

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-04T13:54:29.170
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4069732343364137856
 2Mass ID (if available) : 18082634-2219494

Saturn 2047-06-04T13:54:29 K9.53 G14.36 PgtRgt

ICRS Star Coord at Epoch: 18h 08m 26.36079s -22:19:49.52407s

RUWE (>1.4 is poor) : 1.03
 K magnitude : 9.529
 G magnitude : 14.355
 RP magnitude : 13.147
 BP magnitude : 15.937
 DUPflag : 0
 Distance (au) : 9.080
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -18.60
 Sun-Target sep (deg) : 161.26
 Sun-Moon sep (deg) : 67.79
 B (ring opening deg) : 26.28
 PA of pole (deg) : 5.67

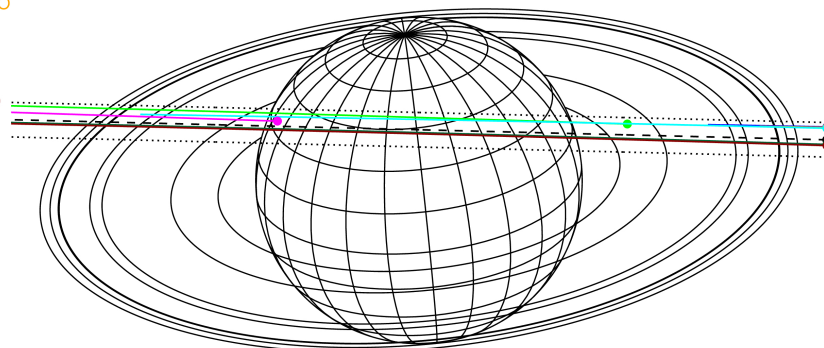
a(km) ring

- 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



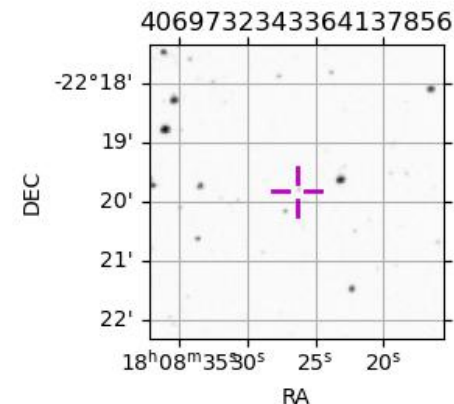
2047-06-04T13:54:29.1700 at: 18 08 26.3608 s: -22 19 49.524 C/A 2.845° PA 178.59 deg v_sky -18.60 km/s D 09.08 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 PMO
 KPNO
 IRTF
 KAV
 AAT
 MSO

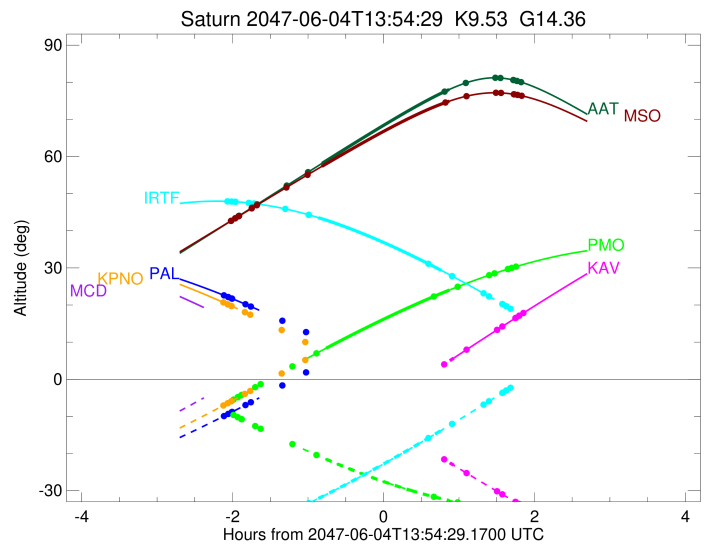
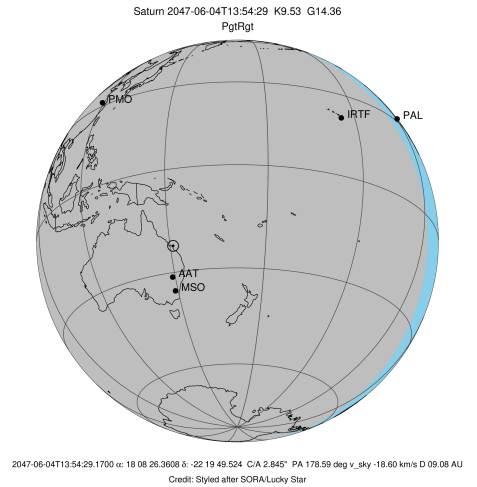


