

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-04T15:21:13.840
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4070427990723332608
 2Mass ID (if available) : 17510473-2225513

ICRS Star Coord at Epoch: 17h 51m 04.72703s -22:25:51.76252s

RUWE (>1.4 is poor) : 0.98
 K magnitude : 7.572
 G magnitude : 13.002
 RP magnitude : 11.673
 BP magnitude : 15.010
 DUPflag : 0
 Distance (au) : 9.287
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.99
 Sun-Target sep (deg) : 136.39
 Sun-Moon sep (deg) : 28.32
 B (ring opening deg) : 26.76
 PA of pole (deg) : 5.34

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

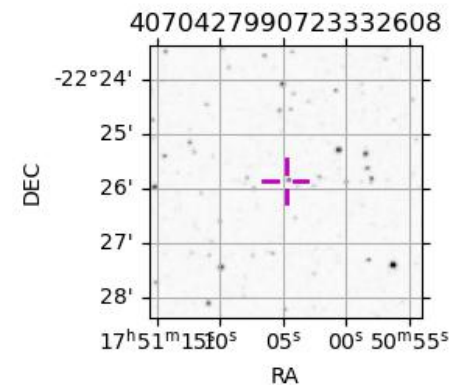
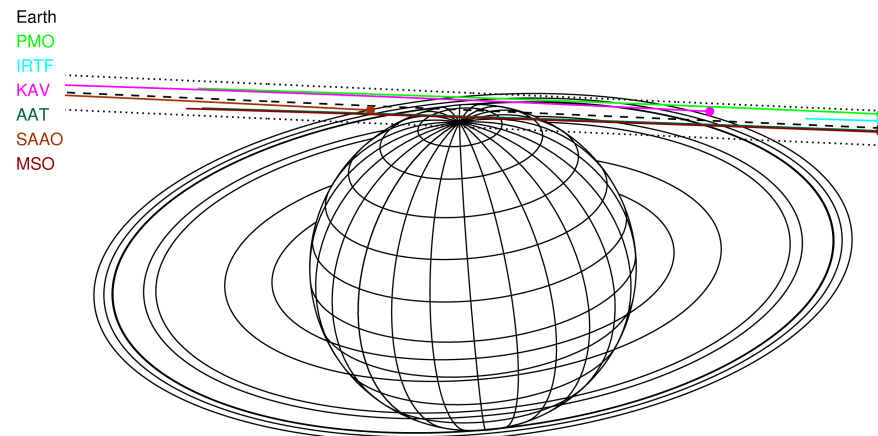
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEncode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs	32.1	118.8	+		+	AUG 04 13:45 - AUG 04 15:28	PnnRie
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	+		+	AUG 04 13:38 - AUG 04 15:42	PnnRie
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3					PnnRnn
AAT	Siding Spring	-31.3	149.1	+	+	+	AUG 04 13:04 - AUG 04 16:17	PieRie
SAAO	So. Afr. Astro	-32.4	20.8			+	AUG 04 16:23 - AUG 04 16:23	PnnRne
MSO	Mt. Stromlo Ob	-35.3	149.0	+	+	+	AUG 04 13:02 - AUG 04 16:20	PieRie

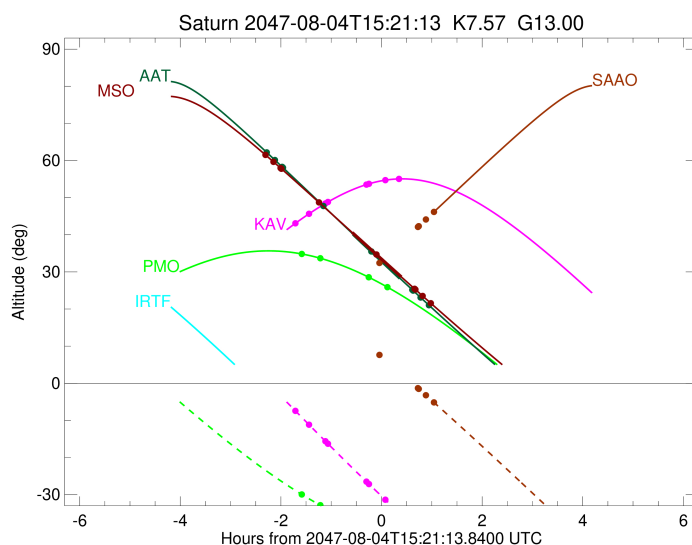
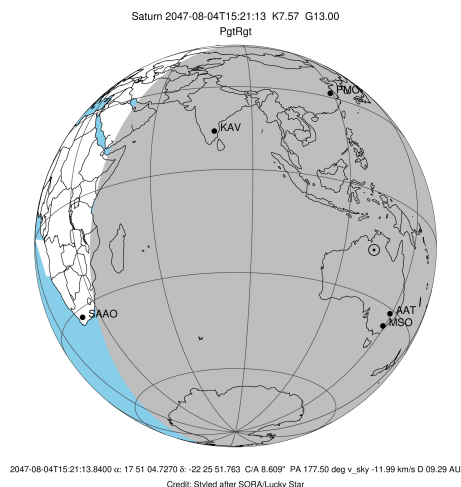


