

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-24T18:47:43.210
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4069866380704705024
 2Mass ID (if available) : 18020868-2221484

ICRS Star Coord at Epoch: 18h 02m 08.67408s -22:21:48.73105s

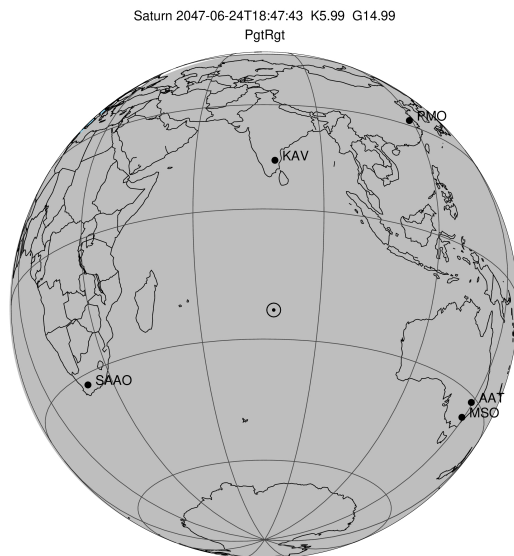
RUWE (>1.4 is poor) : 1.25
 K magnitude : 5.987
 G magnitude : 14.993
 RP magnitude : 13.242
 BP magnitude : 20.406
 DUPflag : 0
 Distance (au) : 9.030
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.17
 Sun-Target sep (deg) : 177.69
 Sun-Moon sep (deg) : 162.27
 B (ring opening deg) : 26.45
 PA of pole (deg) : 5.56

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

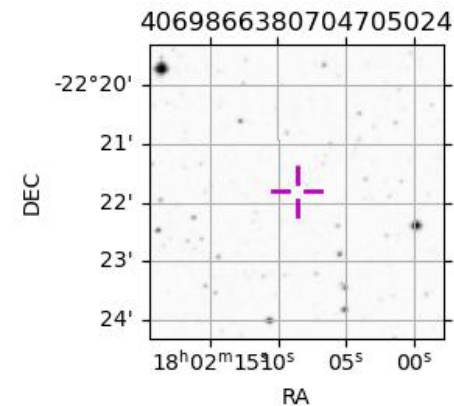
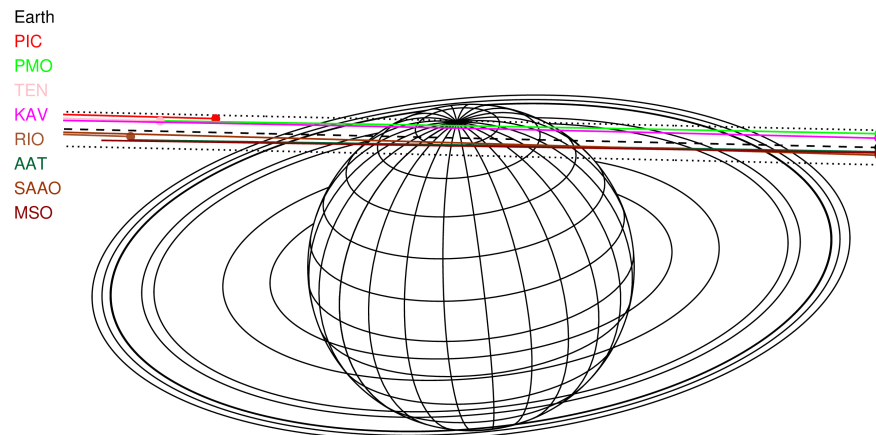
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs	32.1	118.8	+	+	+	JUN 24 17:21 - JUN 24 19:31	PieRie
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					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observ	12.6	78.8	+	+	+	JUN 24 17:21 - JUN 24 19:35	PieRie
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3					PnnRnn
AAT	Siding Spring	-31.3	149.1	+	+	+	JUN 24 17:08 - JUN 24 19:47	PieRie
SAAO	So. Afr. Astro	-32.4	20.8	+	+	+	JUN 24 17:14 - JUN 24 19:51	PieRie
MSO	Mt. Stromlo Ob	-35.3	149.0	+	+	+	JUN 24 17:07 - JUN 24 19:48	PieRie

