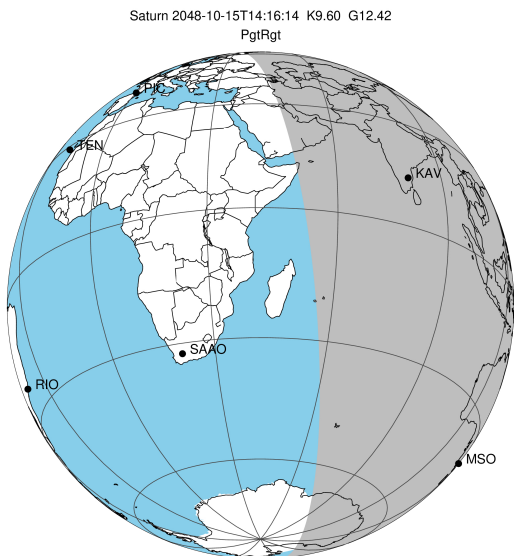


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-10-15T14:16:14.640
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4079180996592402176
 2Mass ID (if available) : 18412748-2244133

ICRS Star Coord at Epoch: 18h 41m 27.48067s -22:44:13.40982s

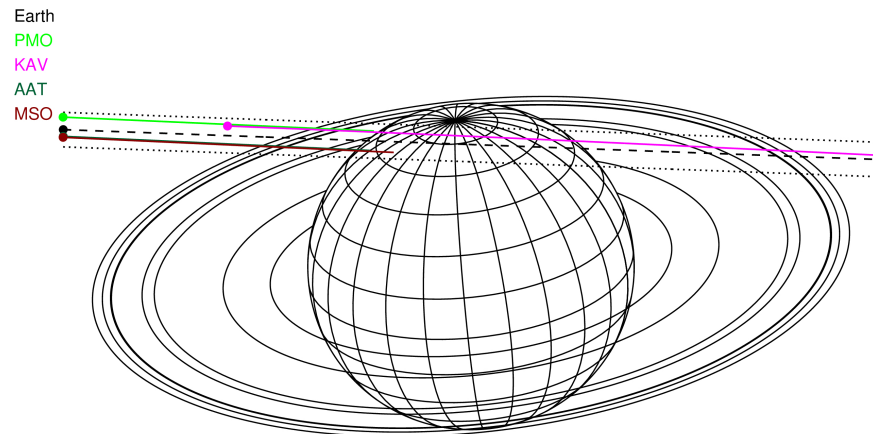
RUWE (>1.4 is poor) : 0.85
 K magnitude : 9.599
 G magnitude : 12.416
 RP magnitude : 11.580
 BP magnitude : 13.151
 DUPflag : 0
 Distance (au) : 10.202
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 16.14
 Sun-Target sep (deg) : 77.33
 Sun-Moon sep (deg) : 26.86
 B (ring opening deg) : 25.89
 PA of pole (deg) : 6.24

#	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



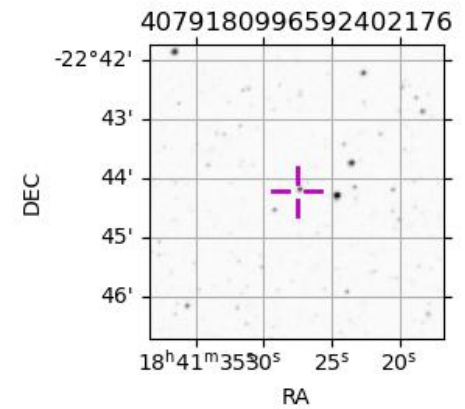
2048-10-15T14:16:14.6400 ra: 18 41 27.4807 s: -22 44 13.410 C/A 6.084° PA 177.90 deg v_sky +16.14 km/s D 10.20 AU
 Credit: Styled after SORA/Lucky Star

