

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-10-24T22:37:32.760
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4078515517151580800
 2Mass ID (if available) : 18435083-2242520

Saturn 2048-10-24T22:37:32 K9.09 G12.94 PgtRgt

ICRS Star Coord at Epoch: 18h 43m 50.81405s -22:42:52.15683s

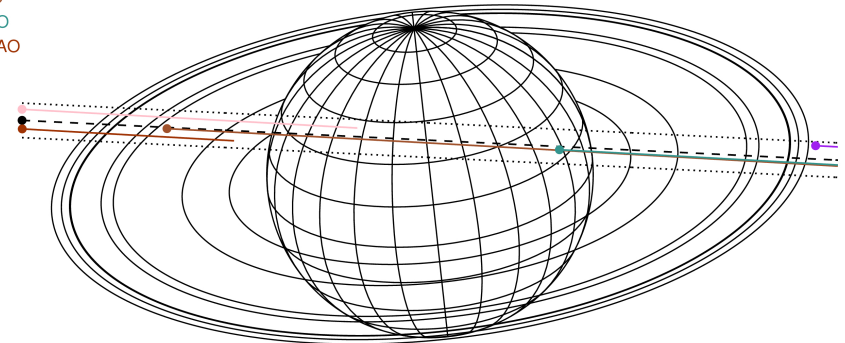
RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.089
 G magnitude : 12.942
 RP magnitude : 11.882
 BP magnitude : 14.112
 DUPflag : 0
 Distance (au) : 10.350
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 20.46
 Sun-Target sep (deg) : 68.59
 Sun-Moon sep (deg) : 147.22
 B (ring opening deg) : 25.80
 PA of pole (deg) : 6.28

#	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



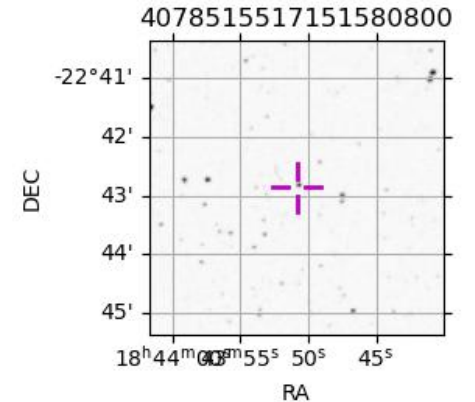
2048-10-24T22:37:32.7600 ra: 18 43 50.8141 s: -22 42 52.157 C/A 1.684° PA 177.21 deg v_sky +20.46 km/s D 10.35 AU
 Credit: Styled after SORA/Lucky Star

Earth
 MCD
 TEN
 RIO
 ESO
 SAAO

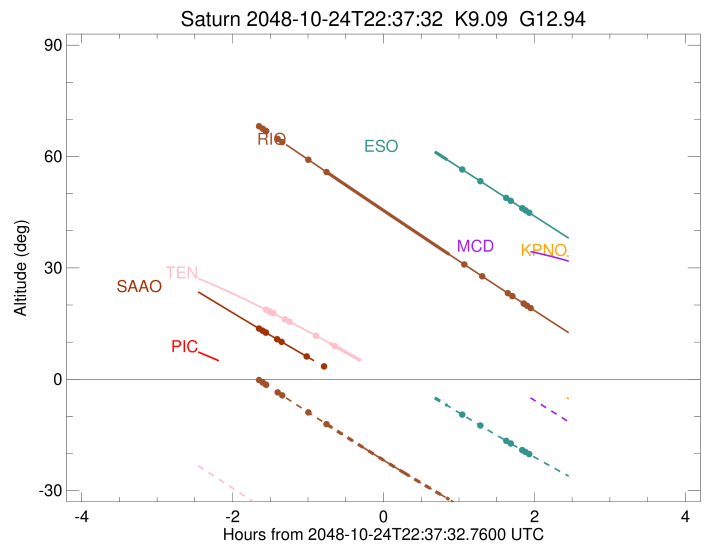
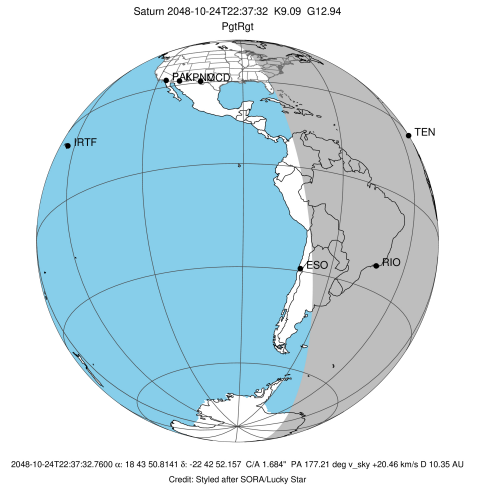