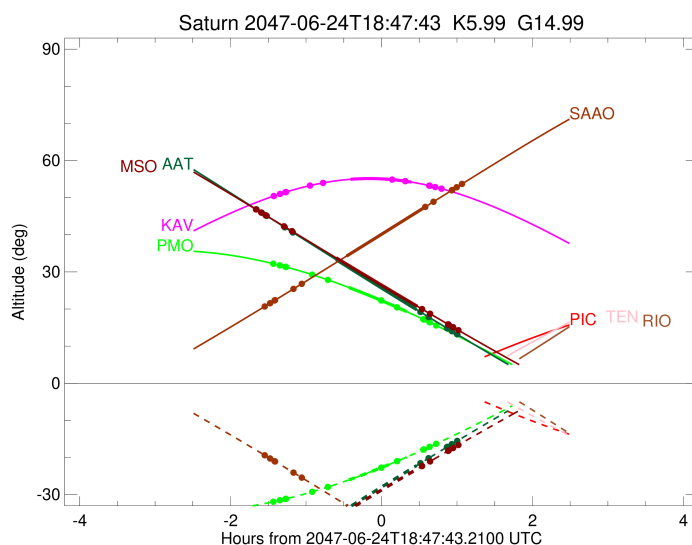
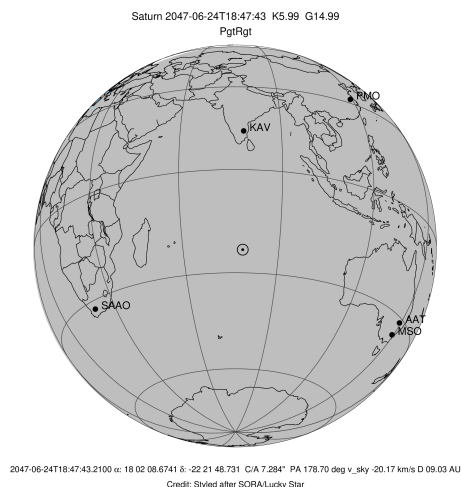


2047-06-24T18:47:43.2100 at: 18 02 08.6741 s: -22 21 48.731 C/A 7.284° PA 178.70 deg v_sky -20.17 km/s D 09.03 AU
 Credit: Styled after SORA/Lucky Star

Saturn 2047-06-24T18:47:43 K5.99 G14.99 PgtRgt

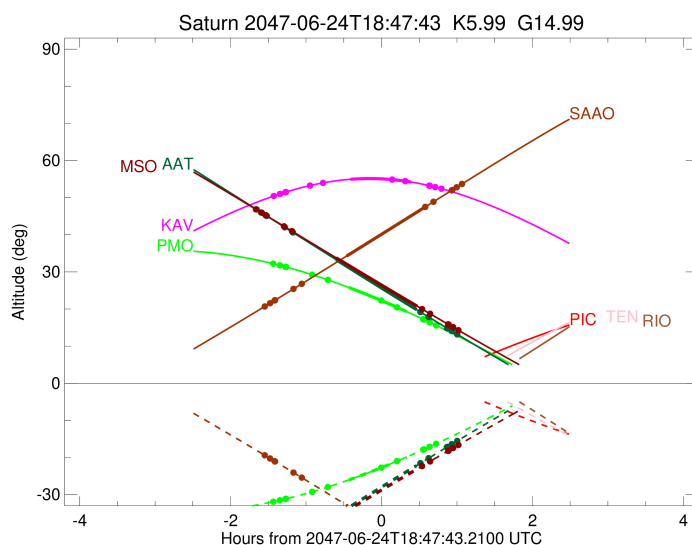
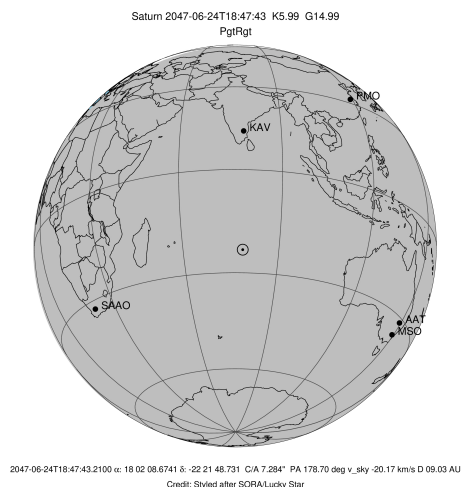