Saturn 2048-10-15T14:16:14 K9.60 G12.42 PgtRgt

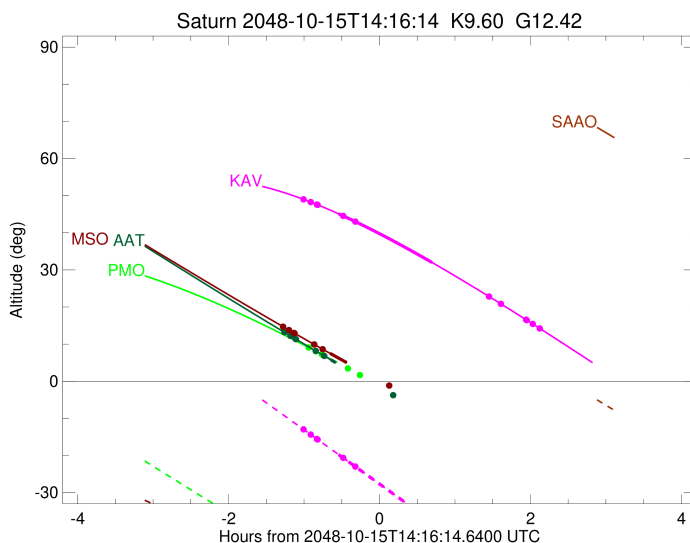
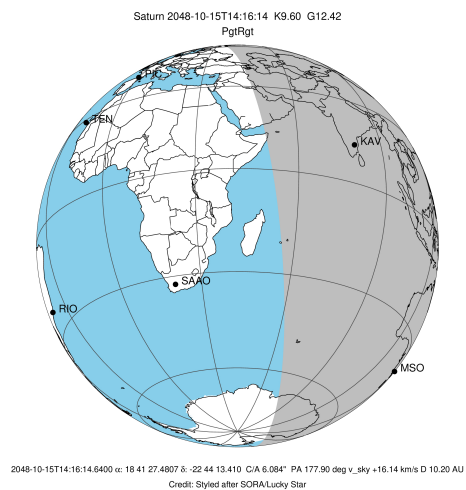


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEncode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs	32.1	118.8	+			OCT 15 13:19 - OCT 15 13:30	PnnRin
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	+	+	+	OCT 15 13:15 - OCT 15 16:23	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	+	+		OCT 15 13:00 - OCT 15 13:37	PinRin
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0	+	+		OCT 15 12:59 - OCT 15 13:36	PinRin



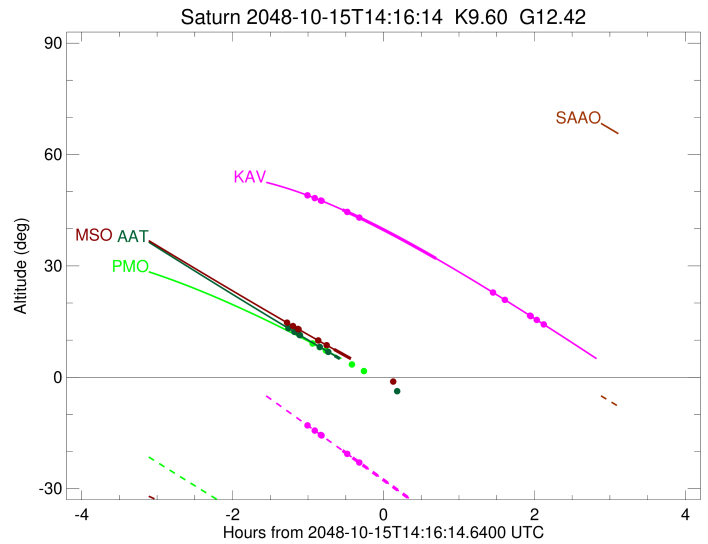
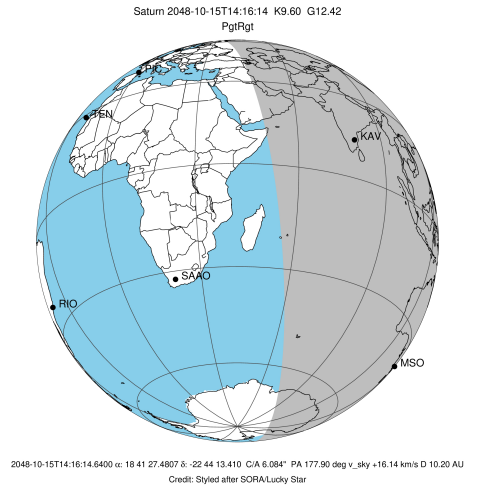
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-10-15T14:22:19.930
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 4079180996592402176
 2Mass ID (if available) : 18412748-2244133
 ICRS Star Coord at Epoch: 18h 41m 27.48067s -22:44:13.40982s
 RUWE (>1.4 is poor) : 0.85
 K magnitude : 9.599
 G magnitude : 12.416
 RP magnitude : 11.580
 BP magnitude : 13.151
 DUPflag : 0
 Distance (au) : 10.202
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 16.14
 Sun-Target sep (deg) : 77.33
 Sun-Moon sep (deg) : 26.04
 B (ring opening deg) : 25.89
 PA of pole (deg) : 6.24
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.531
 C/A sky separation (km) : 48323.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



