

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-02-15T23:45:28.780
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4115037685644211328
 2Mass ID (if available) : 17210871-2139577

Saturn 2046-02-15T23:45:28 K8.99 G13.24 PgtRgt

ICRS Star Coord at Epoch: 17h 21m 08.69235s -21:39:57.94109s

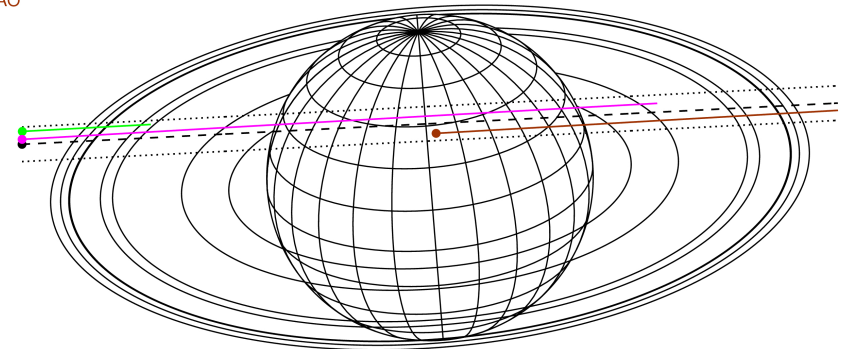
RUWE (>1.4 is poor) : 1.00
 K magnitude : 8.986
 G magnitude : 13.244
 RP magnitude : 12.116
 BP magnitude : 14.586
 DUPflag : 0
 Distance (au) : 10.389
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 21.76
 Sun-Target sep (deg) : 65.85
 Sun-Moon sep (deg) : 174.01
 B (ring opening deg) : 26.60
 PA of pole (deg) : 4.64

#	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



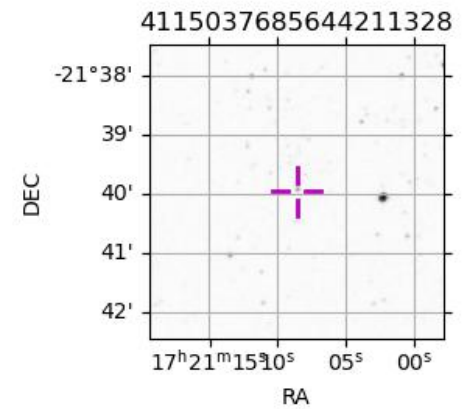
2046-02-15T23:45:28.7800 ra: 17 21 08.6924 s: -21 39 57.941 C/A 2.633° PA 182.89 deg v_sky +21.76 km/s D 10.39 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PMO
 KAV
 SAAO



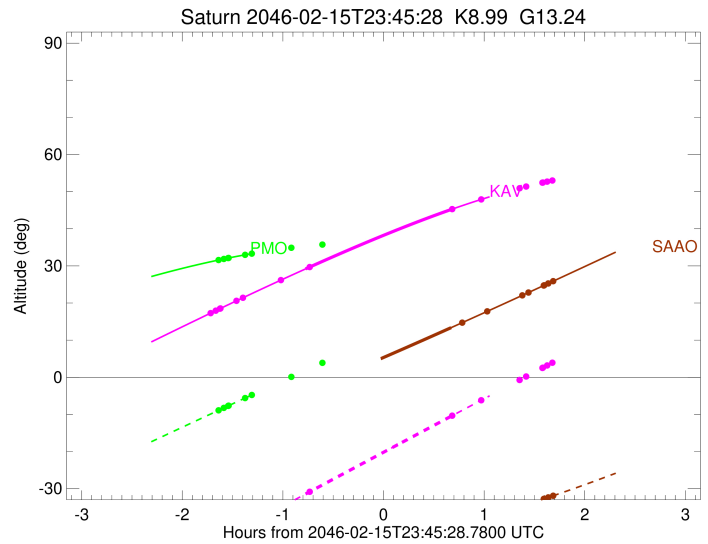
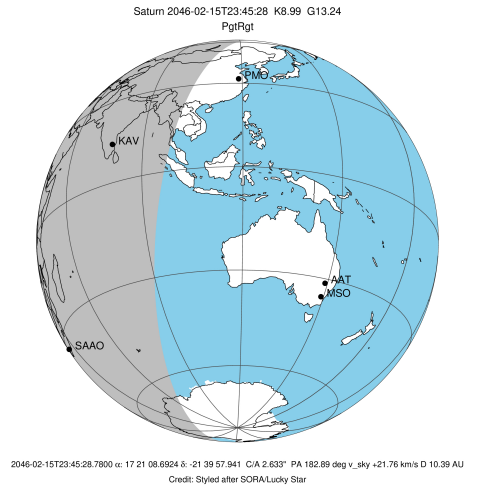
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+			FEB 15 22:07 - FEB 15 22:23	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	+	+	+	FEB 15 22:02 - FEB 16 00:43	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					PnnRnn
SAAO	So. Afr. Astro	-32.4	20.8		+	+	FEB 16 00:25 - FEB 16 01:26	PneRne
MSO	Mt. Stromlo Ob	-35.3	149.0					PnnRnn



