

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-04T01:32:53.280
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4120816924928289024
 2Mass ID (if available) : 17250982-2142199

Saturn 2046-03-04T01:32:53 K8.93 G13.77 PgtRgt

ICRS Star Coord at Epoch: 17h 25m 09.80284s -21:42:20.20449s

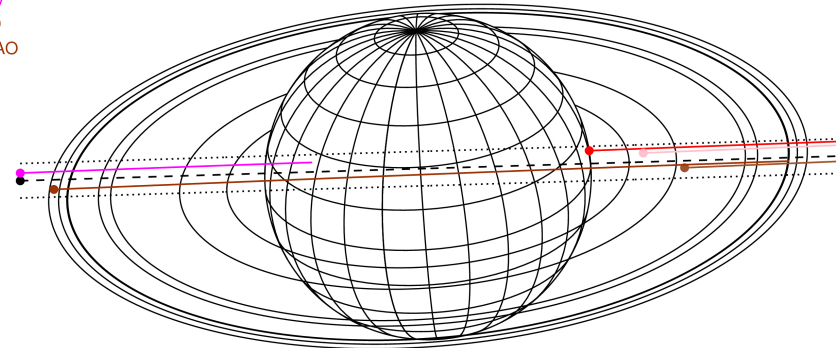
RUWE (>1.4 is poor) : 0.97
 K magnitude : 8.928
 G magnitude : 13.766
 RP magnitude : 12.520
 BP magnitude : 15.491
 DUPflag : 0
 Distance (au) : 10.133
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 14.20
 Sun-Target sep (deg) : 81.08
 Sun-Moon sep (deg) : 41.12
 B (ring opening deg) : 26.57
 PA of pole (deg) : 4.74

#	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



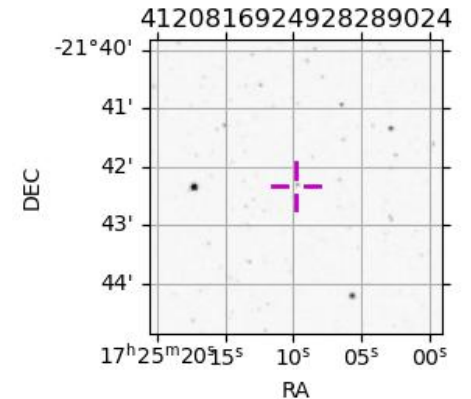
2046-03-04T01:32:53.2800 cc: 17 25 09.8028 s: -21 42 20.204 C/A 0.403° PA 181.73 deg v_sky +14.20 km/s D 10.13 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 TEN
 KAV
 RIO
 SAAO

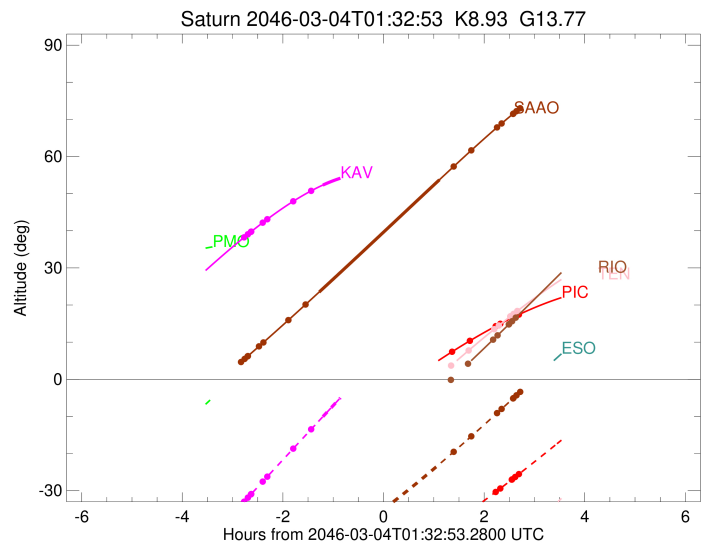
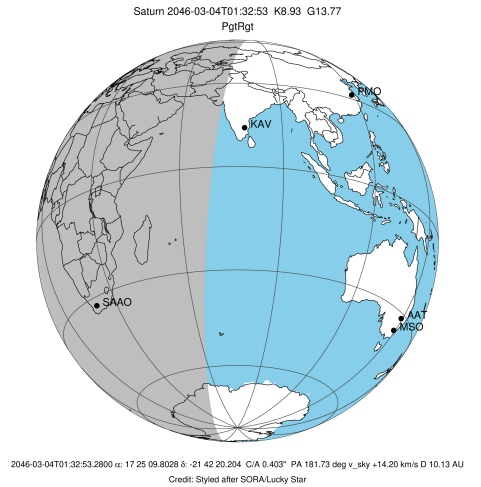