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

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2048-10-15T13:19:53.647		9.10	-48.29	140461.00	-11.02		
A (OER)	I	2048-10-15T13:25:34.250		8.09	-49.37	136774.40	-10.63		
Encke (OEG)	I	2048-10-15T13:30:24.213		7.23	-50.29	133744.89	-10.27		
Encke (IEG)	I	2048-10-15T13:30:55.599		7.14	-50.39	133423.31	-10.23		
A (IER)	I	2048-10-15T13:51:10.697	b	3.44x	-54.09	122050.38	-8.41		
B (OER)	I	2048-10-15T14:00:37.100	b	1.68x	-55.74	117571.16	-7.39		
Saturn	I	2048-10-15T13:46:24.401		4.32x	-53.24	59402.82		53.49	58.60
Saturn	E	2048-10-15T14:58:38.860		-9.55x	-64.10	59718.28		39.65	45.26
B (OER)	E	2048-10-15T15:42:42.273		-18.45x	-66.97	117571.16	7.52		
A (IER)	E	2048-10-15T15:51:57.987		-20.35x	-67.03	122050.38	8.58		
Encke (IEG)	E	2048-10-15T16:11:46.555		-24.45x	-66.50	133423.31	10.48		
Encke (OEG)	E	2048-10-15T16:12:17.191		-24.56x	-66.48	133744.89	10.52		
A (OER)	E	2048-10-15T16:17:00.065		-25.54x	-66.22	136774.40	10.90		
F ring	E	2048-10-15T16:22:31.967		-26.69x	-65.85	140461.00	11.31		

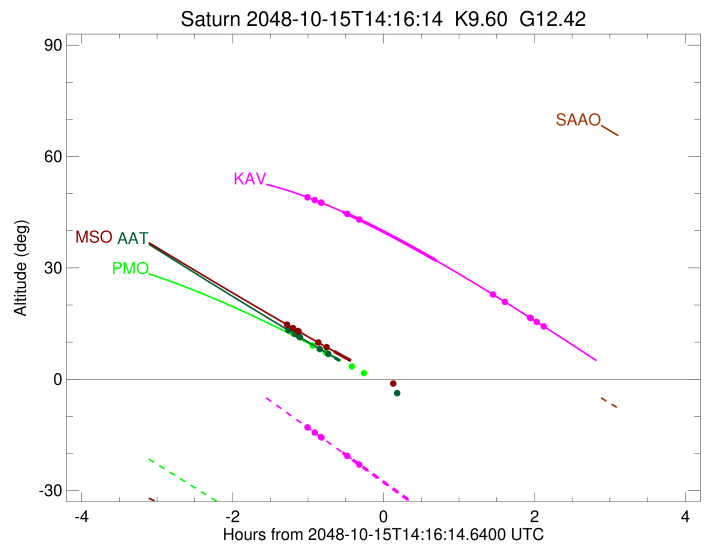
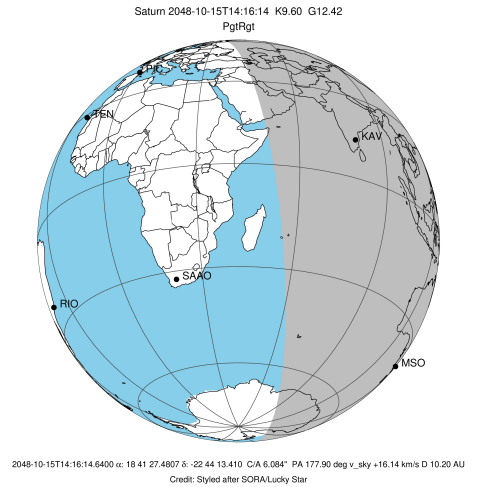
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-10-15T14:20:41.730
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 4079180996592402176
 2Mass ID (if available) : 18412748-2244133
 ICRS Star Coord at Epoch: 18h 41m 27.48067s -22:44:13.40982s
 RUWE (>1.4 is poor) : 0.85
 K magnitude : 9.599
 G magnitude : 12.416
 RP magnitude : 11.580
 BP magnitude : 13.151
 DUPflag : 0
 Distance (au) : 10.202
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 16.14
 Sun-Target sep (deg) : 77.33
 Sun-Moon sep (deg) : 26.55
 B (ring opening deg) : 25.89
 PA of pole (deg) : 6.24
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.490
 C/A sky separation (km) : 48022.0
 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