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-24T18:44:52.220
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 4069866380704705024
 2Mass ID (if available) : 18020868-2221484
 ICRS Star Coord at Epoch: 18h 02m 08.67408s -22:21:48.73105s
 RUWE (>1.4 is poor) : 1.25
 K magnitude : 5.987
 G magnitude : 14.993
 RP magnitude : 13.242
 BP magnitude : 20.406
 DUPflag : 0
 Distance (au) : 9.030
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.17
 Sun-Target sep (deg) : 177.69
 Sun-Moon sep (deg) : 161.88
 B (ring opening deg) : 26.45
 PA of pole (deg) : 5.56
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.979
 C/A sky separation (km) : 52257.6
 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



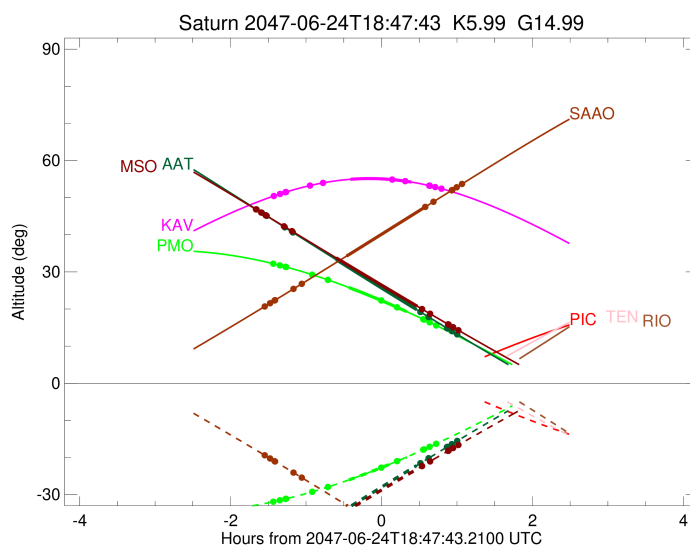
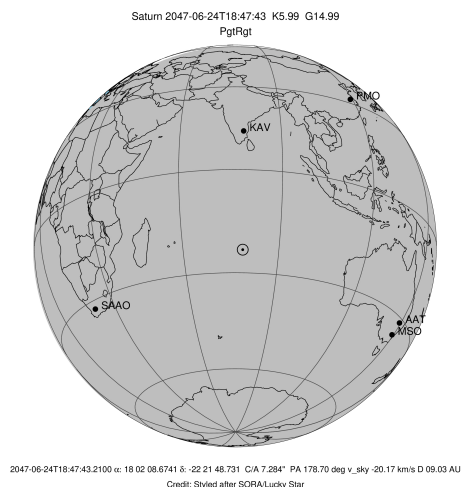
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-06-24T17:21:33.055		32.22	-31.92	140461.00	-12.21		
A (OER)	I	2047-06-24T17:26:43.524		31.78	-31.53	136774.40	-11.53		
Encke (OEG)	I	2047-06-24T17:31:13.605		31.38	-31.17	133744.89	-10.90		
Encke (IEG)	I	2047-06-24T17:31:43.216		31.33	-31.13	133423.31	-10.82		
A (IER)	I	2047-06-24T17:52:26.217		29.27	-29.26	122050.38	-7.32		
B (OER)	I	2047-06-24T18:04:40.300		27.90	-27.99	117571.16	-4.84		
Saturn	I	2047-06-24T18:21:40.876		25.81	-26.05	59509.94		47.09	52.58
Saturn	E	2047-06-24T19:07:43.223		19.30	-19.88	59294.94		56.32	61.19
B (OER)	E	2047-06-24T18:47:43.974	b	22.27	-22.71	117571.16	4.81		
A (IER)	E	2047-06-24T19:00:02.778	b	20.46	-20.99	122050.38	7.27		
Encke (IEG)	E	2047-06-24T19:20:55.246		17.23	-17.90	133423.31	10.74		
Encke (OEG)	E	2047-06-24T19:21:25.095		17.15	-17.82	133744.89	10.81		
A (OER)	E	2047-06-24T19:25:57.390		16.42	-17.12	136774.40	11.44		
F ring	E	2047-06-24T19:31:10.482		15.58	-16.30	140461.00	12.10		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-24T18:47:28.100
 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 : 4069866380704705024
 2Mass ID (if available) : 18020868-2221484
 ICRS Star Coord at Epoch: 18h 02m 08.67408s -22:21:48.73105s
 RUWE (>1.4 is poor) : 1.25
 K magnitude : 5.987
 G magnitude : 14.993
 RP magnitude : 13.242
 BP magnitude : 20.406
 DUPflag : 0
 Distance (au) : 9.030
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.17
 Sun-Target sep (deg) : 177.69
 Sun-Moon sep (deg) : 162.48
 B (ring opening deg) : 26.45
 PA of pole (deg) : 5.56
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.839
 C/A sky separation (km) : 51341.6
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-06-24T17:21:58.809		50.43	-48.51	140461.00	-12.72		
A (OER)	I	2047-06-24T17:26:55.762		50.99	-49.10	136774.40	-12.10		
Encke (OEG)	I	2047-06-24T17:31:12.304		51.45	-49.59	133744.89	-11.51		
Encke (IEG)	I	2047-06-24T17:31:40.312		51.50	-49.64	133423.31	-11.45		
A (IER)	I	2047-06-24T17:50:42.202		53.24	-51.55	122050.38	-8.33		
B (OER)	I	2047-06-24T18:00:51.686		53.96	-52.37	117571.16	-6.33		
Saturn	I	2047-06-24T18:23:04.032		54.95	-53.63	59549.06		45.47	51.02
Saturn	E	2047-06-24T19:11:29.989		54.20	-53.62	59316.94		55.33	60.29
B (OER)	E	2047-06-24T18:56:22.552	b	54.86	-54.04	117571.16	6.30		
A (IER)	E	2047-06-24T19:06:34.616	b	54.45	-53.80	122050.38	8.30		
Encke (IEG)	E	2047-06-24T19:25:40.773		53.24	-52.90	133423.31	11.41		
Encke (OEG)	E	2047-06-24T19:26:08.874		53.20	-52.87	133744.89	11.48		
A (OER)	E	2047-06-24T19:30:26.243		52.85	-52.58	136774.40	12.06		
F ring	E	2047-06-24T19:35:24.114		52.41	-52.22	140461.00	12.69		