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+ + + + +			JUN 04 11:47 - JUN 04 12:08	PnnRin
PMO	Purple Mtn Obs	32.1	118.8		+	+	JUN 04 13:01 - JUN 04 15:39	PieRie
KPNO	Kitt Peak Natl	32.0	248.4	+ + + +			JUN 04 11:47 - JUN 04 11:53	PnnRin
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	+ + + + +	+	+	JUN 04 11:50 - JUN 04 15:18	PieRie
KAV	Kavalur Observ	12.6	78.8		+		JUN 04 14:50 - JUN 04 15:45	PneRne
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3					PnnRnn
AAT	Siding Spring	-31.3	149.1	+ + + + +	+	+	JUN 04 11:53 - JUN 04 15:43	PieRie
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0	+ + + + +	+	+	JUN 04 11:53 - JUN 04 15:44	PieRie



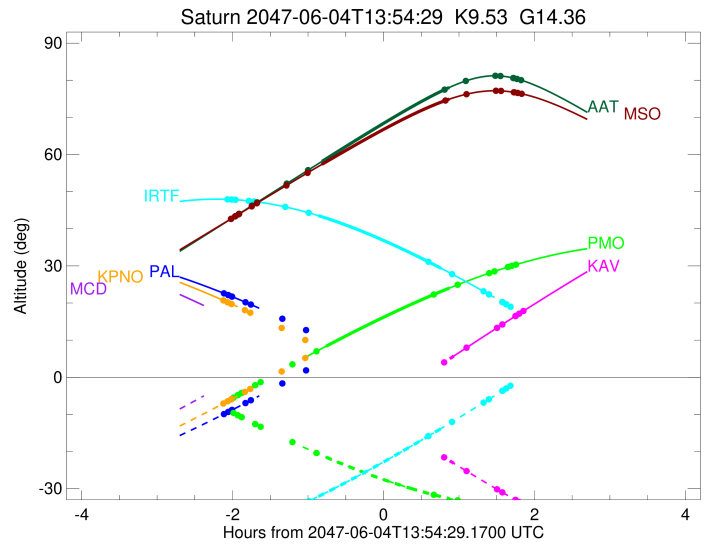
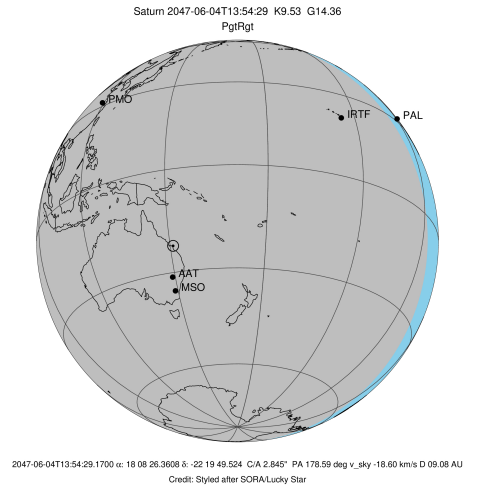
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-04T13:50:01.460
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4069732343364137856
 2Mass ID (if available) : 18082634-2219494
 ICRS Star Coord at Epoch: 18h 08m 26.36079s -22:19:49.52407s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 9.529
 G magnitude : 14.355
 RP magnitude : 13.147
 BP magnitude : 15.937
 DUPflag : 0
 Distance (au) : 9.080
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -18.60
 Sun-Target sep (deg) : 161.26
 Sun-Moon sep (deg) : 68.14
 B (ring opening deg) : 26.28
 PA of pole (deg) : 5.67