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1			+	MAR 04 02:54 - MAR 04 04:14	PnnRne
PAL	Palomar Mt (20	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4					PnnRnn
MCD	McDonald Obs.	30.7	256.0					PnnRnn
TEN	Teide Obs./Ten	28.3	343.5			+	MAR 04 03:14 - MAR 04 04:12	PnnRne
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observ	12.6	78.8	+	+		MAR 03 22:46 - MAR 04 00:20	PinRin
RIO	Rio de Janeiro	-22.9	316.8			+	MAR 04 03:43 - MAR 04 04:10	PnnRne
ESO	European South	-29.3	289.3					PnnRnn
AAT	Siding Spring	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro	-32.4	20.8	+	+	+	MAR 03 22:47 - MAR 04 04:07	PieRie
MSO	Mt. Stromlo Ob	-35.3	149.0					PnnRnn



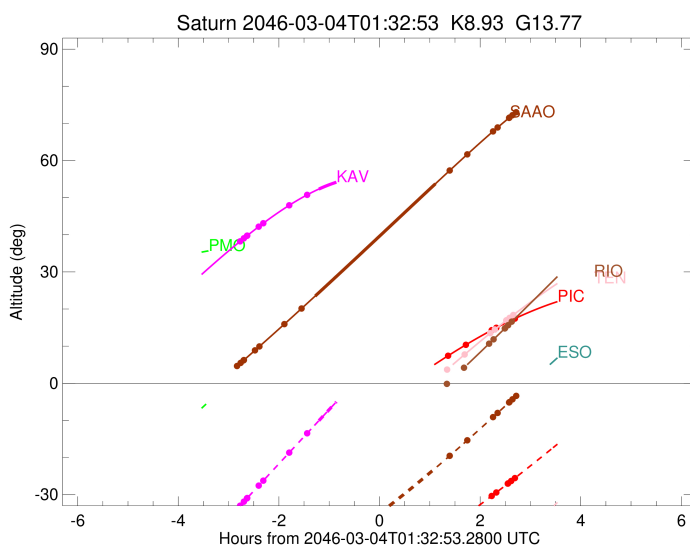
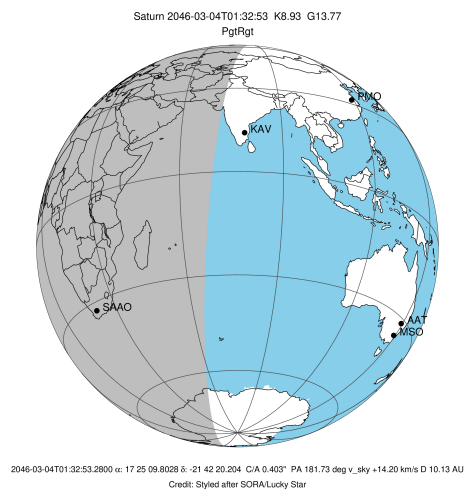
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-04T01:27:18.810
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 4120816924928289024
 2Mass ID (if available) : 17250982-2142199
 ICRS Star Coord at Epoch: 17h 25m 09.80284s -21:42:20.20449s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 8.928
 G magnitude : 13.766
 RP magnitude : 12.520
 BP magnitude : 15.491
 DUPflag : 0
 Distance (au) : 10.133
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 14.20
 Sun-Target sep (deg) : 81.08
 Sun-Moon sep (deg) : 41.60
 B (ring opening deg) : 26.57
 PA of pole (deg) : 4.74
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.983
 C/A sky separation (km) : 7224.6
 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	2046-03-03T22:46:36.083	-35.08x	-49.23	140461.00	-14.39			
A (OER)	I	2046-03-03T22:50:52.395	-34.29x	-49.65	136774.40	-14.38			
Encke (OEG)	I	2046-03-03T22:54:23.197	-33.64x	-49.98	133744.89	-14.37			
Encke (IEG)	I	2046-03-03T22:54:45.582	-33.57x	-50.01	133423.31	-14.36			
A (IER)	I	2046-03-03T23:07:58.513	-31.14x	-51.15	122050.38	-14.32			
B (OER)	I	2046-03-03T23:13:11.515	-30.18x	-51.54	117571.16	-14.30			
B (IER)	I	2046-03-03T23:43:09.016	-24.69x	-53.20	91984.69	-14.16			
C (IER)	I	2046-03-04T00:03:51.131	-20.93x	-53.68	74490.58	-14.00			
Saturn	I	2046-03-04T00:17:07.350	-18.54x	-53.69	60237.23			8.37	10.24
Saturn	E	2046-03-04T02:38:10.315	5.00x	-41.33	60261.18			3.93	4.82
C (IER)	E	2046-03-04T02:54:39.839	7.41	-38.86	74490.58	13.70			
B (IER)	E	2046-03-04T03:15:52.505	10.36	-35.50	91984.69	13.78			
B (OER)	E	2046-03-04T03:46:45.455	14.30	-30.35	117571.16	13.82			
A (IER)	E	2046-03-04T03:52:09.426	14.94	-29.42	122050.38	13.83			
Encke (IEG)	E	2046-03-04T04:05:51.828	16.51	-27.04	133423.31	13.83			
Encke (OEG)	E	2046-03-04T04:06:15.080	16.55	-26.97	133744.89	13.83			
A (OER)	E	2046-03-04T04:09:54.134	16.95	-26.33	136774.40	13.83			
F ring	E	2046-03-04T04:14:20.701	17.42	-25.55	140461.00	13.83			

