40.93	122050.38	-5.50			
B (OER)	I	2047-04-03T01:58:10.617	-16.02x	-43.70	117571.16	-5.47			
B (IER)	I	2047-04-03T03:17:28.485	-1.29x	-58.24	91984.69	-5.28			
C (IER)	I	2047-04-03T04:13:21.485	9.95	-64.94	74490.58	-5.15			
Saturn	I	2047-04-03T04:44:04.877	16.33	-66.18	60223.87			10.27	12.55
Saturn	E	2047-04-03T11:59:41.749	65.59	13.23x	60253.19			-5.93	-7.27
C (IER)	E	2047-04-03T12:43:29.863	56.06	22.37x	74490.58	4.80			
B (IER)	E	2047-04-03T13:43:44.178	42.87	34.25x	91984.69	4.88			
B (OER)	E	2047-04-03T15:09:50.037	24.25	48.43x	117571.16	5.02			
A (IER)	E	2047-04-03T15:24:39.810	21.10	50.30x	122050.38	5.05			
Encke (IEG)	E	2047-04-03T16:02:00.492	13.25	53.86x	133423.31	5.10			
Encke (OEG)	E	2047-04-03T16:03:03.475	13.03	53.93x	133744.89	5.11			
A (OER)	E	2047-04-03T16:12:55.861	10.99	54.54x	136774.40	5.12			
F ring	E	2047-04-03T16:24:54.409	8.53	55.07x	140461.00	5.14			

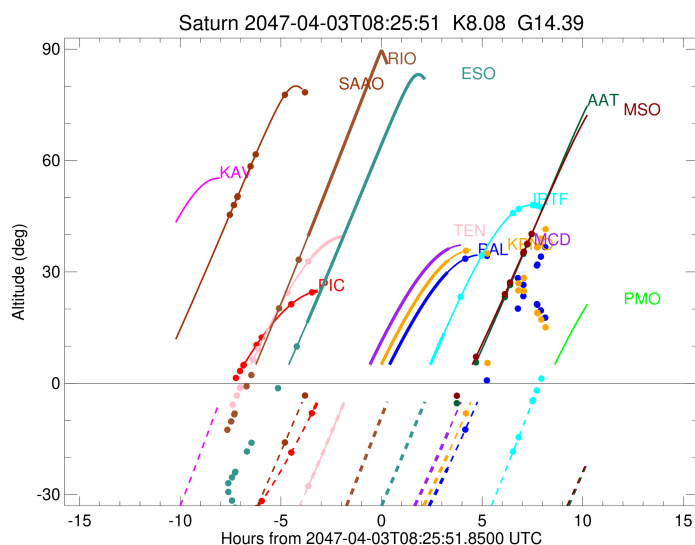
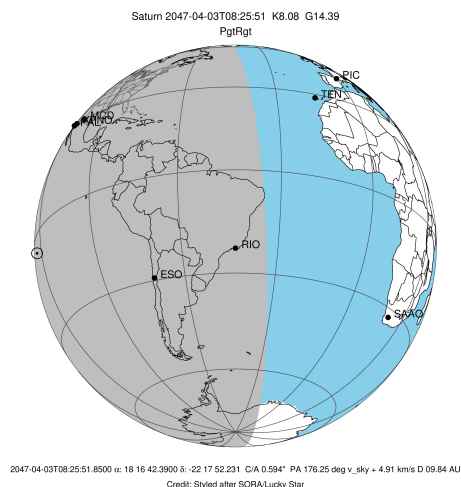
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-03T08:21:07.740
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 4090527406850443648
 2Mass ID (if available) : 18164240-2217517
 ICRS Star Coord at Epoch: 18h 16m 42.38996s -22:17:52.23095s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 8.076
 G magnitude : 14.391
 RP magnitude : 12.778
 BP magnitude : 17.689
 DUPflag : 0
 Distance (au) : 9.841
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.91
 Sun-Target sep (deg) : 98.99
 Sun-Moon sep (deg) : 173.78
 B (ring opening deg) : 26.05
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.104
 C/A sky separation (km) : 744.8
 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	2047-04-03T01:20:54.852		14.75	52.04x	140461.00	-5.43		
A (OER)	I	2047-04-03T01:32:13.347		12.44	52.73x	136774.40	-5.44		
Encke (OEG)	I	2047-04-03T01:41:29.466		10.56	53.15x	133744.89	-5.45		
Encke (IEG)	I	2047-04-03T01:42:28.422		10.36	53.19x	133423.31	-5.46		
A (IER)	I	2047-04-03T02:17:04.553		3.47x	53.58x	122050.38	-5.50		
B (OER)	I	2047-04-03T02:30:37.714		0.84x	53.22x	117571.16	-5.52		
B (IER)	I	2047-04-03T03:47:21.342		-13.26x	46.45x	91984.69	-5.59		
C (IER)	I	2047-04-03T04:39:18.397		-21.66x	38.58x	74490.58	-5.63		
Saturn	I	2047-04-03T05:12:36.856		-26.34x	32.70x	60241.34		7.97	9.75
Saturn	E	2047-04-03T11:34:35.611		-11.85x	-46.01	60240.08		-8.15	-9.98
