

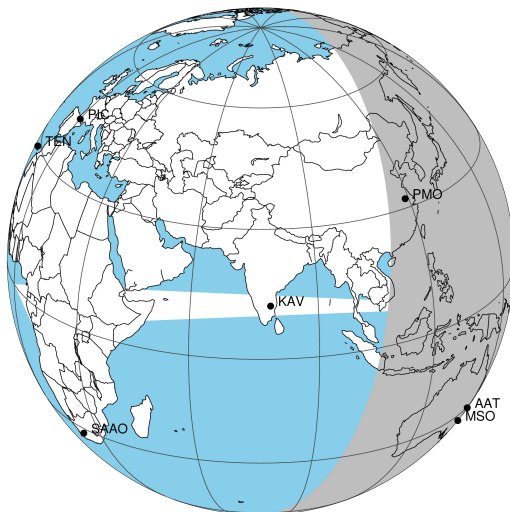
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2033-04-23T10:58:11.480
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3425088706047309056
 2Mass ID (if available) : 06093223+2246246

Saturn 2033-04-23T10:58:11 K9.92 G12.87 PgtRgt

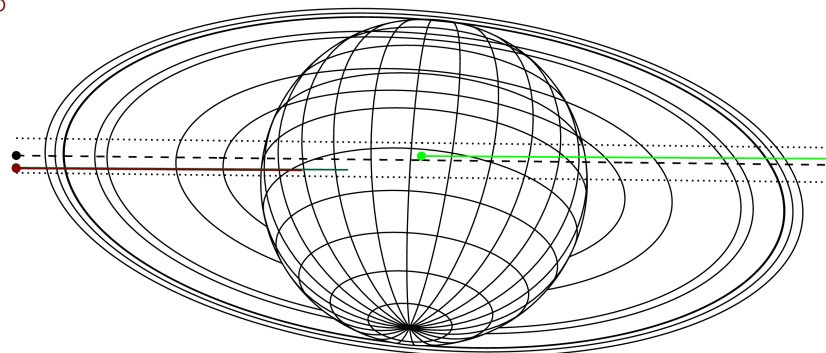
ICRS Star Coord at Epoch: 06h 09m 32.23207s +22:46:24.61859s

RUWE (>1.4 is poor) : 1.25
 K magnitude : 9.921
 G magnitude : 12.867
 RP magnitude : 11.988
 BP magnitude : 13.666
 DUPflag : 0
 Distance (au) : 9.493
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 24.96
 Sun-Target sep (deg) : 59.05
 Sun-Moon sep (deg) : 136.41
 B (ring opening deg) : -26.69
 PA of pole (deg) : -5.72

Saturn 2033-04-23T10:58:11 K9.92 G12.87
 PgtRgt



Earth
 PMO
 AAT
 MSO

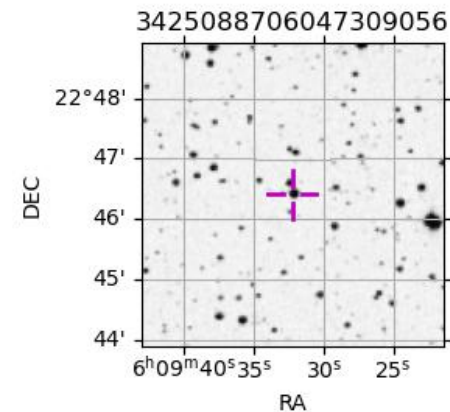


2033-04-23T10:58:11.4800 ex: 06 09 32.2321 8: +22 46 24.619 C/A 1.193° PA 179.33 deg v_sky +24.96 km/s D 09.49 AU
 Credit: Styled after SORA/Lucky Star