2047-08-04T15:21:13.8400 at: 17 51 04.7270 s: -22 25 51.763 C/A 8.609° PA 177.50 deg v_sky -11.99 km/s D 09.29 AU
 Credit: Styled after SORA/Lucky Star

Saturn 2047-08-04T15:21:13 K7.57 G13.00 PgtRgt



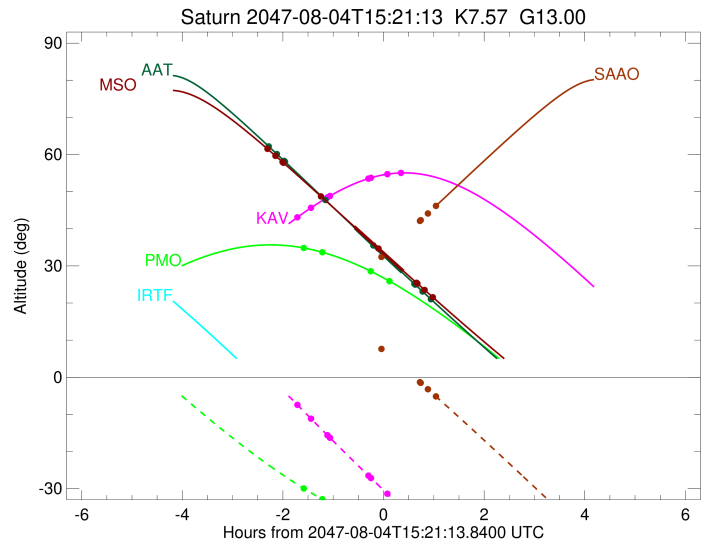
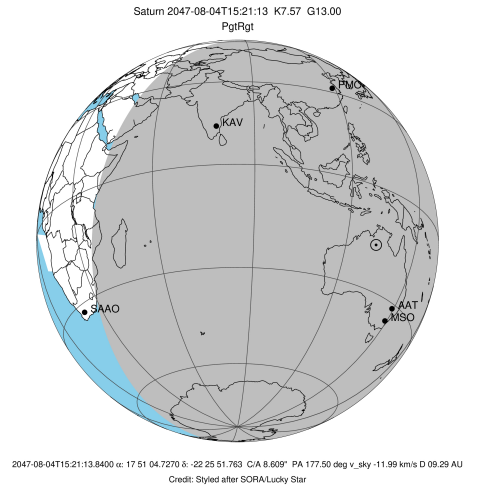
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-04T15:17:31.180
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 4070427990723332608
 2Mass ID (if available) : 17510473-2225513
 ICRS Star Coord at Epoch: 17h 51m 04.72703s -22:25:51.76252s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 7.572
 G magnitude : 13.002
 RP magnitude : 11.673
 BP magnitude : 15.010
 DUPflag : 0
 Distance (au) : 9.287
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.99
 Sun-Target sep (deg) : 136.39
 Sun-Moon sep (deg) : 28.14
 B (ring opening deg) : 26.76
 PA of pole (deg) : 5.34
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 9.308
 C/A sky separation (km) : 62692.2
 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	2047-08-04T13:45:39.878		34.85	-29.88	140461.00	-3.53		
A (OER)	I	2047-08-04T14:07:29.227		33.72	-32.75	136774.40	-2.08		
No planet occultations									
A (OER)	E	2047-08-04T15:06:27.105		28.51	-38.61	136774.40	2.07		
F ring	E	2047-08-04T15:28:28.064		25.87	-39.94	140461.00	3.50		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-04T15:21:55.100
 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 : 4070427990723332608
 2Mass ID (if available) : 17510473-2225513
 ICRS Star Coord at Epoch: 17h 51m 04.72703s -22:25:51.76252s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 7.572
 G magnitude : 13.002
 RP magnitude : 11.673
 BP magnitude : 15.010
 DUPflag : 0
 Distance (au) : 9.287
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.99
 Sun-Target sep (deg) : 136.39
 Sun-Moon sep (deg) : 28.80
 B (ring opening deg) : 26.76
 PA of pole (deg) : 5.34
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 9.154
 C/A sky separation (km) : 61658.5
 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