4115037685644211328

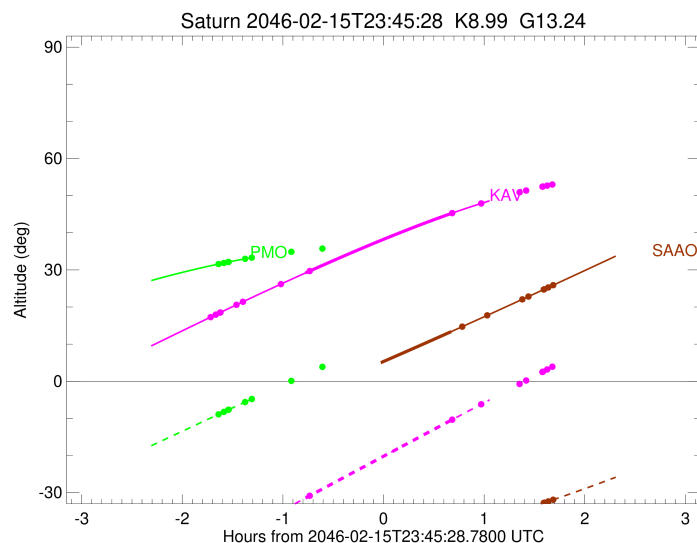
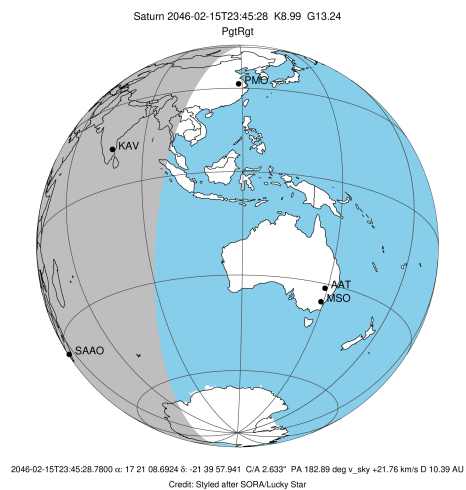
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-02-15T23:45:18.570
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 4115037685644211328
 2Mass ID (if available) : 17210871-2139577
 ICRS Star Coord at Epoch: 17h 21m 08.69235s -21:39:57.94109s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 8.986
 G magnitude : 13.244
 RP magnitude : 12.116
 BP magnitude : 14.586
 DUPflag : 0
 Distance (au) : 10.389
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 21.76
 Sun-Target sep (deg) : 65.85
 Sun-Moon sep (deg) : 174.78
 B (ring opening deg) : 26.60
 PA of pole (deg) : 4.64
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.314
 C/A sky separation (km) : 24970.6
 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	2046-02-15T22:07:10.085		31.58	-8.90	140461.00	-19.67		
A (OER)	I	2046-02-15T22:10:17.948		31.88	-8.25	136774.40	-19.57		
Encke (OEG)	I	2046-02-15T22:12:53.103		32.11	-7.71	133744.89	-19.48		
Encke (IEG)	I	2046-02-15T22:13:09.616		32.14	-7.65	133423.31	-19.47		
A (IER)	I	2046-02-15T22:22:59.779		32.99	-5.59	122050.38	-19.05		
B (OER)	I	2046-02-15T22:26:56.066		33.30	-4.77x	117571.16	-18.86		
B (IER)	I	2046-02-15T22:50:33.941		34.89	0.11x	91984.69	-17.01		
C (IER)	I	2046-02-15T23:09:05.705	b	35.75	3.90x	74490.58	-14.16		
Saturn	I	2046-02-15T23:02:42.944		35.49	2.60x	60041.56		23.27	27.77
Saturn	E	2046-02-16T00:27:58.643		35.36	19.31x	60092.90		20.31	24.40
C (IER)	E	2046-02-16T00:26:09.782	b	35.45	18.97x	74490.58	14.16		
B (IER)	E	2046-02-16T00:44:42.343		34.45	22.37x	91984.69	16.99		
B (OER)	E	2046-02-16T01:08:22.481		32.69	26.54x	117571.16	18.82		
A (IER)	E	2046-02-16T01:12:19.244		32.35	27.21x	122050.38	19.02		
Encke (IEG)	E	2046-02-16T01:22:10.709		31.44	28.86x	133423.31	19.42		
Encke (OEG)	E	2046-02-16T01:22:27.260		31.42	28.91x	133744.89	19.43		
A (OER)	E	2046-02-16T01:25:02.784		31.16	29.33x	136774.40	19.52		
F ring	E	2046-02-16T01:28:11.109		30.85	29.84x	140461.00	19.63		