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.413
 C/A sky separation (km) : 22479.7
 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	2047-06-04T11:47:38.056		22.61	-9.92	140461.00	-18.15		
A (OER)	I	2047-06-04T11:51:01.623		22.15	-9.34	136774.40	-18.07		
Encke (OEG)	I	2047-06-04T11:53:49.556		21.76	-8.85	133744.89	-18.01		
Encke (IEG)	I	2047-06-04T11:54:07.418		21.72	-8.80	133423.31	-18.00		
A (IER)	I	2047-06-04T12:04:44.243		20.21	-6.95	122050.38	-17.71		
B (OER)	I	2047-06-04T12:08:58.219		19.60	-6.20	117571.16	-17.56		
B (IER)	I	2047-06-04T12:34:02.888		15.77	-1.67x	91984.69	-16.29		
C (IER)	I	2047-06-04T12:52:54.823		12.71	1.85x	74490.58	-14.42		
Saturn	I	2047-06-04T13:00:24.244		11.45	3.27x	60188.80		13.69	16.64
Saturn	E	2047-06-04T14:39:39.956		-6.69x	22.91x	60008.33		25.43	30.19
C (IER)	E	2047-06-04T14:29:22.155	b	-4.70x	20.82x	74490.58	14.29		
B (IER)	E	2047-06-04T14:48:25.667		-8.40x	24.70x	91984.69	16.11		
B (OER)	E	2047-06-04T15:13:49.651		-13.42x	29.94x	117571.16	17.31		
A (IER)	E	2047-06-04T15:18:07.401		-14.28x	30.82x	122050.38	17.44		
Encke (IEG)	E	2047-06-04T15:28:54.352		-16.44x	33.06x	133423.31	17.70		
Encke (OEG)	E	2047-06-04T15:29:12.512		-16.50x	33.12x	133744.89	17.71		
A (OER)	E	2047-06-04T15:32:03.280		-17.08x	33.72x	136774.40	17.77		
F ring	E	2047-06-04T15:35:30.372		-17.77x	34.43x	140461.00	17.83		