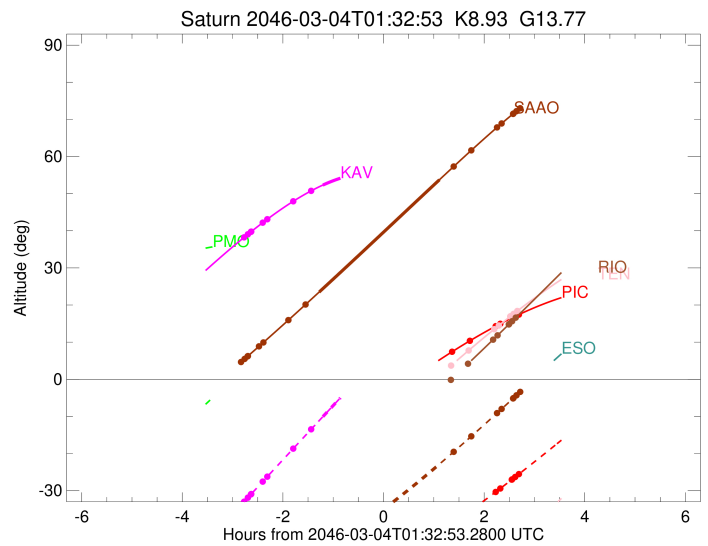
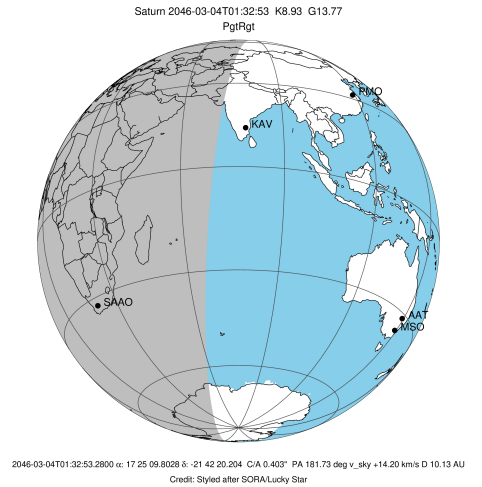
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-04T01:26:10.260
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 4120816924928289024
 2Mass ID (if available) : 17250982-2142199
 ICRS Star Coord at Epoch: 17h 25m 09.80284s -21:42:20.20449s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 8.928
 G magnitude : 13.766
 RP magnitude : 12.520
 BP magnitude : 15.491
 DUPflag : 0
 Distance (au) : 10.133
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 14.20
 Sun-Target sep (deg) : 81.08
 Sun-Moon sep (deg) : 41.62
 B (ring opening deg) : 26.57
 PA of pole (deg) : 4.74
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.740
 C/A sky separation (km) : 5435.6
 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	2046-03-03T22:45:59.184	-48.99x	-48.12	140461.00	-14.56			
A (OER)	I	2046-03-03T22:50:12.414	-48.06x	-48.97	136774.40	-14.55			
Encke (OEG)	I	2046-03-03T22:53:40.647	-47.30x	-49.66	133744.89	-14.54			
Encke (IEG)	I	2046-03-03T22:54:02.758	-47.21x	-49.73	133423.31	-14.54			
A (IER)	I	2046-03-03T23:07:05.702	-44.33x	-52.29	122050.38	-14.51			
B (OER)	I	2046-03-03T23:12:14.610	-43.20x	-53.28	117571.16	-14.49			
B (IER)	I	2046-03-03T23:41:46.269	-36.71x	-58.63	91984.69	-14.38			
C (IER)	I	2046-03-04T00:02:06.763	-32.26x	-61.91	74490.58	-14.27			
Saturn	I	2046-03-04T00:16:19.350	-29.16x	-63.91	60247.76			6.78	8.31
Saturn	E	2046-03-04T02:36:46.758	0.37x	-61.31	60265.22			2.51	3.08
C (IER)	E	2046-03-04T02:53:27.880	3.68x	-58.59	74490.58	13.91			
B (IER)	E	2046-03-04T03:14:24.016	7.75	-54.84	91984.69	13.94			
B (OER)	E	2046-03-04T03:45:00.399	13.49	-48.92	117571.16	13.92			
A (IER)	E	2046-03-04T03:50:22.119	14.47	-47.84	122050.38	13.92			
Encke (IEG)	E	2046-03-04T04:03:59.505	16.91	-45.06	133423.31	13.91			
Encke (OEG)	E	2046-03-04T04:04:22.629	16.98	-44.98	133744.89	13.91			
A (OER)	E	2046-03-04T04:08:00.509	17.61	-44.23	136774.40	13.90			
F ring	E	2046-03-04T04:12:25.732	18.38	-43.31	140461.00	13.90			