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	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					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	+	+		OCT 24 21:04 - OCT 24 21:54	PinRin
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+	+		OCT 24 21:37 - OCT 25 00:34	PieRie
ESO	European South	-29.3	289.3		+		OCT 24 23:28 - OCT 25 00:33	PneRne
AAT	Siding Spring	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro	-32.4	20.8	+	+		OCT 24 20:58 - OCT 24 21:36	PnnRin
MSO	Mt. Stromlo Ob	-35.3	149.0					PnnRnn



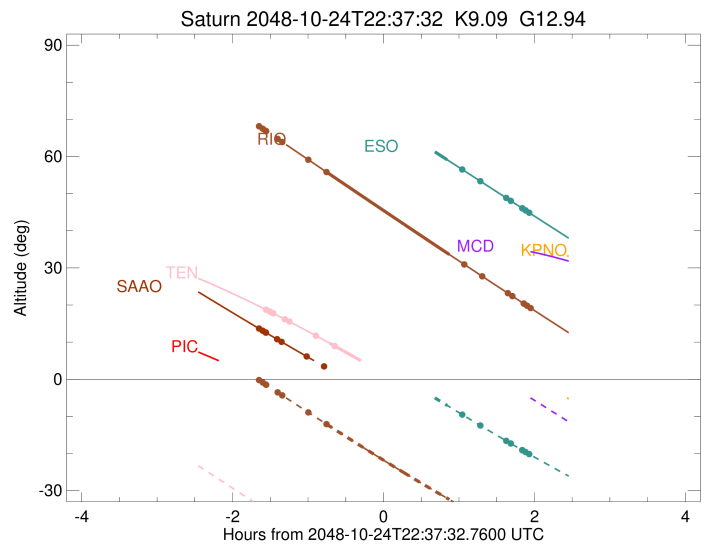
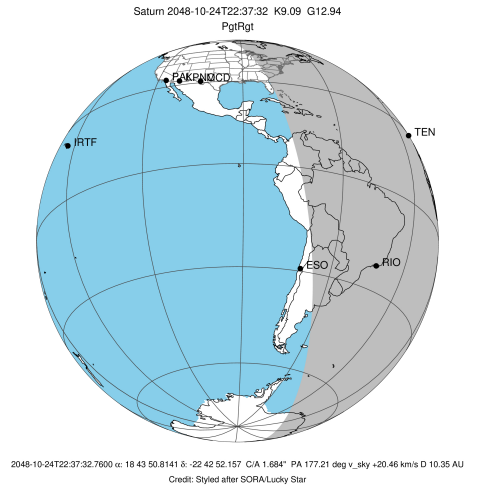
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-10-24T22:42:14.030
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 4078515517151580800
 2Mass ID (if available) : 18435083-2242520
 ICRS Star Coord at Epoch: 18h 43m 50.81405s -22:42:52.15683s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.089
 G magnitude : 12.942
 RP magnitude : 11.882
 BP magnitude : 14.112
 DUPflag : 0
 Distance (au) : 10.350
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 20.46
 Sun-Target sep (deg) : 68.59
 Sun-Moon sep (deg) : 147.93
 B (ring opening deg) : 25.80
 PA of pole (deg) : 6.28
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.082
 C/A sky separation (km) : 15626.3
 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	2048-10-24T21:04:12.554		18.74	-35.20	140461.00	-20.67		
A (OER)	I	2048-10-24T21:07:11.002		18.23	-35.85	136774.40	-20.64		
Encke (OEG)	I	2048-10-24T21:09:37.842		17.81	-36.39	133744.89	-20.62		
Encke (IEG)	I	2048-10-24T21:09:53.439		17.77	-36.45	133423.31	-20.62		
A (IER)	I	2048-10-24T21:19:06.667		16.17	-38.47	122050.38	-20.49		
B (OER)	I	2048-10-24T21:22:45.550		15.53	-39.27	117571.17	-20.43		
B (IER)	I	2048-10-24T21:43:52.859		11.72	-43.87	91984.69	-19.87		
C (IER)	I	2048-10-24T21:58:49.866	b	8.95	-47.10	74490.58	-19.04		
Saturn	I	2048-10-24T21:54:39.868		9.73	-46.20	60078.82		21.97	26.29
Saturn	E	2048-10-24T23:29:43.378		-9.07x	-65.45	60257.70		5.00	6.13
C (IER)	E	2048-10-24T23:41:18.832		-11.47x	-67.45	74490.58	19.27		
B (IER)	E	2048-10-24T23:56:04.119		-14.55x	-69.75	91984.69	20.16		
B (OER)	E	2048-10-25T00:16:50.834		-18.94x	-72.35	117571.17	20.81		
A (IER)	E	2048-10-25T00:20:25.653		-19.70x	-72.70	122050.38	20.89		
Encke (IEG)	E	2048-10-25T00:29:27.942		-21.63x	-73.43	133423.31	21.05		
Encke (OEG)	E	2048-10-25T00:29:43.218		-21.68x	-73.45	133744.89	21.05		
A (OER)	E	2048-10-25T00:32:06.986		-22.19x	-73.60	136774.40	21.09		
F ring	E	2048-10-25T00:35:01.612		-22.82x	-73.76	140461.00	21.13		