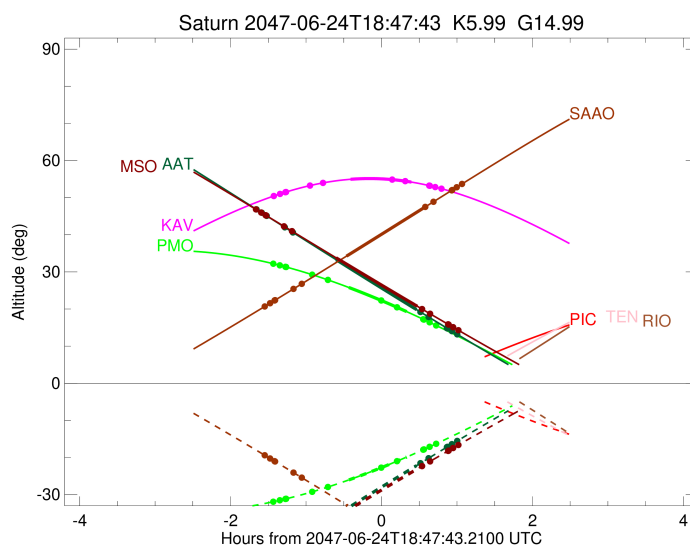
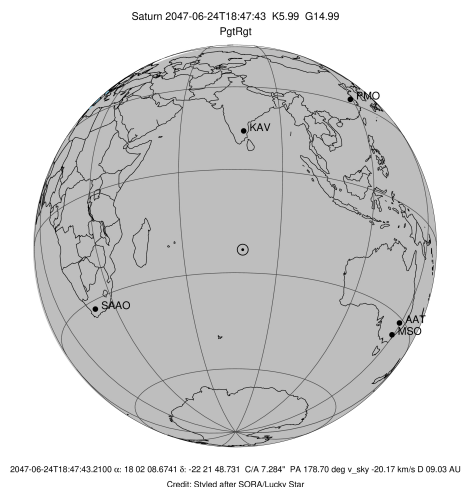
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-24T18:43:46.050
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 4069866380704705024
 2Mass ID (if available) : 18020868-2221484
 ICRS Star Coord at Epoch: 18h 02m 08.67408s -22:21:48.73105s
 RUWE (>1.4 is poor) : 1.25
 K magnitude : 5.987
 G magnitude : 14.993
 RP magnitude : 13.242
 BP magnitude : 20.406
 DUPflag : 0
 Distance (au) : 9.030
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.17
 Sun-Target sep (deg) : 177.69
 Sun-Moon sep (deg) : 161.66
 B (ring opening deg) : 26.45
 PA of pole (deg) : 5.56
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.897
 C/A sky separation (km) : 45174.5
 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

