

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-11-15T18:22:00.090
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4078632267201650304
 2Mass ID (if available) : 18511806-2236358

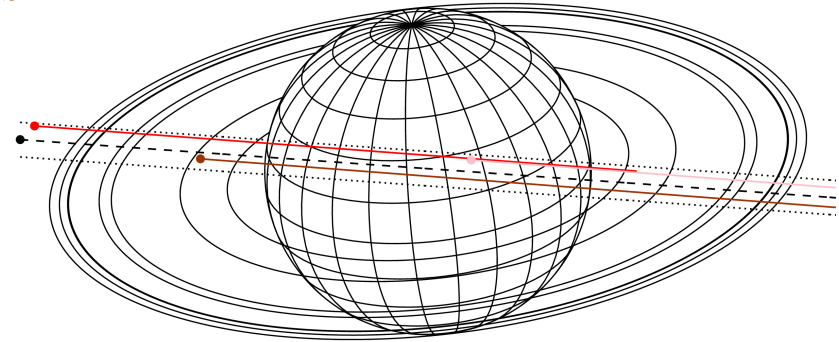
Saturn 2048-11-15T18:22:00 K8.47 G12.45 PgtRgt

ICRS Star Coord at Epoch: 18h 51m 18.08761s -22:36:35.87322s
 RUWE (>1.4 is poor) : 0.93
 K magnitude : 8.469
 G magnitude : 12.454
 RP magnitude : 11.352
 BP magnitude : 13.726
 DUPflag : 0
 Distance (au) : 10.657
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 29.37
 Sun-Target sep (deg) : 48.44
 Sun-Moon sep (deg) : 77.56
 B (ring opening deg) : 25.51
 PA of pole (deg) : 6.38
 # a(km) ring



2048-11-15T18:22:00.0900 α: 18 51 18.0876 δ: -22 36 35.873 C/A 0.134° PA 175.89 deg v_sky +29.37 km/s D 10.66 AU
 Credit: Styled after SORA/Lucky Star

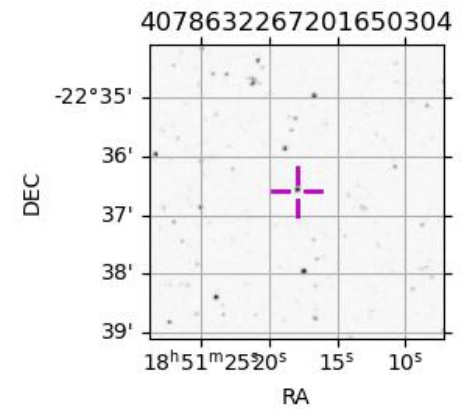
Earth
 PIC
 TEN
 SAAO



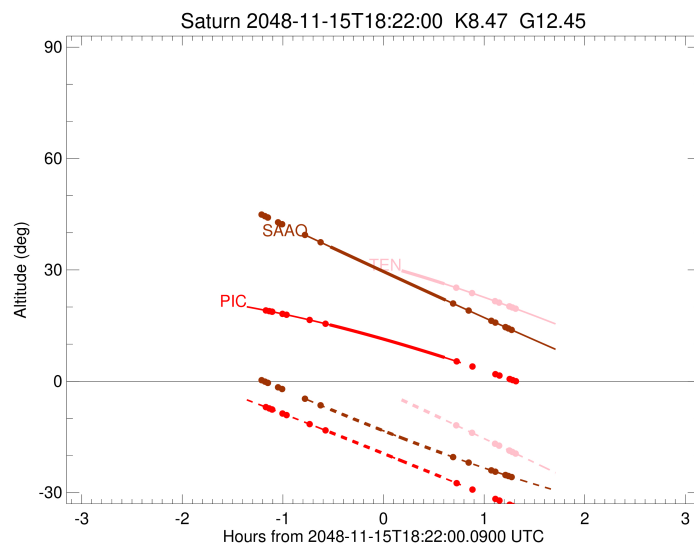
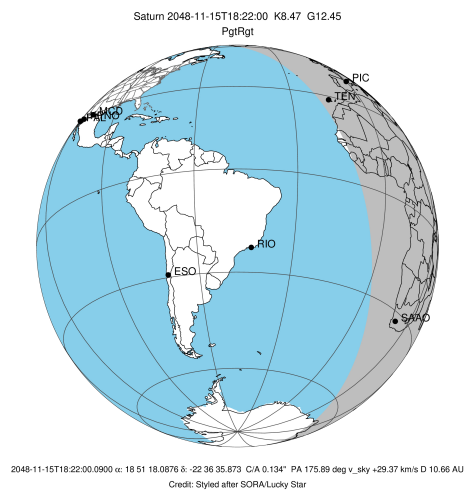
- 1 74490.6 C (IER)
- 2 91984.7 B (IER)
- 3 117571.2 B (OER)
- 4 122050.4 A (IER)
- 5 133423.3 Encke (IEG)
- 6 133744.9 Encke (OEG)
- 7 136774.4 A (OER)
- 8 140461.0 F ring