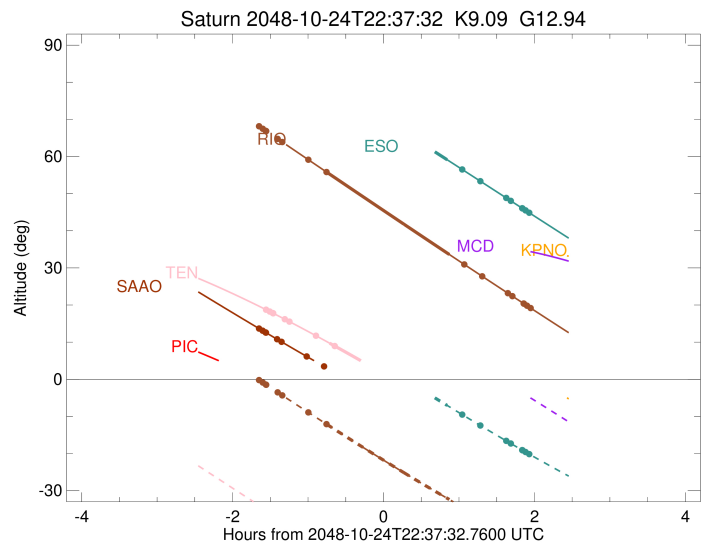
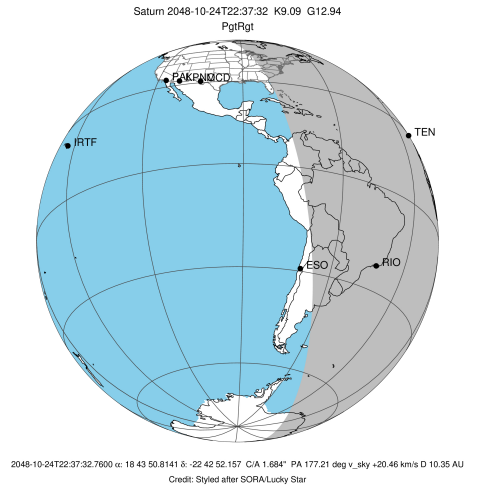
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-10-24T22:41:12.480
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 4078515517151580800
 2Mass ID (if available) : 18435083-2242520
 ICRS Star Coord at Epoch: 18h 43m 50.81405s -22:42:52.15683s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.089
 G magnitude : 12.942
 RP magnitude : 11.882
 BP magnitude : 14.112
 DUPflag : 0
 Distance (au) : 10.350
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 20.46
 Sun-Target sep (deg) : 68.59
 Sun-Moon sep (deg) : 148.08
 B (ring opening deg) : 25.80
 PA of pole (deg) : 6.28
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.545
 C/A sky separation (km) : 11600.0
 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	2048-10-24T20:58:38.786		68.15	-0.23x	140461.00	-20.77		
A (OER)	I	2048-10-24T21:01:36.309		67.47	-0.89x	136774.40	-20.76		
Encke (OEG)	I	2048-10-24T21:04:02.287		66.91	-1.43x	133744.89	-20.75		
Encke (IEG)	I	2048-10-24T21:04:17.788		66.85	-1.49x	133423.31	-20.75		
A (IER)	I	2048-10-24T21:13:26.772		64.74	-3.53x	122050.38	-20.68		
B (OER)	I	2048-10-24T21:17:03.481		63.91	-4.34x	117571.17	-20.65		
B (IER)	I	2048-10-24T21:37:49.786		59.13	-8.93	91984.69	-20.37		
C (IER)	I	2048-10-24T21:52:16.758		55.82	-12.10	74490.58	-19.94		
Saturn	I	2048-10-24T21:52:23.815		55.79	-12.12	60133.09		18.40	22.19
Saturn	E	2048-10-24T23:29:55.271		33.60	-32.40	60267.10		1.48	1.82
C (IER)	E	2048-10-24T23:41:44.057		30.94	-34.66	74490.58	20.18		
B (IER)	E	2048-10-24T23:55:59.761		27.75	-37.32	91984.69	20.66		
B (OER)	E	2048-10-25T00:16:25.928		23.19	-40.94	117571.17	21.03		
A (IER)	E	2048-10-25T00:19:58.651		22.40	-41.54	122050.38	21.08		
Encke (IEG)	E	2048-10-25T00:28:56.903		20.41	-43.03	133423.31	21.18		
Encke (OEG)	E	2048-10-25T00:29:12.087		20.36	-43.07	133744.89	21.18		
A (OER)	E	2048-10-25T00:31:35.052		19.83	-43.46	136774.40	21.20		
F ring	E	2048-10-25T00:34:28.823		19.19	-43.92	140461.00	21.23		