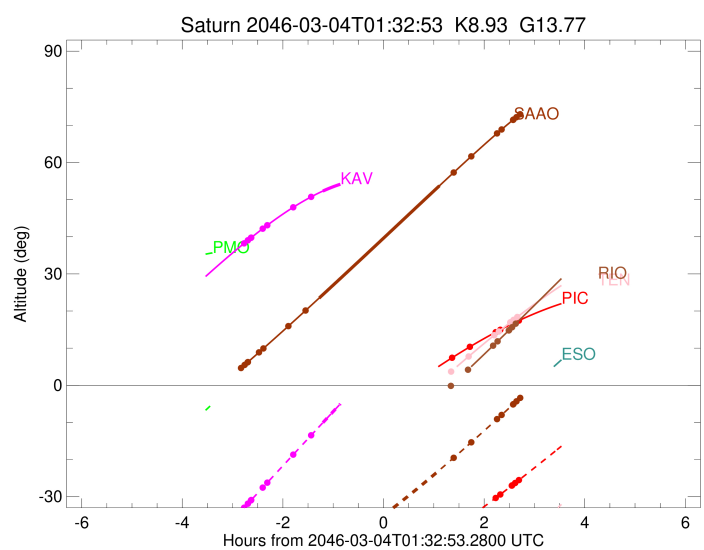
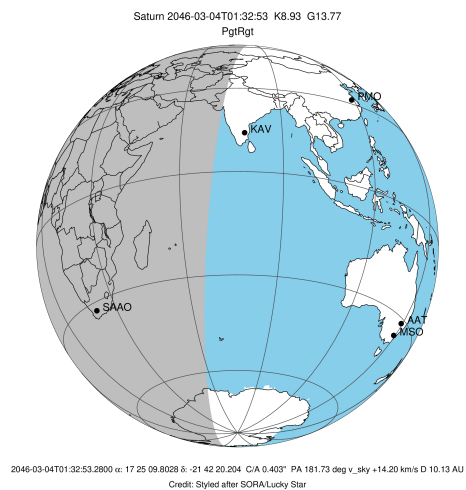
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-04T01:33:02.970
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 4120816924928289024
 2Mass ID (if available) : 17250982-2142199
 ICRS Star Coord at Epoch: 17h 25m 09.80284s -21:42:20.20449s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 8.928
 G magnitude : 13.766
 RP magnitude : 12.520
 BP magnitude : 15.491
 DUPflag : 0
 Distance (au) : 10.133
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 14.20
 Sun-Target sep (deg) : 81.08
 Sun-Moon sep (deg) : 41.64
 B (ring opening deg) : 26.57
 PA of pole (deg) : 4.74
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.892
 C/A sky separation (km) : 6556.2
 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	2046-03-03T22:46:43.223		38.24	-32.97	140461.00	-13.88		
A (OER)	I	2046-03-03T22:51:08.990		39.05	-31.89	136774.40	-13.87		
Encke (OEG)	I	2046-03-03T22:54:47.547		39.71	-31.00	133744.89	-13.86		
Encke (IEG)	I	2046-03-03T22:55:10.755		39.78	-30.90	133423.31	-13.86		
A (IER)	I	2046-03-03T23:08:52.637		42.19	-27.56	122050.38	-13.82		
B (OER)	I	2046-03-03T23:14:16.949		43.11	-26.24	117571.16	-13.80		
B (IER)	I	2046-03-03T23:45:17.368		47.95	-18.67	91984.69	-13.70		
C (IER)	I	2046-03-04T00:06:39.809		50.76	-13.46	74490.58	-13.58		
Saturn	I	2046-03-04T00:20:31.941		52.31	-10.09	60238.92		8.13	9.96
Saturn	E	2046-03-04T02:45:42.839		50.37	24.94x	60264.44		2.84	3.48
C (IER)	E	2046-03-04T03:02:47.606		48.09	28.99x	74490.58	13.55		
B (IER)	E	2046-03-04T03:24:12.581		44.85	34.02x	91984.69	13.66		
B (OER)	E	2046-03-04T03:55:17.858		39.54	41.23x	117571.16	13.76		
A (IER)	E	2046-03-04T04:00:43.163		38.55	42.47x	122050.38	13.78		
Encke (IEG)	E	2046-03-04T04:14:27.764		35.98	45.58x	133423.31	13.81		
Encke (OEG)	E	2046-03-04T04:14:51.054		35.91	45.67x	133744.89	13.81		
A (OER)	E	2046-03-04T04:18:30.386		35.21	46.49x	136774.40	13.82		
F ring	E	2046-03-04T04:22:57.124		34.35	47.48x	140461.00	13.83		