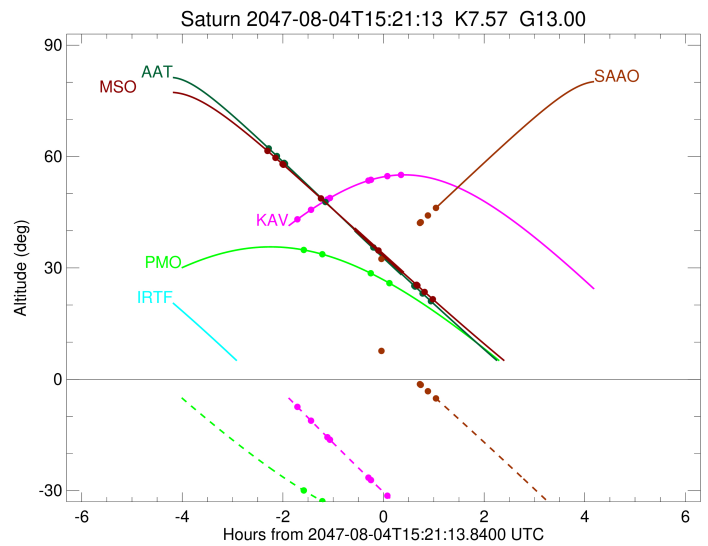
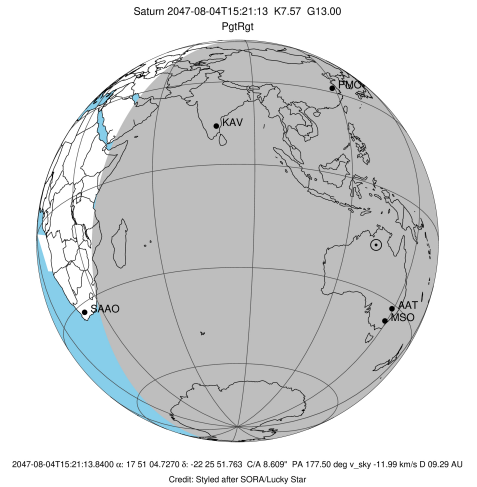
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-08-04T13:38:08.113		43.02	-7.34	140461.00	-4.32		
A (OER)	I	2047-08-04T13:54:16.985		45.58	-11.05	136774.40	-3.28		
Encke (OEG)	I	2047-08-04T14:13:33.889		48.33	-15.43	133744.89	-1.94		
Encke (IEG)	I	2047-08-04T14:16:28.824		48.72	-16.09	133423.31	-1.73		

No planet occultations

Encke (IEG)	E	2047-08-04T15:03:46.335		53.56	-26.61	133423.31	1.73		
Encke (OEG)	E	2047-08-04T15:06:41.621		53.76	-27.25	133744.89	1.94		
A (OER)	E	2047-08-04T15:26:01.704		54.72	-31.41	136774.40	3.27		
F ring	E	2047-08-04T15:42:14.070		55.05	-34.83	140461.00	4.30		