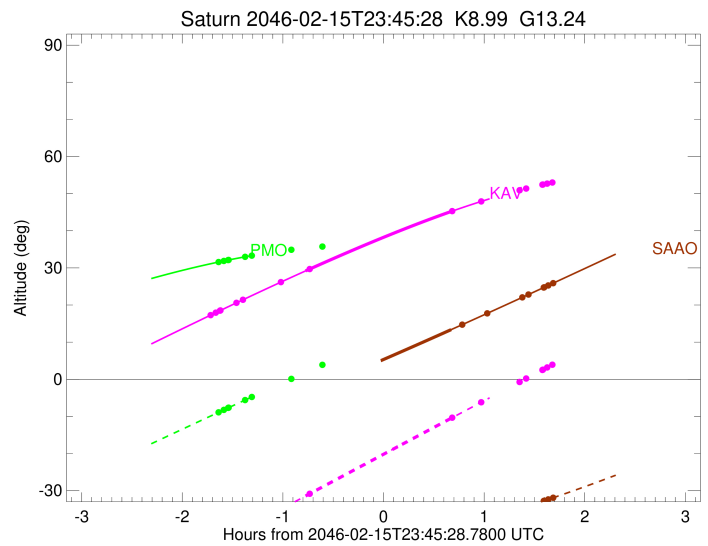
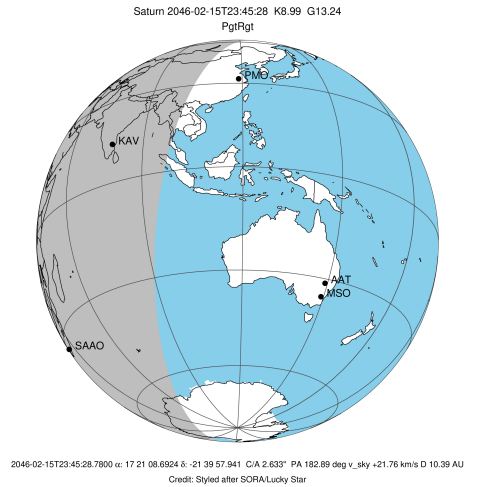
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-02-15T23:42:10.920
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 4115037685644211328
 2Mass ID (if available) : 17210871-2139577
 ICRS Star Coord at Epoch: 17h 21m 08.69235s -21:39:57.94109s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 8.986
 G magnitude : 13.244
 RP magnitude : 12.116
 BP magnitude : 14.586
 DUPflag : 0
 Distance (au) : 10.390
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 21.76
 Sun-Target sep (deg) : 65.85
 Sun-Moon sep (deg) : 174.24
 B (ring opening deg) : 26.60
 PA of pole (deg) : 4.64
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.012
 C/A sky separation (km) : 22692.9
 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_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	2046-02-15T22:02:25.755		17.28	-45.18	140461.00	-20.16		
A (OER)	I	2046-02-15T22:05:29.004		17.94	-44.44	136774.40	-20.07		
Encke (OEG)	I	2046-02-15T22:08:00.221		18.49	-43.83	133744.89	-19.99		
Encke (IEG)	I	2046-02-15T22:08:16.308		18.55	-43.76	133423.31	-19.99		
A (IER)	I	2046-02-15T22:17:50.188		20.60	-41.44	122050.38	-19.63		
B (OER)	I	2046-02-15T22:21:39.271		21.41	-40.51	117571.17	-19.47		
B (IER)	I	2046-02-15T22:44:20.040		26.18	-35.00	91984.69	-17.96		
C (IER)	I	2046-02-15T23:01:31.450	b	29.70	-30.84	74490.58	-15.73		
Saturn	I	2046-02-15T22:58:57.456		29.18	-31.46	60082.52		20.94	25.11
Saturn	E	2046-02-16T00:25:35.088		45.16	-10.55	60121.93		18.48	22.28
C (IER)	E	2046-02-16T00:26:27.505		45.29	-10.34	74490.58	15.64		
B (IER)	E	2046-02-16T00:43:46.769		47.91	-6.19	91984.69	17.80		
B (OER)	E	2046-02-16T01:06:42.284		50.93	-0.71x	117571.16	19.23		
A (IER)	E	2046-02-16T01:10:34.314		51.38	0.21x	122050.38	19.38		
Encke (IEG)	E	2046-02-16T01:20:16.149		52.43	2.51x	133423.31	19.70		
Encke (OEG)	E	2046-02-16T01:20:32.471		52.45	2.58x	133744.89	19.71		
A (OER)	E	2046-02-16T01:23:05.926		52.71	3.19x	136774.40	19.78		