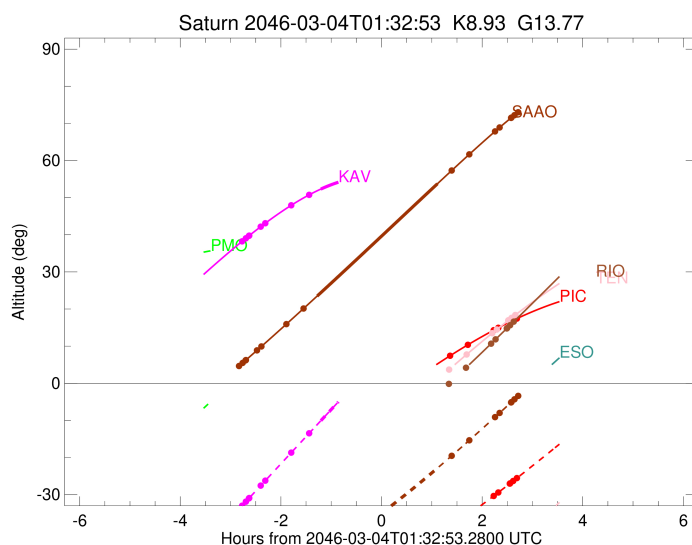
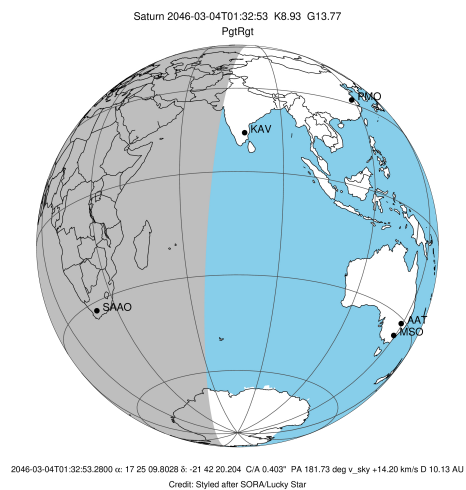
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-04T01:27:06.610
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 4120816924928289024
 2Mass ID (if available) : 17250982-2142199
 ICRS Star Coord at Epoch: 17h 25m 09.80284s -21:42:20.20449s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 8.928
 G magnitude : 13.766
 RP magnitude : 12.520
 BP magnitude : 15.491
 DUPflag : 0
 Distance (au) : 10.133
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 14.20
 Sun-Target sep (deg) : 81.08
 Sun-Moon sep (deg) : 41.46
 B (ring opening deg) : 26.57
 PA of pole (deg) : 4.74
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.080
 C/A sky separation (km) : 587.5
 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	2046-03-03T22:46:56.570	-42.01x	-20.63	140461.00	-14.74			
A (OER)	I	2046-03-03T22:51:06.782	-41.62x	-21.55	136774.40	-14.73			
Encke (OEG)	I	2046-03-03T22:54:32.456	-41.28x	-22.31	133744.89	-14.73			
Encke (IEG)	I	2046-03-03T22:54:54.291	-41.25x	-22.39	133423.31	-14.73			
A (IER)	I	2046-03-03T23:07:46.930	-39.88x	-25.20	122050.38	-14.71			
B (OER)	I	2046-03-03T23:12:51.464	-39.30x	-26.30	117571.16	-14.71			
B (IER)	I	2046-03-03T23:41:53.826	-35.55x	-32.51	91984.69	-14.66			
C (IER)	I	2046-03-04T00:01:48.199	-32.61x	-36.64	74490.58	-14.63			
Saturn	I	2046-03-04T00:17:48.635	-30.07x	-39.86	60266.62			1.77	2.17
Saturn	E	2046-03-04T02:37:03.453	-3.57x	-60.07	60264.86			-2.66	-3.27
C (IER)	E	2046-03-04T02:53:11.522	-0.18x	-60.70	74490.58	14.29			
B (IER)	E	2046-03-04T03:13:37.549	4.18x	-60.75	91984.69	14.25			
B (OER)	E	2046-03-04T03:43:37.507	10.67	-59.31	117571.16	14.18			
A (IER)	E	2046-03-04T03:48:53.465	11.82	-58.89	122050.38	14.17			
Encke (IEG)	E	2046-03-04T04:02:16.854	14.76	-57.60	133423.31	14.14			
Encke (OEG)	E	2046-03-04T04:02:39.594	14.84	-57.56	133744.89	14.14			
A (OER)	E	2046-03-04T04:06:13.893	15.63	-57.17	136774.40	14.13			
F ring	E	2046-03-04T04:10:34.831	16.59	-56.67	140461.00	14.12			