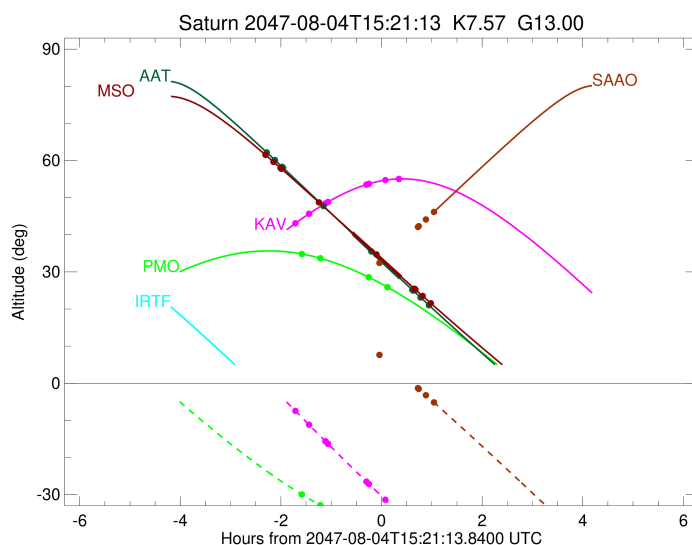
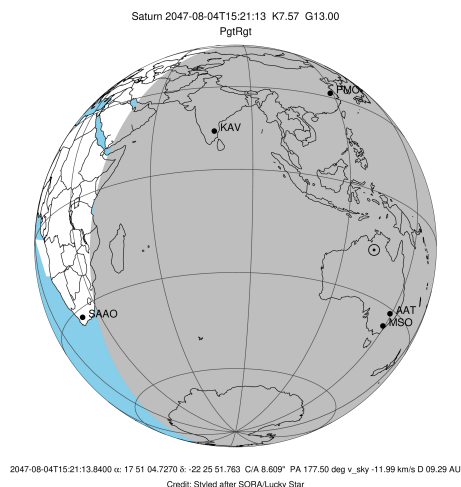
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-04T15:15:33.570
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 4070427990723332608
 2Mass ID (if available) : 17510473-2225513
 ICRS Star Coord at Epoch: 17h 51m 04.72703s -22:25:51.76252s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 7.572
 G magnitude : 13.002
 RP magnitude : 11.673
 BP magnitude : 15.010
 DUPflag : 0
 Distance (au) : 9.287
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.99
 Sun-Target sep (deg) : 136.39
 Sun-Moon sep (deg) : 27.91
 B (ring opening deg) : 26.76
 PA of pole (deg) : 5.34
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 8.266
 C/A sky separation (km) : 55677.4
 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