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	+	+	+	NOV 15 17:11 - NOV 15 19:05	PieRie
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		+	+	NOV 15 18:58 - NOV 15 19:40	PneRne
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					PnnRnn
SAAO	So. Afr. Astro	-32.4	20.8		+	+	NOV 15 17:44 - NOV 15 19:38	PieRie
MSO	Mt. Stromlo Ob	-35.3	149.0					PnnRnn



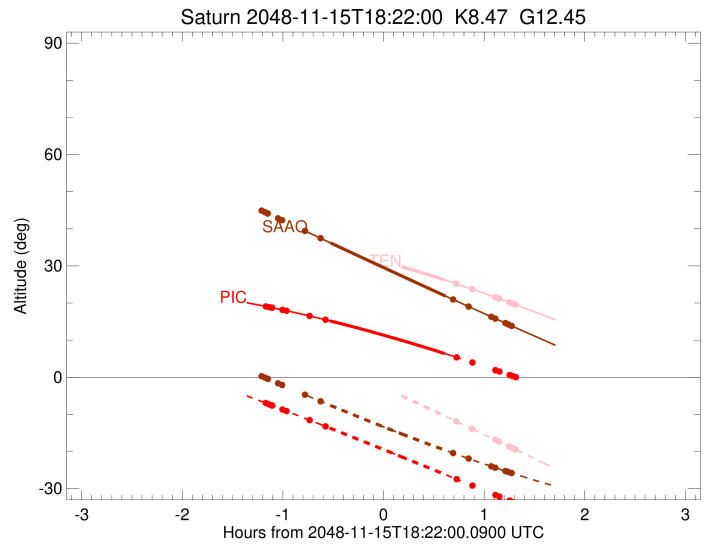
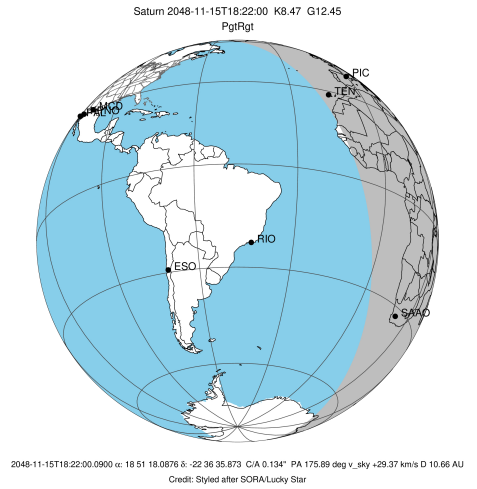
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-11-15T18:24:12.700
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 4078632267201650304
 2Mass ID (if available) : 18511806-2236358
 ICRS Star Coord at Epoch: 18h 51m 18.08761s -22:36:35.87322s
 RUWE (>1.4 is poor) : 0.93
 K magnitude : 8.469
 G magnitude : 12.454
 RP magnitude : 11.352
 BP magnitude : 13.726
 DUPflag : 0
 Distance (au) : 10.657
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 29.37
 Sun-Target sep (deg) : 48.44
 Sun-Moon sep (deg) : 77.61
 B (ring opening deg) : 25.51
 PA of pole (deg) : 6.38
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.769
 C/A sky separation (km) : 5944.7
 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	2048-11-15T17:11:53.685		19.07	-6.97	140461.00	-31.02		
A (OER)	I	2048-11-15T17:13:52.537		18.89	-7.31	136774.40	-31.02		
Encke (OEG)	I	2048-11-15T17:15:30.219		18.74	-7.60	133744.89	-31.01		
Encke (IEG)	I	2048-11-15T17:15:40.589		18.73	-7.63	133423.31	-31.01		
A (IER)	I	2048-11-15T17:21:47.438		18.15	-8.69	122050.38	-30.99		
B (OER)	I	2048-11-15T17:24:11.996		17.92	-9.12	117571.16	-30.98		
B (IER)	I	2048-11-15T17:37:59.077		16.52	-11.55	91984.69	-30.88		
C (IER)	I	2048-11-15T17:47:26.939		15.49	-13.23	74490.58	-30.72		
Saturn	I	2048-11-15T17:49:56.851		15.21	-13.68	60183.33		14.67	17.81
Saturn	E	2048-11-15T18:58:27.773		6.40	-26.14	60259.86		-4.50	-5.53
C (IER)	E	2048-11-15T19:05:35.849		5.37	-27.45	74490.58	30.86		
B (IER)	E	2048-11-15T19:15:00.824		3.98x	-29.18	91984.69	31.05		
B (OER)	E	2048-11-15T19:28:42.749		1.91x	-31.69	117571.16	31.20		
A (IER)	E	2048-11-15T19:31:06.285		1.55x	-32.13	122050.38	31.22		
Encke (IEG)	E	2048-11-15T19:37:10.378		0.61x	-33.24	133423.31	31.26		
Encke (OEG)	E	2048-11-15T19:37:20.666		0.58x	-33.27	133744.89	31.26		
A (OER)	E	2048-11-15T19:38:57.574		0.33x	-33.57	136774.40	31.27		
F ring	E	2048-11-15T19:40:55.461		0.02x	-33.93	140461.00	31.28		