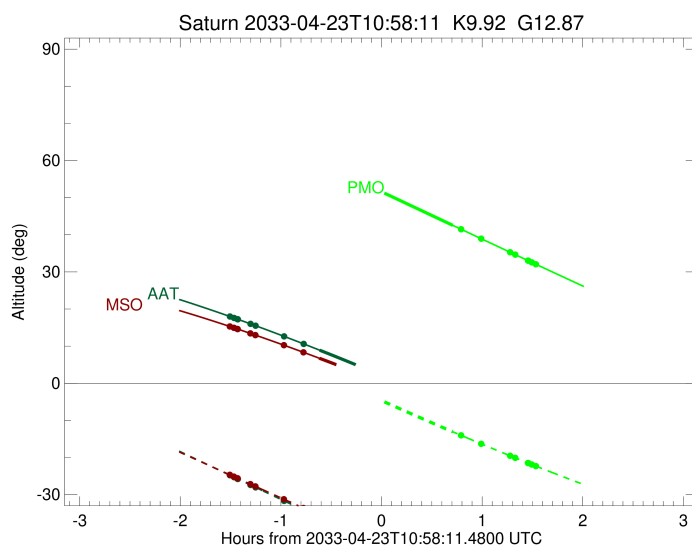
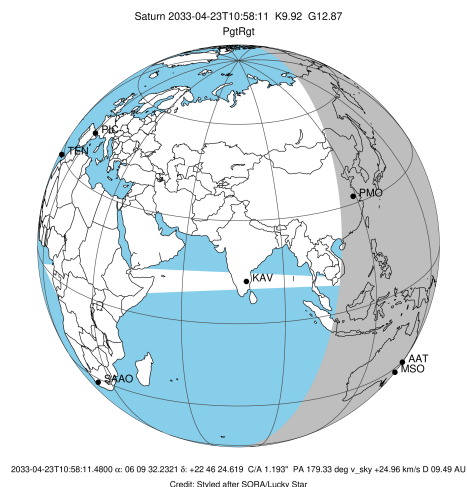
#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring

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		+	+	APR 23 11:40 - APR 23 12:30	PneRne
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					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3					PnnRnn
AAT	Siding Spring	-31.3	149.1	+	+		APR 23 09:27 - APR 23 10:21	PinRin
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0	+	+		APR 23 09:27 - APR 23 10:21	PinRin

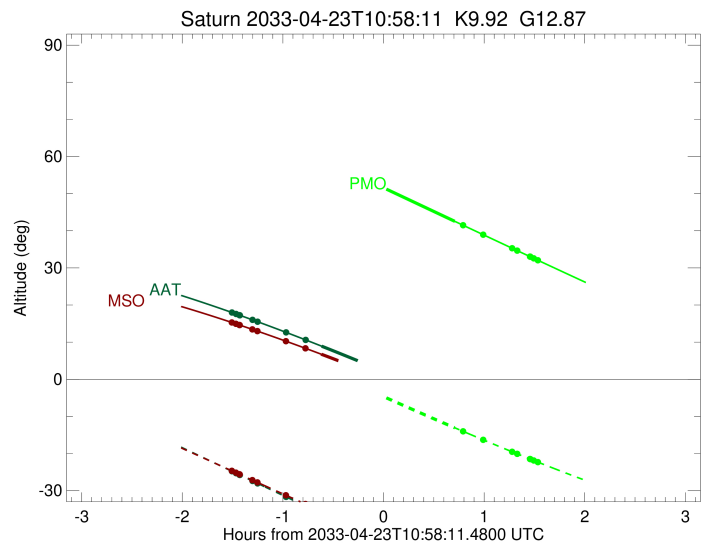
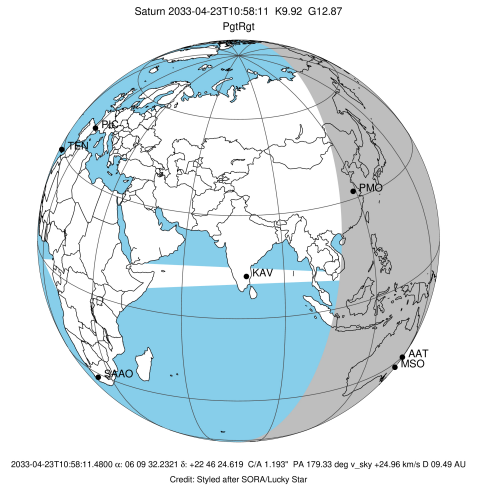