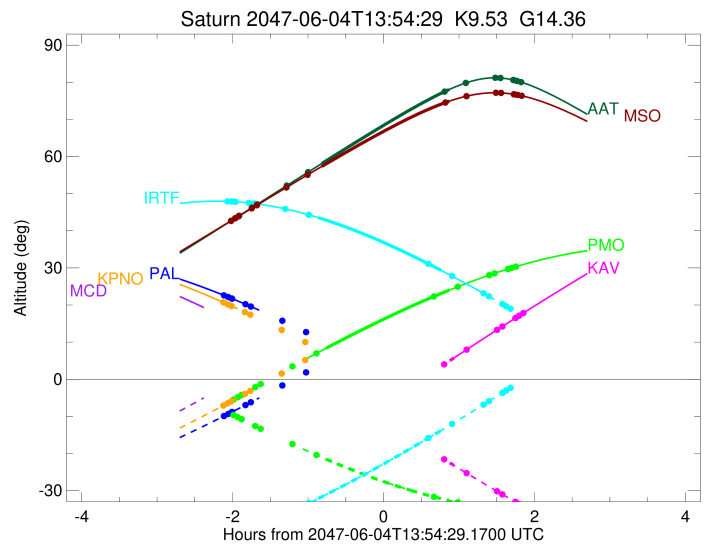
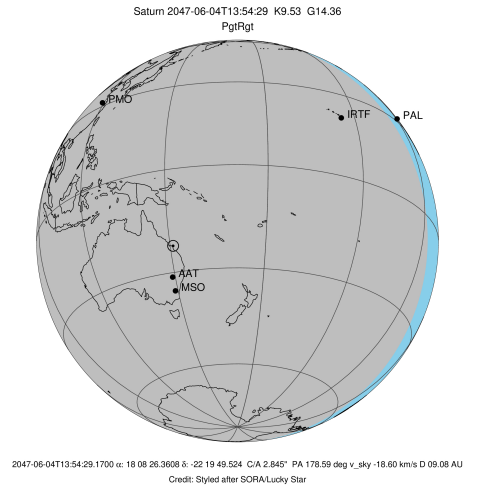
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-04T13:58:02.550
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 4069732343364137856
 2Mass ID (if available) : 18082634-2219494
 ICRS Star Coord at Epoch: 18h 08m 26.36079s -22:19:49.52407s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 9.529
 G magnitude : 14.355
 RP magnitude : 13.147
 BP magnitude : 15.937
 DUPflag : 0
 Distance (au) : 9.080
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -18.60
 Sun-Target sep (deg) : 161.26
 Sun-Moon sep (deg) : 67.83
 B (ring opening deg) : 26.28
 PA of pole (deg) : 5.67
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.531
 C/A sky separation (km) : 23253.9
 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	2047-06-04T11:55:13.006		-5.49x	-9.63	140461.00	-17.97		
A (OER)	I	2047-06-04T11:58:38.575		-4.82x	-10.23	136774.40	-17.90		
Encke (OEG)	I	2047-06-04T12:01:28.122		-4.27x	-10.72	133744.89	-17.84		
Encke (IEG)	I	2047-06-04T12:01:46.153		-4.21x	-10.77	133423.31	-17.83		
A (IER)	I	2047-06-04T12:12:28.829		-2.14x	-12.61	122050.38	-17.55		
B (OER)	I	2047-06-04T12:16:45.059		-1.31x	-13.33	117571.16	-17.41		
B (IER)	I	2047-06-04T12:42:03.618		3.47x	-17.46	91984.69	-16.12		
C (IER)	I	2047-06-04T13:01:11.158		6.98	-20.40	74490.58	-14.15		
Saturn	I	2047-06-04T13:08:50.162		8.36	-21.52	60188.70		13.69	16.65
Saturn	E	2047-06-04T14:46:52.130		24.03	-32.67	59982.21		26.78	31.69
C (IER)	E	2047-06-04T14:34:25.920	b	22.29	-31.65	74490.58	14.21		
B (IER)	E	2047-06-04T14:53:26.820		24.92	-33.15	91984.69	16.25		
B (OER)	E	2047-06-04T15:18:31.018		28.04	-34.60	117571.17	17.61		
A (IER)	E	2047-06-04T15:22:44.315		28.52	-34.79	122050.38	17.76		
Encke (IEG)	E	2047-06-04T15:33:19.036		29.68	-35.17	133423.31	18.07		
Encke (OEG)	E	2047-06-04T15:33:36.832		29.71	-35.18	133744.89	18.07		
A (OER)	E	2047-06-04T15:36:24.135		30.00	-35.26	136774.40	18.14		
F ring	E	2047-06-04T15:39:46.907		30.34	-35.35	140461.00	18.22		