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-04T01:27:37.160
 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 : 4120816924928289024
 2Mass ID (if available) : 17250982-2142199
 ICRS Star Coord at Epoch: 17h 25m 09.80284s -21:42:20.20449s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 8.928
 G magnitude : 13.766
 RP magnitude : 12.520
 BP magnitude : 15.491
 DUPflag : 0
 Distance (au) : 10.133
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 14.20
 Sun-Target sep (deg) : 81.08
 Sun-Moon sep (deg) : 41.96
 B (ring opening deg) : 26.57
 PA of pole (deg) : 4.74
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.106
 C/A sky separation (km) : 777.3
 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	2046-03-03T22:43:01.163	4.65x	-51.30	140461.00	-14.37			
A (OER)	I	2046-03-03T22:47:17.745	5.49	-51.32	136774.40	-14.36			
Encke (OEG)	I	2046-03-03T22:50:48.717	6.18	-51.32	133744.89	-14.36			
Encke (IEG)	I	2046-03-03T22:51:11.118	6.25	-51.31	133423.31	-14.36			
A (IER)	I	2046-03-03T23:04:24.151	8.87	-51.14	122050.38	-14.33			
B (OER)	I	2046-03-03T23:09:36.919	9.91	-51.00	117571.16	-14.32			
B (IER)	I	2046-03-03T23:39:28.298	15.94	-49.46	91984.69	-14.25			
C (IER)	I	2046-03-03T23:59:57.896	20.14	-47.75	74490.58	-14.20			
Saturn	I	2046-03-04T00:16:11.685	23.50	-46.05	60264.46			2.83	3.48
Saturn	E	2046-03-04T02:39:42.637	53.77	-22.84	60266.88			-1.59	-1.95
C (IER)	E	2046-03-04T02:56:33.565	57.30	-19.55	74490.58	13.90			
B (IER)	E	2046-03-04T03:17:33.301	61.66	-15.37	91984.69	13.88			
B (OER)	E	2046-03-04T03:48:19.186	67.85	-9.11	117571.16	13.85			
A (IER)	E	2046-03-04T03:53:42.713	68.90	-8.00	122050.38	13.84			
Encke (IEG)	E	2046-03-04T04:07:24.623	71.48	-5.17	133423.31	13.83			
Encke (OEG)	E	2046-03-04T04:07:47.872	71.55	-5.09	133744.89	13.83			
A (OER)	E	2046-03-04T04:11:26.921	72.21	-4.33x	136774.40	13.83			
F ring	E	2046-03-04T04:15:53.536	73.00	-3.41x	140461.00	13.83			