C (IER)	E	2047-04-03T12:10:16.308		-5.40x	-52.46	74490.58	5.16		
B (IER)	E	2047-04-03T13:07:29.495		5.60	-60.77	91984.69	5.03		
B (OER)	E	2047-04-03T14:33:44.646		23.21	-63.57	117571.16	4.86		
A (IER)	E	2047-04-03T14:49:09.832		26.45	-62.48	122050.38	4.83		
Encke (IEG)	E	2047-04-03T15:28:43.996		34.83	-57.95	133423.31	4.76		
Encke (OEG)	E	2047-04-03T15:29:51.637		35.07	-57.79	133744.89	4.75		
A (OER)	E	2047-04-03T15:40:30.207		37.34	-56.23	136774.40	4.74		
F ring	E	2047-04-03T15:53:30.479		40.12	-54.18	140461.00	4.71		

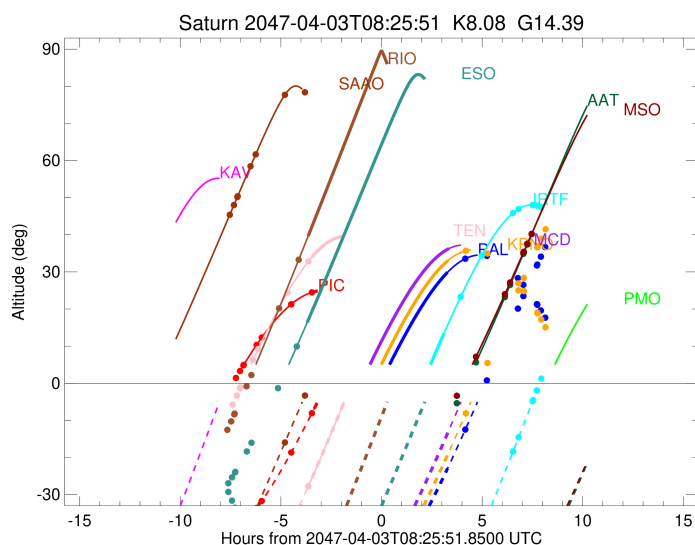
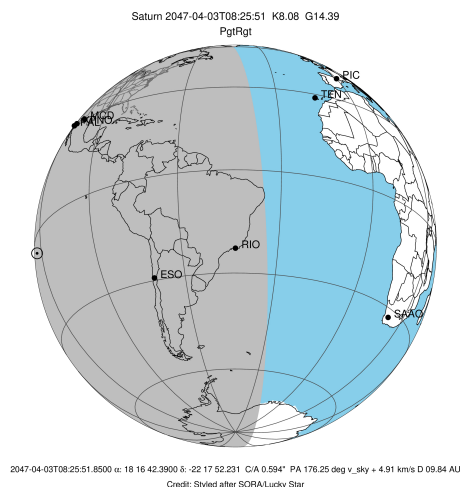
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-03T08:42:24.410
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : SAAO
 Location : So. Afr. Astro. Obs. (Sutherland)
 Latitude (deg) : -32.37953
 E. Longitude (deg) : 20.81070
 Altitude (km) : 1.768
 Gaia source ID : 4090527406850443648
 2Mass ID (if available) : 18164240-2217517
 ICRS Star Coord at Epoch: 18h 16m 42.38996s -22:17:52.23095s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 8.076
 G magnitude : 14.391
 RP magnitude : 12.778
 BP magnitude : 17.689
 DUPflag : 0
 Distance (au) : 9.840
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.91
 Sun-Target sep (deg) : 98.99
 Sun-Moon sep (deg) : 173.23
 B (ring opening deg) : 26.05
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.213
 C/A sky separation (km) : 1517.7
 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	2047-04-03T00:53:43.956		45.43	-48.75	140461.00	-5.00		
A (OER)	I	2047-04-03T01:06:02.566		48.04	-46.55	136774.40	-4.98		
Encke (OEG)	I	2047-04-03T01:16:11.339		50.19	-44.68	133744.89	-4.97		
Encke (IEG)	I	2047-04-03T01:17:16.051		50.42	-44.47	133423.31	-4.97		
A (IER)	I	2047-04-03T01:55:35.124		58.49	-37.07	122050.38	-4.93		
B (OER)	I	2047-04-03T02:10:45.570		61.65	-34.03	117571.16	-4.91		
B (IER)	I	2047-04-03T03:38:00.970		77.73	-15.91	91984.69	-4.87		
C (IER)	I	2047-04-03T04:37:51.612		78.35	-3.27x	74490.58	-4.88		
Saturn	I	2047-04-03T05:07:27.434		73.91	2.95x	60216.57		11.10	13.55
Saturn	E	2047-04-03T12:06:52.005		-10.52x	47.09x	60235.76		-8.77	-10.73
C (IER)	E	2047-04-03T12:39:42.097		-16.03x	42.82x	74490.58	5.42		
B (IER)	E	2047-04-03T13:33:17.408		-24.03x	34.21x	91984.69	5.45		
B (OER)	E	2047-04-03T14:51:23.591		-32.46x	19.48x	117571.16	5.46		
A (IER)	E	2047-04-03T15:05:04.538		-33.43x	16.74x	122050.38	5.45		