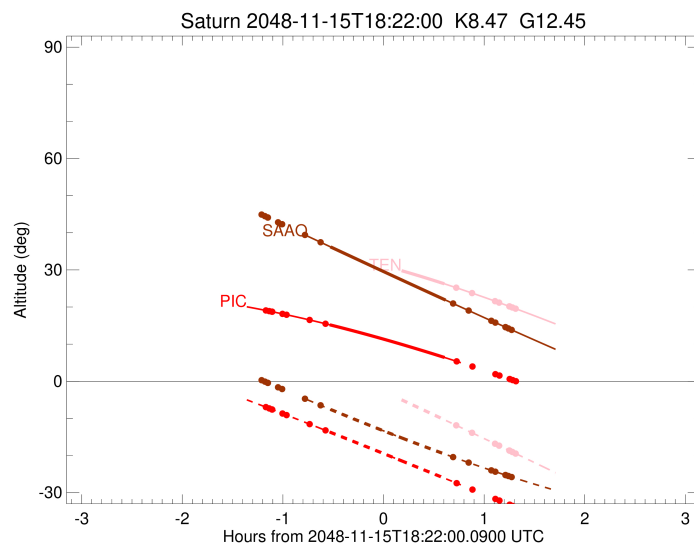
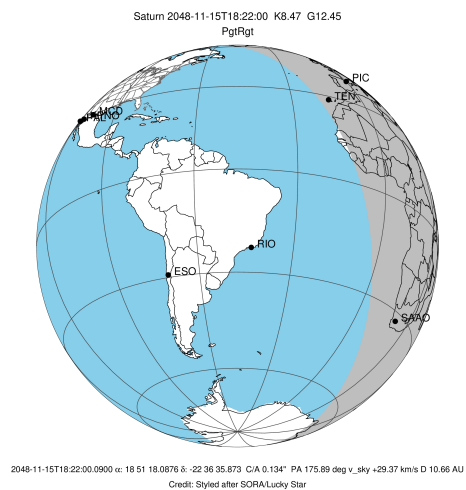
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-11-15T18:23:52.340
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 4078632267201650304
 2Mass ID (if available) : 18511806-2236358
 ICRS Star Coord at Epoch: 18h 51m 18.08761s -22:36:35.87322s
 RUWE (>1.4 is poor) : 0.93
 K magnitude : 8.469
 G magnitude : 12.454
 RP magnitude : 11.352
 BP magnitude : 13.726
 DUPflag : 0
 Distance (au) : 10.657
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 29.37
 Sun-Target sep (deg) : 48.44
 Sun-Moon sep (deg) : 77.93
 B (ring opening deg) : 25.51
 PA of pole (deg) : 6.38
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.700
 C/A sky separation (km) : 5413.9
 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	2048-11-15T17:10:58.313		37.75	11.53x	140461.00	-30.91		
A (OER)	I	2048-11-15T17:12:57.579		37.63	11.14x	136774.40	-30.91		
Encke (OEG)	I	2048-11-15T17:14:35.599		37.53	10.82x	133744.89	-30.91		
Encke (IEG)	I	2048-11-15T17:14:46.004		37.52	10.79x	133423.31	-30.91		
A (IER)	I	2048-11-15T17:20:54.092		37.11	9.59x	122050.38	-30.89		
B (OER)	I	2048-11-15T17:23:19.124		36.94	9.12x	117571.17	-30.88		
B (IER)	I	2048-11-15T17:37:08.677		35.86	6.38x	91984.69	-30.79		
C (IER)	I	2048-11-15T17:46:37.813		35.01	4.48x	74490.58	-30.67		
Saturn	I	2048-11-15T17:49:26.043		34.74	3.92x	60188.57		14.20	17.25
Saturn	E	2048-11-15T18:58:17.968		26.25	-10.37	60258.13		-4.96	-6.08
C (IER)	E	2048-11-15T19:05:19.715		25.21	-11.86	74490.58	30.81		
B (IER)	E	2048-11-15T19:14:45.948		23.77	-13.88	91984.69	30.97		
B (OER)	E	2048-11-15T19:28:30.303		21.58	-16.82	117571.16	31.10		
A (IER)	E	2048-11-15T19:30:54.305		21.19	-17.34	122050.38	31.11		
Encke (IEG)	E	2048-11-15T19:36:59.613		20.19	-18.65	133423.31	31.15		
Encke (OEG)	E	2048-11-15T19:37:09.936		20.16	-18.69	133744.89	31.15		
A (OER)	E	2048-11-15T19:38:47.174		19.89	-19.04	136774.40	31.16		