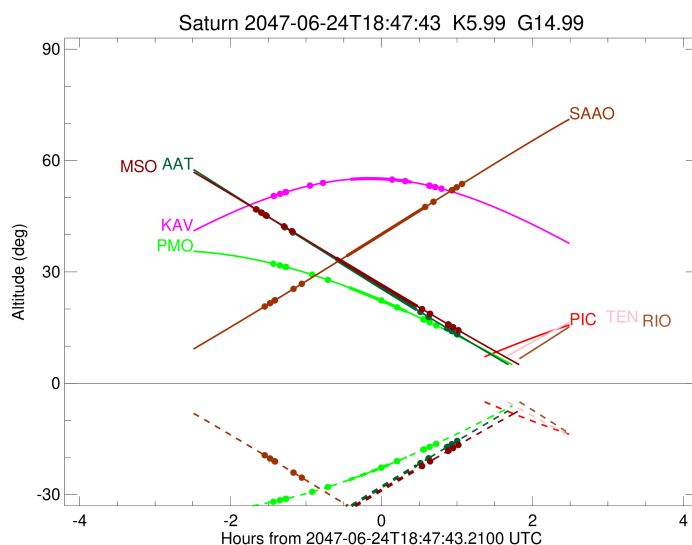
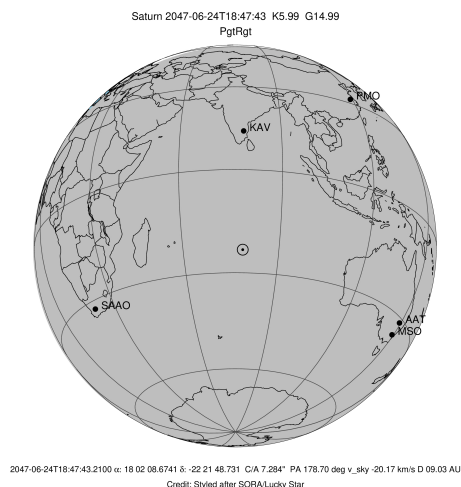
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-06-24T17:08:14.379		46.86	-49.10	140461.00	-14.85		
A (OER)	I	2047-06-24T17:12:26.027		45.96	-48.20	136774.40	-14.44		
Encke (OEG)	I	2047-06-24T17:15:58.500		45.20	-47.44	133744.89	-14.07		
Encke (IEG)	I	2047-06-24T17:16:21.389		45.12	-47.36	133423.31	-14.03		
A (IER)	I	2047-06-24T17:30:45.113		42.03	-44.28	122050.38	-12.23		
B (OER)	I	2047-06-24T17:37:06.060		40.67	-42.93	117571.16	-11.27		
Saturn	I	2047-06-24T18:11:41.233		33.28	-35.57	59743.71		37.40	42.97
Saturn	E	2047-06-24T19:15:36.855		19.83	-22.16	59493.05		47.79	53.25
B (OER)	E	2047-06-24T19:18:43.755		19.18	-21.52	117571.16	11.16		
A (IER)	E	2047-06-24T19:25:08.584		17.86	-20.20	122050.38	12.10		
Encke (IEG)	E	2047-06-24T19:39:41.885		14.86	-17.21	133423.31	13.86		
Encke (OEG)	E	2047-06-24T19:40:05.045		14.78	-17.13	133744.89	13.91		
A (OER)	E	2047-06-24T19:43:40.083		14.05	-16.40	136774.40	14.27		
F ring	E	2047-06-24T19:47:54.882		13.19	-15.54	140461.00	14.66		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-24T18:51:11.320
 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 : 4069866380704705024
 2Mass ID (if available) : 18020868-2221484
 ICRS Star Coord at Epoch: 18h 02m 08.67408s -22:21:48.73105s
 RUWE (>1.4 is poor) : 1.25
 K magnitude : 5.987
 G magnitude : 14.993
 RP magnitude : 13.242
 BP magnitude : 20.406
 DUPflag : 0
 Distance (au) : 9.030
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.17
 Sun-Target sep (deg) : 177.69
 Sun-Moon sep (deg) : 163.06
 B (ring opening deg) : 26.45
 PA of pole (deg) : 5.56
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.004
 C/A sky separation (km) : 45873.0
 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	2047-06-24T17:14:48.421		20.67	-19.38	140461.00	-14.67		
A (OER)	I	2047-06-24T17:19:03.237		21.55	-20.24	136774.40	-14.26		
Encke (OEG)	I	2047-06-24T17:22:38.506		22.29	-20.97	133744.89	-13.88		
Encke (IEG)	I	2047-06-24T17:23:01.704		22.37	-21.05	133423.31	-13.84		
A (IER)	I	2047-06-24T17:37:38.913		25.40	-24.05	122050.38	-12.00		
B (OER)	I	2047-06-24T17:44:07.657		26.75	-25.38	117571.16	-11.02		