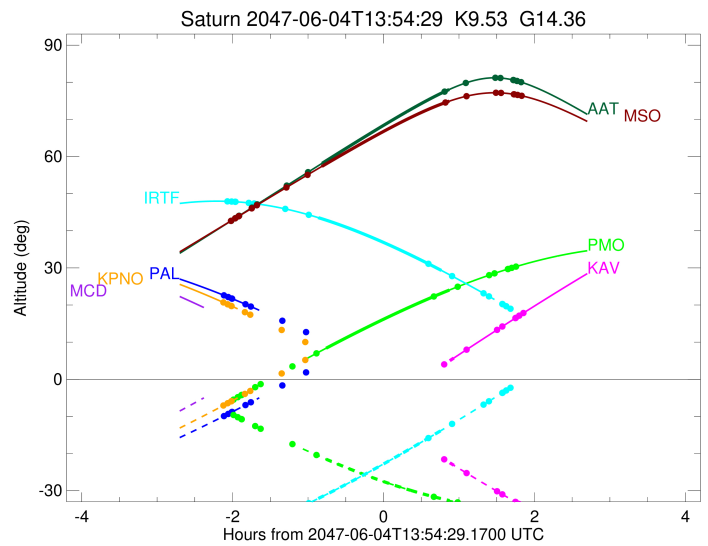
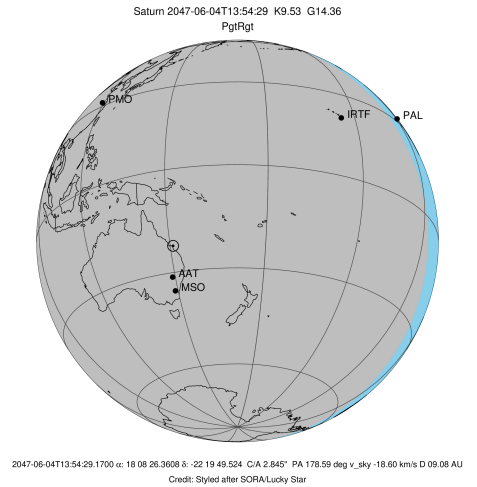
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-04T13:49:50.320
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 4069732343364137856
 2Mass ID (if available) : 18082634-2219494
 ICRS Star Coord at Epoch: 18h 08m 26.36079s -22:19:49.52407s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 9.529
 G magnitude : 14.355
 RP magnitude : 13.147
 BP magnitude : 15.937
 DUPflag : 0
 Distance (au) : 9.080
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -18.60
 Sun-Target sep (deg) : 161.26
 Sun-Moon sep (deg) : 68.10
 B (ring opening deg) : 26.28
 PA of pole (deg) : 5.67
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.369
 C/A sky separation (km) : 22184.2
 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	2047-06-04T11:47:11.761		20.70	-7.07	140461.00	-18.16		
A (OER)	I	2047-06-04T11:50:35.191		20.19	-6.45	136774.40	-18.09		
Encke (OEG)	I	2047-06-04T11:53:22.995		19.77	-5.95	133744.89	-18.02		
Encke (IEG)	I	2047-06-04T11:53:40.843		19.72	-5.89	133423.31	-18.01		
A (IER)	I	2047-06-04T12:04:17.021		18.07	-3.95x	122050.38	-17.73		
B (OER)	I	2047-06-04T12:08:30.655		17.40	-3.16x	117571.16	-17.59		
B (IER)	I	2047-06-04T12:33:31.672		13.28	1.56x	91984.69	-16.36		
C (IER)	I	2047-06-04T12:52:17.060		10.04	5.19x	74490.58	-14.55		
Saturn	I	2047-06-04T13:00:01.866		8.66	6.71x	60191.63		13.43	16.34
Saturn	E	2047-06-04T14:39:40.838		-10.34x	26.98x	60013.57		25.15	29.88
C (IER)	E	2047-06-04T14:29:53.257	b	-8.38x	24.94x	74490.58	14.41		
B (IER)	E	2047-06-04T14:48:50.537		-12.18x	28.89x	91984.69	16.17		
B (OER)	E	2047-06-04T15:14:11.535		-17.33x	34.22x	117571.16	17.33		
A (IER)	E	2047-06-04T15:18:29.078		-18.21x	35.13x	122050.38	17.45		
Encke (IEG)	E	2047-06-04T15:29:15.744		-20.43x	37.41x	133423.31	17.71		
Encke (OEG)	E	2047-06-04T15:29:33.900		-20.50x	37.47x	133744.89	17.72		
A (OER)	E	2047-06-04T15:32:24.641		-21.08x	38.07x	136774.40	17.77		
F ring	E	2047-06-04T15:35:51.722		-21.80x	38.80x	140461.00	17.83		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-04T13:51:35.580
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 4069732343364137856
 2Mass ID (if available) : 18082634-2219494
 ICRS Star Coord at Epoch: 18h 08m 26.36079s -22:19:49.52407s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 9.529
 G magnitude : 14.355
 RP magnitude : 13.147
 BP magnitude : 15.937
 DUPflag : 0
 Distance (au) : 9.080
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -18.60
 Sun-Target sep (deg) : 161.26
 Sun-Moon sep (deg) : 68.56
 B (ring opening deg) : 26.28
 PA of pole (deg) : 5.67
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.424
 C/A sky separation (km) : 22551.6
 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