F ring	E	2048-11-15T19:40:45.466		19.56	-19.46	140461.00	31.17		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-11-15T18:24:44.460
 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 : 4078632267201650304
 2Mass ID (if available) : 18511806-2236358
 ICRS Star Coord at Epoch: 18h 51m 18.08761s -22:36:35.87322s
 RUWE (>1.4 is poor) : 0.93
 K magnitude : 8.469
 G magnitude : 12.454
 RP magnitude : 11.352
 BP magnitude : 13.726
 DUPflag : 0
 Distance (au) : 10.657
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 29.37
 Sun-Target sep (deg) : 48.44
 Sun-Moon sep (deg) : 77.88
 B (ring opening deg) : 25.51
 PA of pole (deg) : 6.38
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.225
 C/A sky separation (km) : 1737.5
 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	2048-11-15T17:09:20.071		44.89	0.28x	140461.00	-31.23		
A (OER)	I	2048-11-15T17:11:18.118		44.48	-0.10x	136774.40	-31.23		
Encke (OEG)	I	2048-11-15T17:12:55.117		44.13	-0.42x	133744.88	-31.23		
Encke (IEG)	I	2048-11-15T17:13:05.413		44.10	-0.45x	133423.31	-31.23		
A (IER)	I	2048-11-15T17:19:09.481		42.81	-1.63x	122050.38	-31.24		
B (OER)	I	2048-11-15T17:21:32.842		42.31	-2.09x	117571.16	-31.25		
B (IER)	I	2048-11-15T17:35:11.526		39.42	-4.71x	91984.69	-31.26		
C (IER)	I	2048-11-15T17:44:31.167		37.44	-6.48	74490.58	-31.26		
Saturn	I	2048-11-15T17:50:23.167		36.21	-7.58	60241.34		8.17	10.00
Saturn	E	2048-11-15T18:59:00.418		21.87	-19.69	60218.64		-11.15	-13.60
C (IER)	E	2048-11-15T19:03:27.256		20.96	-20.42	74490.58	31.42		
B (IER)	E	2048-11-15T19:12:43.645		19.06	-21.90	91984.69	31.46		
B (OER)	E	2048-11-15T19:26:16.322		16.29	-24.00	117571.16	31.50		
A (IER)	E	2048-11-15T19:28:38.482		15.81	-24.36	122050.38	31.51		
Encke (IEG)	E	2048-11-15T19:34:39.301		14.60	-25.25	133423.31	31.53		
Encke (OEG)	E	2048-11-15T19:34:49.501		14.56	-25.27	133744.89	31.53		
A (OER)	E	2048-11-15T19:36:25.584		14.24	-25.51	136774.40	31.53		
F ring	E	2048-11-15T19:38:22.491		13.85	-25.79	140461.00	31.54		