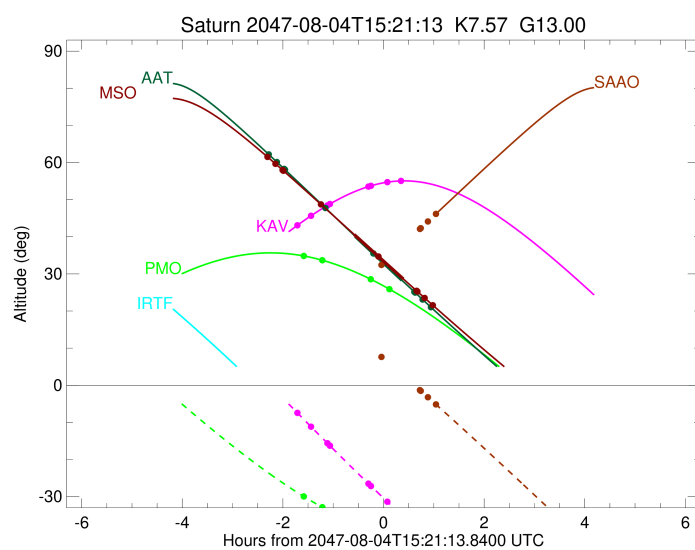
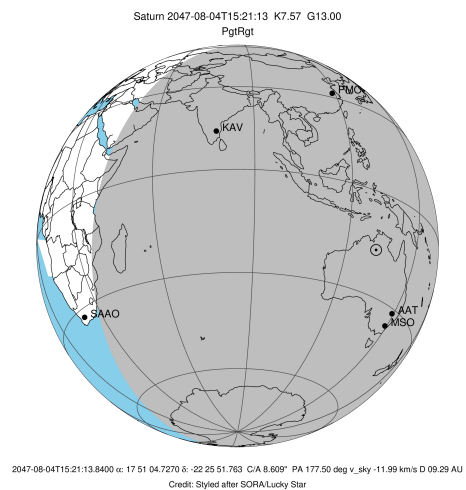
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-08-04T13:04:07.025		62.24	-69.58	140461.00	-6.58		
A (OER)	I	2047-08-04T13:13:49.511		60.19	-71.12	136774.40	-6.07		
Encke (OEG)	I	2047-08-04T13:22:29.544		58.35	-72.39	133744.89	-5.58		
Encke (IEG)	I	2047-08-04T13:23:27.500		58.14	-72.52	133423.31	-5.52		
A (IER)	I	2047-08-04T14:11:24.365		47.87	-76.03	122050.38	-2.25		
Saturn	I	2047-08-04T14:47:24.685		40.15	-73.62	59358.66		52.43	57.62
Saturn	E	2047-08-04T15:43:04.810		28.31	-64.63	59174.39		60.61	65.05
A (IER)	E	2047-08-04T15:09:17.929	b	35.48	-70.56	122050.38	2.23		
Encke (IEG)	E	2047-08-04T15:58:01.177		25.16	-61.74	133423.31	5.40		
Encke (OEG)	E	2047-08-04T15:59:00.404		24.95	-61.55	133744.89	5.46		
A (OER)	E	2047-08-04T16:07:52.360		23.10	-59.79	136774.40	5.93		
F ring	E	2047-08-04T16:17:49.318		21.02	-57.78	140461.00	6.42		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-04T15:27:14.200
 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 : 4070427990723332608
 2Mass ID (if available) : 17510473-2225513
 ICRS Star Coord at Epoch: 17h 51m 04.72703s -22:25:51.76252s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 7.572
 G magnitude : 13.002
 RP magnitude : 11.673
 BP magnitude : 15.010
 DUPflag : 0
 Distance (au) : 9.287
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.99
 Sun-Target sep (deg) : 136.39
 Sun-Moon sep (deg) : 29.22
 B (ring opening deg) : 26.76
 PA of pole (deg) : 5.34
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 8.319
 C/A sky separation (km) : 56034.6
 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	2047-08-04T13:08:19.534		5.79	29.59x	140461.00	-6.55		
A (OER)	I	2047-08-04T13:18:03.219		7.70	28.22x	136774.40	-6.07		
Encke (OEG)	I	2047-08-04T13:26:41.726		9.40	26.95x	133744.89	-5.61		
Encke (IEG)	I	2047-08-04T13:27:39.336		9.60	26.81x	133423.31	-5.56		
A (IER)	I	2047-08-04T14:13:41.920		18.89	19.43x	122050.38	-2.54		
Saturn	I	2047-08-04T15:00:20.734		28.55	11.10x	59362.84		52.26	57.46
Saturn	E	2047-08-04T15:53:11.325		39.68	0.96x	59156.48		61.48	65.82
A (IER)	E	2047-08-04T15:18:57.925	b	32.45	7.60x	122050.38	2.54		
Encke (IEG)	E	2047-08-04T16:04:43.286		42.12	-1.33x	133423.31	5.61		
Encke (OEG)	E	2047-08-04T16:05:40.324		42.32	-1.52x	133744.89	5.67		
A (OER)	E	2047-08-04T16:14:13.245		44.13	-3.23x	136774.40	6.14		
F ring	E	2047-08-04T16:23:49.708		46.17	-5.16	140461.00	6.64		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-04T15:15:50.530
 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 : 4070427990723332608
 2Mass ID (if available) : 17510473-2225513
 ICRS Star Coord at Epoch: 17h 51m 04.72703s -22:25:51.76252s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 7.572
 G magnitude : 13.002
 RP magnitude : 11.673
 BP magnitude : 15.010
 DUPflag : 0
 Distance (au) : 9.287
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.99
 Sun-Target sep (deg) : 136.39
 Sun-Moon sep (deg) : 27.95
 B (ring opening deg) : 26.76
 PA of pole (deg) : 5.34
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 8.210
 C/A sky separation (km) : 55298.2
 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	2047-08-04T13:02:38.187		61.56	-66.58	140461.00	-6.70		
A (OER)	I	2047-08-04T13:12:09.047		59.70	-67.87	136774.40	-6.21		
Encke (OEG)	I	2047-08-04T13:20:36.228		58.02	-68.91	133744.89	-5.73		
Encke (IEG)	I	2047-08-04T13:21:32.573		57.84	-69.02	133423.31	-5.68		
A (IER)	I	2047-08-04T14:06:10.870		48.82	-71.99	122050.38	-2.69		
Saturn	I	2047-08-04T14:46:14.585		40.62	-70.27	59376.69		51.68	56.92
Saturn	E	2047-08-04T15:44:49.372		28.66	-62.26	59183.51		60.18	64.66
A (IER)	E	2047-08-04T15:15:20.544	b	34.66	-66.85	122050.38	2.66		
Encke (IEG)	E	2047-08-04T16:00:43.403		25.44	-59.49	133423.31	5.56		
Encke (OEG)	E	2047-08-04T16:01:40.970		25.25	-59.32	133744.89	5.61		
A (OER)	E	2047-08-04T16:10:19.619		23.51	-57.75	136774.40	6.06		
F ring	E	2047-08-04T16:20:04.402		21.56	-55.94	140461.00	6.54		