Saturn	I	2047-06-24T18:19:52.615		34.24	-32.81	59737.98		37.64	43.22
Saturn	E	2047-06-24T19:22:04.896		47.42	-45.90	59460.87		49.14	54.53
B (OER)	E	2047-06-24T19:22:34.086		47.52	-46.00	117571.16	11.05		
A (IER)	E	2047-06-24T19:29:01.390		48.89	-47.37	122050.38	12.06		
Encke (IEG)	E	2047-06-24T19:43:33.701		51.97	-50.44	133423.31	13.94		
Encke (OEG)	E	2047-06-24T19:43:56.742		52.05	-50.53	133744.89	13.98		
A (OER)	E	2047-06-24T19:47:30.488		52.80	-51.28	136774.40	14.36		
F ring	E	2047-06-24T19:51:43.362		53.69	-52.17	140461.00	14.79		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-24T18:43:57.320
 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 : 4069866380704705024
 2Mass ID (if available) : 18020868-2221484
 ICRS Star Coord at Epoch: 18h 02m 08.67408s -22:21:48.73105s
 RUWE (>1.4 is poor) : 1.25
 K magnitude : 5.987
 G magnitude : 14.993
 RP magnitude : 13.242
 BP magnitude : 20.406
 DUPflag : 0
 Distance (au) : 9.030
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.17
 Sun-Target sep (deg) : 177.69
 Sun-Moon sep (deg) : 161.69
 B (ring opening deg) : 26.45
 PA of pole (deg) : 5.56
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.841
 C/A sky separation (km) : 44805.4
 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	2047-06-24T17:07:50.835		46.86	-49.11	140461.00	-14.97		
A (OER)	I	2047-06-24T17:12:00.430		46.01	-48.26	136774.40	-14.57		
Encke (OEG)	I	2047-06-24T17:15:30.976		45.29	-47.55	133744.89	-14.21		
Encke (IEG)	I	2047-06-24T17:15:53.645		45.21	-47.47	133423.31	-14.17		
A (IER)	I	2047-06-24T17:30:06.877		42.30	-44.56	122050.38	-12.42		
B (OER)	I	2047-06-24T17:36:21.282		41.02	-43.29	117571.16	-11.49		
Saturn	I	2047-06-24T18:11:30.290		33.82	-36.11	59754.83		36.93	42.49
Saturn	E	2047-06-24T19:16:10.325		20.74	-23.07	59502.73		47.39	52.87
B (OER)	E	2047-06-24T19:20:01.495		19.98	-22.31	117571.16	11.38		
A (IER)	E	2047-06-24T19:26:19.602		18.72	-21.06	122050.38	12.29		
Encke (IEG)	E	2047-06-24T19:40:41.984		15.88	-18.22	133423.31	14.01		
Encke (OEG)	E	2047-06-24T19:41:04.912		15.81	-18.15	133744.89	14.05		
A (OER)	E	2047-06-24T19:44:37.910		15.11	-17.45	136774.40	14.40		
F ring	E	2047-06-24T19:48:50.519		14.29	-16.63	140461.00	14.79		