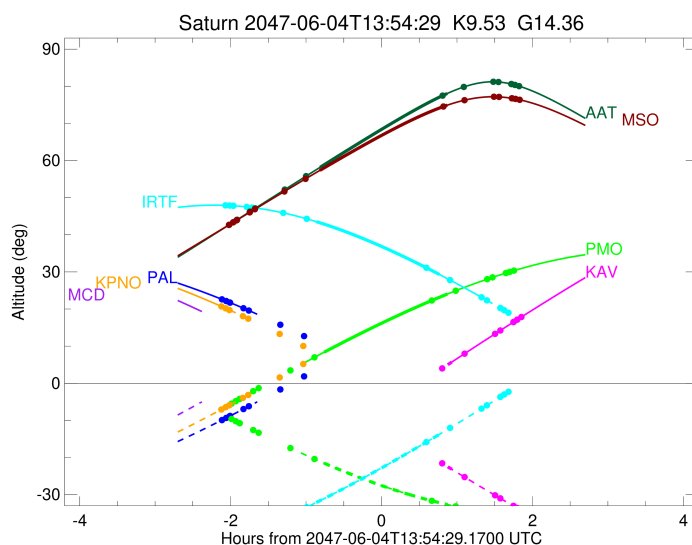
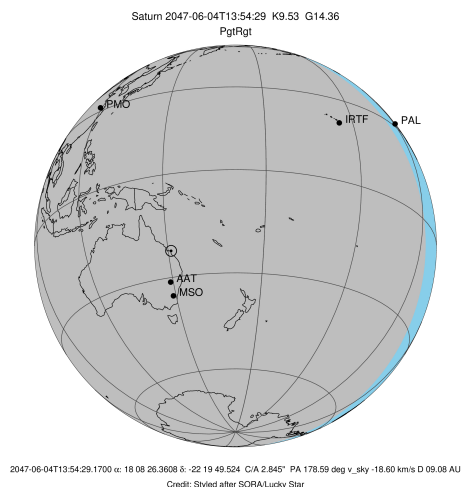