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

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2048-10-15T13:15:50.211		49.01	-12.97	140461.00	-10.86		
A (OER)	I	2048-10-15T13:21:35.473		48.27	-14.37	136774.40	-10.49		
Encke (OEG)	I	2048-10-15T13:26:29.169		47.61	-15.56	133744.89	-10.14		
Encke (IEG)	I	2048-10-15T13:27:00.944		47.53	-15.68	133423.31	-10.10		
A (IER)	I	2048-10-15T13:47:27.719	b	44.53	-20.65	122050.38	-8.36		
B (OER)	I	2048-10-15T13:56:55.898	b	43.03	-22.96	117571.16	-7.39		
Saturn	I	2048-10-15T13:43:39.677		45.12	-19.73	59412.45		53.05	58.19
Saturn	E	2048-10-15T14:58:08.818		31.97	-37.88	59726.47		39.29	44.90
B (OER)	E	2048-10-15T15:43:38.041		22.77	-48.99	117571.16	7.53		
A (IER)	E	2048-10-15T15:52:54.968		20.82	-51.25	122050.38	8.54		
Encke (IEG)	E	2048-10-15T16:12:53.751		16.56	-56.13	133423.31	10.36		
Encke (OEG)	E	2048-10-15T16:13:24.733		16.45	-56.25	133744.89	10.40		
A (OER)	E	2048-10-15T16:18:10.938		15.42	-57.42	136774.40	10.77		
F ring	E	2048-10-15T16:23:47.004		14.21	-58.78	140461.00	11.17		