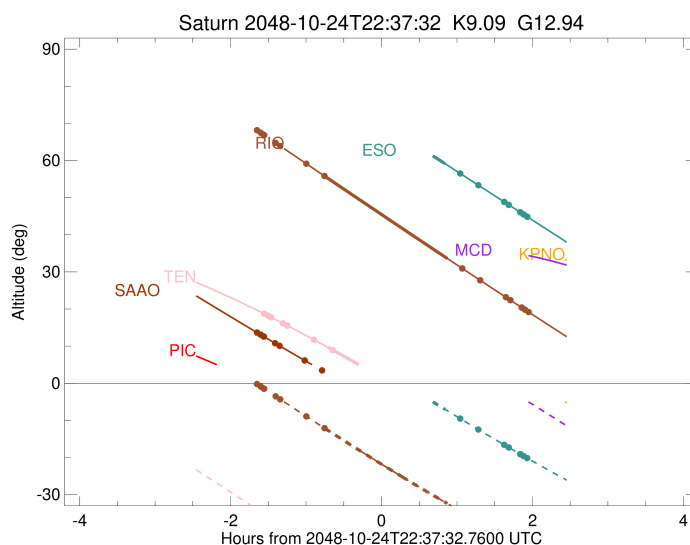
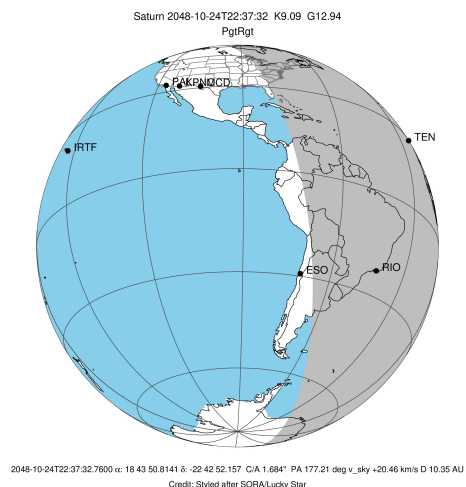
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-10-24T22:39:11.910
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4078515517151580800
 2Mass ID (if available) : 18435083-2242520
 ICRS Star Coord at Epoch: 18h 43m 50.81405s -22:42:52.15683s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.089
 G magnitude : 12.942
 RP magnitude : 11.882
 BP magnitude : 14.112
 DUPflag : 0
 Distance (au) : 10.350
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 20.46
 Sun-Target sep (deg) : 68.59
 Sun-Moon sep (deg) : 147.90
 B (ring opening deg) : 25.80
 PA of pole (deg) : 6.28
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.555
 C/A sky separation (km) : 11670.2
 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	2048-10-24T20:56:02.689		82.42	25.62x	140461.00	-20.70		
A (OER)	I	2048-10-24T20:59:00.875		82.75	24.97x	136774.40	-20.68		
Encke (OEG)	I	2048-10-24T21:01:27.418		82.99	24.44x	133744.89	-20.67		
Encke (IEG)	I	2048-10-24T21:01:42.980		83.01	24.38x	133423.31	-20.66		
A (IER)	I	2048-10-24T21:10:54.253		83.53	22.38x	122050.38	-20.59		
B (OER)	I	2048-10-24T21:14:31.934		83.56	21.58x	117571.17	-20.56		
B (IER)	I	2048-10-24T21:35:24.623		81.93	17.03x	91984.69	-20.25		
C (IER)	I	2048-10-24T21:49:56.928		79.62	13.88x	74490.58	-19.81		
Saturn	I	2048-10-24T21:50:11.378		79.58	13.82x	60134.64		18.29	22.06
Saturn	E	2048-10-24T23:28:11.833		59.13	-7.05	60266.83		1.68	2.07
C (IER)	E	2048-10-24T23:40:06.252		56.52	-9.51	74490.58	19.98		
B (IER)	E	2048-10-24T23:54:30.451		53.37	-12.45	91984.69	20.46		
B (OER)	E	2048-10-25T00:15:08.782		48.85	-16.59	117571.16	20.83		
A (IER)	E	2048-10-25T00:18:43.628		48.07	-17.30	122050.38	20.87		
Encke (IEG)	E	2048-10-25T00:27:47.273		46.08	-19.07	133423.31	20.97		
Encke (OEG)	E	2048-10-25T00:28:02.610		46.03	-19.12	133744.89	20.97		
A (OER)	E	2048-10-25T00:30:27.012		45.50	-19.59	136774.40	20.99		