Encke (IEG)	E	2047-04-03T15:39:52.790		-35.08x	9.64x	133423.31	5.44		
Encke (OEG)	E	2047-04-03T15:40:51.942		-35.11x	9.43x	133744.89	5.44		
A (OER)	E	2047-04-03T15:50:09.545		-35.34x	7.51x	136774.40	5.43		
F ring	E	2047-04-03T16:01:29.007		-35.49x	5.15x	140461.00	5.42		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-03T08:21:14.690
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MSO
 Location : Mt. Stromlo Observatory
 Latitude (deg) : -35.32000
 E. Longitude (deg) : 149.00833
 Altitude (km) : 0.770
 Gaia source ID : 4090527406850443648
 2Mass ID (if available) : 18164240-2217517
 ICRS Star Coord at Epoch: 18h 16m 42.38996s -22:17:52.23095s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 8.076
 G magnitude : 14.391
 RP magnitude : 12.778
 BP magnitude : 17.689
 DUPflag : 0
 Distance (au) : 9.841
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.91
 Sun-Target sep (deg) : 98.99
 Sun-Moon sep (deg) : 173.76
 B (ring opening deg) : 26.05
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.141
 C/A sky separation (km) : 1003.7
 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_itr93_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	2047-04-03T01:19:20.689		16.27	48.09x	140461.00	-5.42		
A (OER)	I	2047-04-03T01:30:40.170		14.05	48.73x	136774.40	-5.43		
Encke (OEG)	I	2047-04-03T01:39:57.176		12.24	49.12x	133744.89	-5.44		
Encke (IEG)	I	2047-04-03T01:40:56.229		12.05	49.16x	133423.31	-5.45		
A (IER)	I	2047-04-03T02:15:36.285		5.43	49.57x	122050.38	-5.49		
B (OER)	I	2047-04-03T02:29:11.223		2.89x	49.29x	117571.16	-5.50		
B (IER)	I	2047-04-03T03:46:07.098		-10.59x	43.39x	91984.69	-5.58		
C (IER)	I	2047-04-03T04:38:14.184		-18.56x	36.22x	74490.58	-5.61		
Saturn	I	2047-04-03T05:12:07.040		-23.03x	30.69x	60242.78		7.75	9.49
Saturn	E	2047-04-03T11:35:14.057		-9.42x	-44.09	60238.25		-8.42	-10.30
C (IER)	E	2047-04-03T12:10:19.950		-3.40x	-49.89	74490.58	5.15		
B (IER)	E	2047-04-03T13:07:34.202		7.11	-57.25	91984.69	5.04		
B (OER)	E	2047-04-03T14:33:44.410		24.00	-59.67	117571.16	4.86		
A (IER)	E	2047-04-03T14:49:07.885		27.11	-58.76	122050.38	4.84		
Encke (IEG)	E	2047-04-03T15:28:36.565		35.14	-54.86	133423.31	4.77		
Encke (OEG)	E	2047-04-03T15:29:44.027		35.37	-54.73	133744.89	4.77		
A (OER)	E	2047-04-03T15:40:20.854		37.55	-53.35	136774.40	4.75		
F ring	E	2047-04-03T15:53:18.857		40.20	-51.53	140461.00	4.73		