F ring	E	2046-02-16T01:26:11.960		53.01	3.92x	140461.00	19.86		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-02-15T23:41:26.430
 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 : 4115037685644211328
 2Mass ID (if available) : 17210871-2139577
 ICRS Star Coord at Epoch: 17h 21m 08.69235s -21:39:57.94109s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 8.986
 G magnitude : 13.244
 RP magnitude : 12.116
 BP magnitude : 14.586
 DUPflag : 0
 Distance (au) : 10.390
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 21.76
 Sun-Target sep (deg) : 65.85
 Sun-Moon sep (deg) : 173.23
 B (ring opening deg) : 26.60
 PA of pole (deg) : 4.64
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.143
 C/A sky separation (km) : 16149.7
 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_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	2046-02-15T21:59:34.724	-14.14x	-43.77	140461.00	-21.32			
A (OER)	I	2046-02-15T22:02:27.862	-13.66x	-43.95	136774.40	-21.27			
Encke (OEG)	I	2046-02-15T22:04:50.434	-13.25x	-44.09	133744.89	-21.23			
Encke (IEG)	I	2046-02-15T22:05:05.584	-13.21x	-44.11	133423.31	-21.22			
A (IER)	I	2046-02-15T22:14:03.629	-11.67x	-44.57	122050.38	-21.04			
B (OER)	I	2046-02-15T22:17:36.907	-11.05x	-44.73	117571.16	-20.96			
B (IER)	I	2046-02-15T22:38:17.130	-7.38x	-45.33	91984.69	-20.22			
C (IER)	I	2046-02-15T22:53:02.546	-4.68x	-45.43	74490.58	-19.19			
Saturn	I	2046-02-15T22:57:16.069	-3.90x	-45.40	60169.24			15.10	18.31
Saturn	E	2046-02-16T00:25:49.102	13.37	-39.98	60197.70			12.69	15.45
C (IER)	E	2046-02-16T00:32:25.968	14.71	-39.24	74490.58	19.02			
B (IER)	E	2046-02-16T00:47:20.983	17.76	-37.44	91984.69	19.97			
B (OER)	E	2046-02-16T01:08:18.888	22.07	-34.62	117571.16	20.62			
A (IER)	E	2046-02-16T01:11:55.693	22.82	-34.11	122050.38	20.69			
Encke (IEG)	E	2046-02-16T01:21:03.263	24.72	-32.76	133423.31	20.84			
Encke (OEG)	E	2046-02-16T01:21:18.694	24.77	-32.73	133744.89	20.84			
A (OER)	E	2046-02-16T01:23:43.945	25.28	-32.36	136774.40	20.87			
F ring	E	2046-02-16T01:26:40.421	25.89	-31.91	140461.00	20.91			