F ring	E	2048-10-25T00:33:22.534		44.86	-20.16	140461.00	21.02		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-10-24T22:41:26.290
 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 : 4078515517151580800
 2Mass ID (if available) : 18435083-2242520
 ICRS Star Coord at Epoch: 18h 43m 50.81405s -22:42:52.15683s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.089
 G magnitude : 12.942
 RP magnitude : 11.882
 BP magnitude : 14.112
 DUPflag : 0
 Distance (au) : 10.350
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 20.46
 Sun-Target sep (deg) : 68.59
 Sun-Moon sep (deg) : 147.71
 B (ring opening deg) : 25.80
 PA of pole (deg) : 6.28
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.121
 C/A sky separation (km) : 8417.3
 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	2048-10-24T20:58:38.348		13.65	-41.44	140461.00	-21.39		
A (OER)	I	2048-10-24T21:01:30.706		13.08	-41.72	136774.40	-21.39		
Encke (OEG)	I	2048-10-24T21:03:52.370		12.60	-41.93	133744.89	-21.38		
Encke (IEG)	I	2048-10-24T21:04:07.409		12.55	-41.96	133423.31	-21.38		
A (IER)	I	2048-10-24T21:12:59.545		10.78	-42.72	122050.38	-21.36		
B (OER)	I	2048-10-24T21:16:29.302		10.08	-43.00	117571.16	-21.35		
B (IER)	I	2048-10-24T21:36:30.965		6.14	-44.34	91984.69	-21.22		
C (IER)	I	2048-10-24T21:50:19.176		3.46x	-44.98	74490.58	-21.00		
Saturn	I	2048-10-24T21:53:11.452		2.91x	-45.09	60169.13		15.67	18.99
Saturn	E	2048-10-24T23:29:33.164		-14.41x	-42.59	60267.40		-1.21	-1.48
C (IER)	E	2048-10-24T23:40:43.415		-16.22x	-41.60	74490.58	21.20		
B (IER)	E	2048-10-24T23:54:23.154		-18.36x	-40.21	91984.69	21.46		
B (OER)	E	2048-10-25T00:14:09.564		-21.31x	-37.91	117571.17	21.65		
A (IER)	E	2048-10-25T00:17:36.294		-21.80x	-37.47	122050.38	21.68		
Encke (IEG)	E	2048-10-25T00:26:20.266		-23.02x	-36.33	133423.31	21.73		
Encke (OEG)	E	2048-10-25T00:26:35.064		-23.06x	-36.30	133744.89	21.73		
A (OER)	E	2048-10-25T00:28:54.434		-23.37x	-35.99	136774.40	21.74		
F ring	E	2048-10-25T00:31:43.933		-23.75x	-35.60	140461.00	21.76		