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2033-04-23T11:00:37.920
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3425088706047309056
 2Mass ID (if available) : 06093223+2246246
 ICRS Star Coord at Epoch: 06h 09m 32.23207s +22:46:24.61859s
 RUWE (>1.4 is poor) : 1.25
 K magnitude : 9.921
 G magnitude : 12.867
 RP magnitude : 11.988
 BP magnitude : 13.666
 DUPflag : 0
 Distance (au) : 9.493
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 24.96
 Sun-Target sep (deg) : 59.05
 Sun-Moon sep (deg) : 136.56
 B (ring opening deg) : -26.69
 PA of pole (deg) : -5.72
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.418
 C/A sky separation (km) : 9759.8
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2033-04-23T09:25:50.966		70.74	14.46x	140461.00	-24.67		
A (OER)	I	2033-04-23T09:28:20.462		70.25	13.94x	136774.40	-24.65		
Encke (OEG)	I	2033-04-23T09:30:23.377		69.84	13.50x	133744.89	-24.64		
Encke (IEG)	I	2033-04-23T09:30:36.427		69.80	13.46x	133423.31	-24.64		
A (IER)	I	2033-04-23T09:38:18.487		68.27	11.84x	122050.38	-24.58		
B (OER)	I	2033-04-23T09:41:20.782		67.66	11.20x	117571.16	-24.56		
B (IER)	I	2033-04-23T09:58:47.301		64.09	7.55x	91984.69	-24.31		
C (IER)	I	2033-04-23T10:10:51.717		61.58	5.03x	74490.58	-23.95		
Saturn	I	2033-04-23T10:20:25.186		59.58	3.05x	60262.03		3.65	4.49
Saturn	E	2033-04-23T11:40:42.072		42.55	-13.07	60193.37		13.03	15.85
C (IER)	E	2033-04-23T11:45:36.458		41.50	-14.02	74490.58	24.09		
B (IER)	E	2033-04-23T11:57:35.963		38.96	-16.30	91984.69	24.49		
B (OER)	E	2033-04-23T12:14:53.360		35.30	-19.53	117571.16	24.80		
A (IER)	E	2033-04-23T12:17:53.829		34.66	-20.09	122050.38	24.84		
Encke (IEG)	E	2033-04-23T12:25:30.955		33.06	-21.47	133423.31	24.92		
Encke (OEG)	E	2033-04-23T12:25:43.860		33.01	-21.51	133744.89	24.92		
A (OER)	E	2033-04-23T12:27:45.385		32.58	-21.88	136774.40	24.94		
F ring	E	2033-04-23T12:30:13.151		32.06	-22.32	140461.00	24.96		