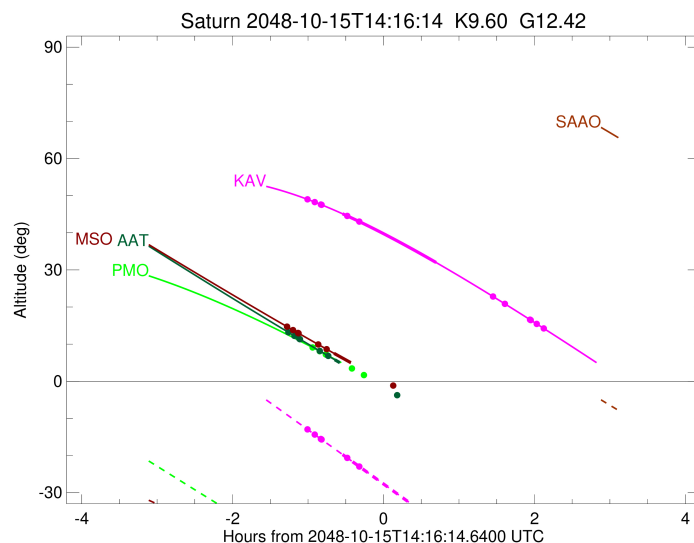
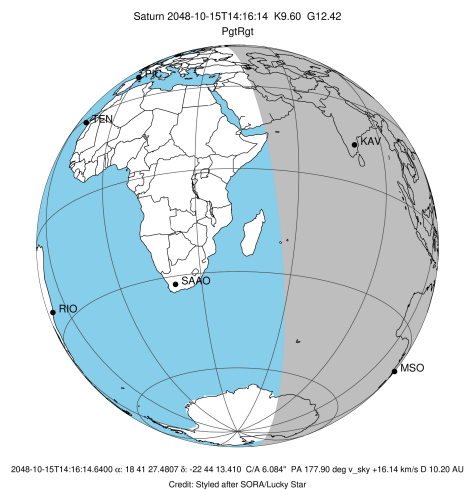
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-10-15T14:21:47.950
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 4079180996592402176
 2Mass ID (if available) : 18412748-2244133
 ICRS Star Coord at Epoch: 18h 41m 27.48067s -22:44:13.40982s
 RUWE (>1.4 is poor) : 0.85
 K magnitude : 9.599
 G magnitude : 12.416
 RP magnitude : 11.580
 BP magnitude : 13.151
 DUPflag : 0
 Distance (au) : 10.202
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 16.14
 Sun-Target sep (deg) : 77.33
 Sun-Moon sep (deg) : 26.26
 B (ring opening deg) : 25.89
 PA of pole (deg) : 6.24
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.555
 C/A sky separation (km) : 41101.6
 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	2048-10-15T13:00:39.880		13.19	-48.35	140461.00	-13.00		
A (OER)	I	2048-10-15T13:05:26.091		12.22	-48.65	136774.40	-12.76		
Encke (OEG)	I	2048-10-15T13:09:25.563		11.41	-48.88	133744.89	-12.54		
Encke (IEG)	I	2048-10-15T13:09:51.230		11.33	-48.91	133423.31	-12.52		
A (IER)	I	2048-10-15T13:25:37.304		8.16	-49.60	122050.38	-11.48		
B (OER)	I	2048-10-15T13:32:16.676		6.84	-49.79	117571.16	-10.94		
B (IER)	I	2048-10-15T14:27:17.236	b	-3.78x	-48.96	91984.69	-3.66		
Saturn	I	2048-10-15T13:37:30.292		5.80	-49.90	59583.54		45.50	51.04
Saturn	E	2048-10-15T15:06:18.960		-10.87x	-45.92	59914.90		30.67	35.92
B (IER)	E	2048-10-15T15:05:38.120	b	-10.75x	-45.99	91984.69	3.69		
B (OER)	E	2048-10-15T15:59:50.316		-19.73x	-39.19	117571.16	11.15		
A (IER)	E	2048-10-15T16:06:22.080		-20.73x	-38.21	122050.38	11.71		
Encke (IEG)	E	2048-10-15T16:21:48.437		-23.00x	-35.79	133423.31	12.80		
Encke (OEG)	E	2048-10-15T16:22:13.534		-23.06x	-35.73	133744.89	12.83		
A (OER)	E	2048-10-15T16:26:07.589		-23.61x	-35.09	136774.40	13.06		
F ring	E	2048-10-15T16:30:47.101		-24.26x	-34.32	140461.00	13.32		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-10-15T14:21:31.750
 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 : 4079180996592402176
 2Mass ID (if available) : 18412748-2244133
 ICRS Star Coord at Epoch: 18h 41m 27.48067s -22:44:13.40982s
 RUWE (>1.4 is poor) : 0.85
 K magnitude : 9.599
 G magnitude : 12.416
 RP magnitude : 11.580
 BP magnitude : 13.151
 DUPflag : 0
 Distance (au) : 10.202
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 16.14
 Sun-Target sep (deg) : 77.33
 Sun-Moon sep (deg) : 26.32
 B (ring opening deg) : 25.89
 PA of pole (deg) : 6.24
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.514
 C/A sky separation (km) : 40799.7
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



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

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2048-10-15T12:59:35.660		14.71	-44.43	140461.00	-13.06		
A (OER)	I	2048-10-15T13:04:20.540		13.78	-44.70	136774.40	-12.82		
Encke (OEG)	I	2048-10-15T13:08:18.793		13.01	-44.91	133744.89	-12.61		
Encke (IEG)	I	2048-10-15T13:08:44.324		12.93	-44.94	133423.31	-12.58		
A (IER)	I	2048-10-15T13:24:24.309		9.91	-45.57	122050.38	-11.57		
B (OER)	I	2048-10-15T13:31:00.304		8.65	-45.75	117571.16	-11.05		
B (IER)	I	2048-10-15T14:24:08.206	b	-1.19x	-45.20	91984.69	-4.16		
Saturn	I	2048-10-15T13:36:54.883		7.52	-45.87	59591.32		45.16	50.72
Saturn	E	2048-10-15T15:06:22.050		-8.50x	-42.34	59921.64		30.35	35.57
B (IER)	E	2048-10-15T15:07:48.224		-8.74x	-42.21	91984.69	4.20		
B (OER)	E	2048-10-15T16:00:09.355		-16.92x	-36.20	117571.16	11.25		
A (IER)	E	2048-10-15T16:06:37.997		-17.85x	-35.31	122050.38	11.79		
Encke (IEG)	E	2048-10-15T16:21:58.913		-19.96x	-33.09	133423.31	12.86		
Encke (OEG)	E	2048-10-15T16:22:23.892		-20.02x	-33.03	133744.89	12.89		
A (OER)	E	2048-10-15T16:26:16.906		-20.53x	-32.45	136774.40	13.11		
F ring	E	2048-10-15T16:30:55.305		-21.14x	-31.74	140461.00	13.37		