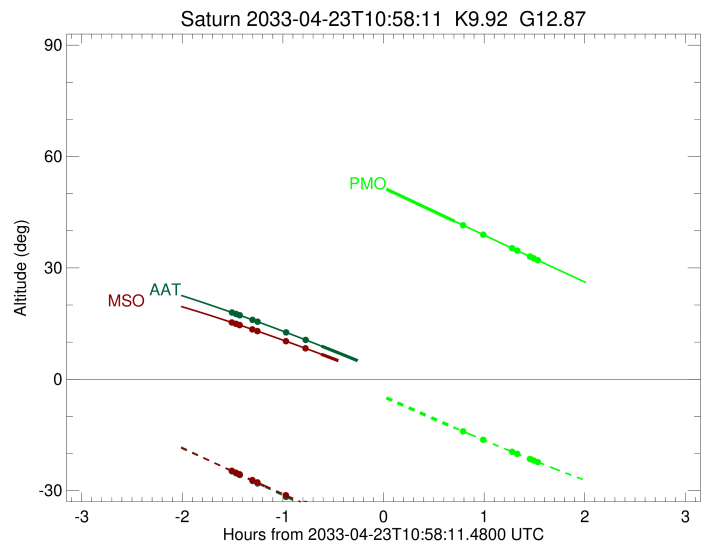
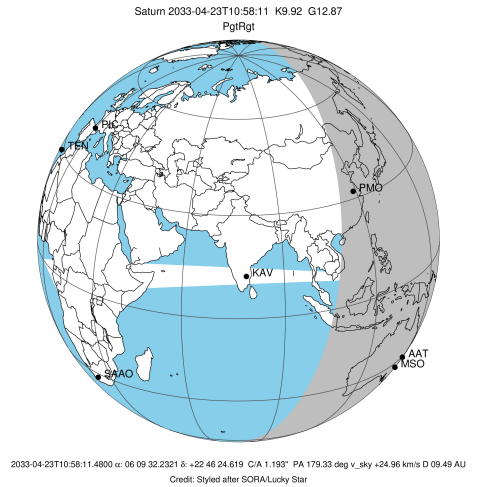
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2033-04-23T11:01:38.730
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 3425088706047309056
 2Mass ID (if available) : 060932223+2246246
 ICRS Star Coord at Epoch: 06h 09m 32.23207s +22:46:24.61859s
 RUWE (>1.4 is poor) : 1.25
 K magnitude : 9.921
 G magnitude : 12.867
 RP magnitude : 11.988
 BP magnitude : 13.666
 DUPflag : 0
 Distance (au) : 9.493
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 24.96
 Sun-Target sep (deg) : 59.05
 Sun-Moon sep (deg) : 135.81
 B (ring opening deg) : -26.69
 PA of pole (deg) : -5.72
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.659
 C/A sky separation (km) : 4536.8
 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_itr93_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	2033-04-23T09:27:50.761		17.98	-24.78	140461.00	-25.03		
A (OER)	I	2033-04-23T09:30:18.041		17.59	-25.31	136774.40	-25.03		
Encke (OEG)	I	2033-04-23T09:32:19.068		17.27	-25.74	133744.89	-25.03		
Encke (IEG)	I	2033-04-23T09:32:31.914		17.23	-25.78	133423.31	-25.03		
A (IER)	I	2033-04-23T09:40:06.246		16.00	-27.41	122050.38	-25.03		
B (OER)	I	2033-04-23T09:43:05.192		15.51	-28.04	117571.16	-25.03		
B (IER)	I	2033-04-23T10:00:07.827		12.63	-31.69	91984.69	-25.00		
C (IER)	I	2033-04-23T10:11:48.226		10.60	-34.18	74490.58	-24.94		
Saturn	I	2033-04-23T10:21:16.466		8.92	-36.20	60267.62		-0.92	-1.13
Saturn	E	2033-04-23T11:41:51.970		-6.33x	-52.91	60234.76		8.65	10.58
C (IER)	E	2033-04-23T11:49:06.287		-7.77x	-54.34	74490.58	25.14		
B (IER)	E	2033-04-23T12:00:40.577		-10.08x	-56.59	91984.69	25.25		
B (OER)	E	2033-04-23T12:17:31.972		-13.49x	-59.75	117571.16	25.34		
A (IER)	E	2033-04-23T12:20:28.674		-14.09x	-60.28	122050.38	25.36		
Encke (IEG)	E	2033-04-23T12:27:56.945		-15.61x	-61.61	133423.31	25.39		
Encke (OEG)	E	2033-04-23T12:28:09.613		-15.66x	-61.65	133744.89	25.39		
A (OER)	E	2033-04-23T12:30:08.933		-16.06x	-61.99	136774.40	25.39		
F ring	E	2033-04-23T12:32:34.088		-16.56x	-62.41	140461.00	25.40		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2033-04-23T11:01:29.180
 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 : 3425088706047309056
 2Mass ID (if available) : 06093223+2246246
 ICRS Star Coord at Epoch: 06h 09m 32.23207s +22:46:24.61859s
 RUWE (>1.4 is poor) : 1.25
 K magnitude : 9.921
 G magnitude : 12.867
 RP magnitude : 11.988
 BP magnitude : 13.666
 DUPflag : 0
 Distance (au) : 9.493
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 24.96
 Sun-Target sep (deg) : 59.05
 Sun-Moon sep (deg) : 135.81
 B (ring opening deg) : -26.69
 PA of pole (deg) : -5.72
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.613
 C/A sky separation (km) : 4217.5
 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	2033-04-23T09:27:45.356		15.30	-24.67	140461.00	-25.05		
A (OER)	I	2033-04-23T09:30:12.532		14.93	-25.17	136774.40	-25.05		
Encke (OEG)	I	2033-04-23T09:32:13.471		14.63	-25.58	133744.89	-25.05		
Encke (IEG)	I	2033-04-23T09:32:26.308		14.59	-25.62	133423.31	-25.05		
A (IER)	I	2033-04-23T09:40:00.299		13.43	-27.17	122050.38	-25.05		
B (OER)	I	2033-04-23T09:42:59.102		12.97	-27.78	117571.16	-25.05		
B (IER)	I	2033-04-23T10:00:00.798		10.26	-31.25	91984.69	-25.03		
C (IER)	I	2033-04-23T10:11:40.326		8.33	-33.61	74490.58	-24.98		
Saturn	I	2033-04-23T10:21:06.572		6.75	-35.52	60267.37		-1.18	-1.45
Saturn	E	2033-04-23T11:41:43.163		-7.81x	-51.19	60236.90		8.36	10.23
C (IER)	E	2033-04-23T11:49:05.062		-9.21x	-52.53	74490.58	25.17		
B (IER)	E	2033-04-23T12:00:38.715		-11.43x	-54.58	91984.69	25.26		
B (OER)	E	2033-04-23T12:17:29.601		-14.69x	-57.43	117571.17	25.35		
A (IER)	E	2033-04-23T12:20:26.247		-15.27x	-57.90	122050.38	25.36		
Encke (IEG)	E	2033-04-23T12:27:54.407		-16.73x	-59.09	133423.31	25.39		
Encke (OEG)	E	2033-04-23T12:28:07.072		-16.78x	-59.12	133744.89	25.39		
A (OER)	E	2033-04-23T12:30:06.371		-17.17x	-59.43	136774.40	25.40		
F ring	E	2033-04-23T12:32:31.502		-17.64x	-59.80	140461.00	25.41		