b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-06-04T11:50:23.566		47.92	-42.44	140461.00	-18.30		
A (OER)	I	2047-06-04T11:53:45.379		47.87	-42.05	136774.40	-18.23		
Encke (OEG)	I	2047-06-04T11:56:31.845		47.82	-41.72	133744.89	-18.17		
Encke (IEG)	I	2047-06-04T11:56:49.550		47.81	-41.69	133423.31	-18.16		
A (IER)	I	2047-06-04T12:07:20.650		47.51	-40.38	122050.38	-17.87		
B (OER)	I	2047-06-04T12:11:32.279		47.35	-39.84	117571.16	-17.73		
B (IER)	I	2047-06-04T12:36:22.443		45.89	-36.31	91984.69	-16.46		
C (IER)	I	2047-06-04T12:55:03.185		44.30	-33.37	74490.58	-14.56		
Saturn	I	2047-06-04T13:02:34.731		43.54	-32.13	60189.71		13.61	16.54
Saturn	E	2047-06-04T14:40:32.938		29.31	-13.75	60005.37		25.59	30.36
C (IER)	E	2047-06-04T14:30:08.037	b	31.12	-15.85	74490.58	14.46		
B (IER)	E	2047-06-04T14:48:57.397		27.81	-12.03	91984.69	16.32		
B (OER)	E	2047-06-04T15:14:01.472		23.16	-6.83	117571.16	17.55		
A (IER)	E	2047-06-04T15:18:15.803		22.35	-5.94	122050.38	17.68		
Encke (IEG)	E	2047-06-04T15:28:54.149		20.29	-3.69x	133423.31	17.94		
Encke (OEG)	E	2047-06-04T15:29:12.067		20.23	-3.62x	133744.89	17.95		
A (OER)	E	2047-06-04T15:32:00.561		19.68	-3.03x	136774.40	18.01		
F ring	E	2047-06-04T15:35:24.895		19.01	-2.30x	140461.00	18.07		

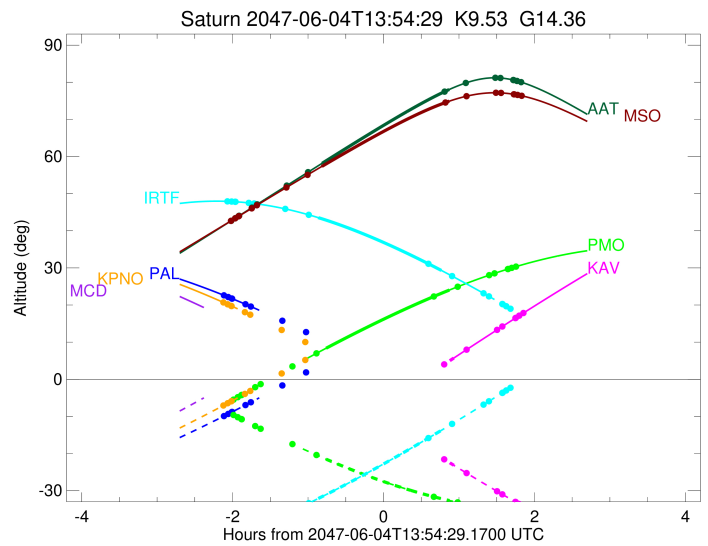
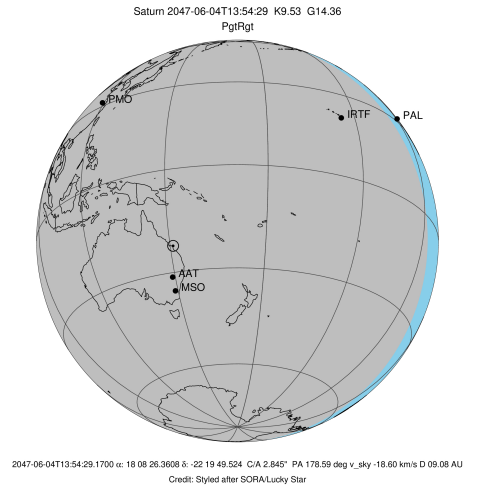
```

target                : Saturn
target radius (km)   : 60268.00
C/A epoch             : 2047-06-04T13:59:51.790
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       : 4069732343364137856
2Mass ID (if available) : 18082634-2219494
ICRS Star Coord at Epoch: 18h 08m 26.36079s -22:19:49.52407s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 9.529
G magnitude           : 14.355
RP magnitude          : 13.147
BP magnitude          : 15.937
DUPflag              : 0
Distance (au)        : 9.080
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -18.60
Sun-Target sep (deg) : 161.26
Sun-Moon sep (deg)   : 67.31
B (ring opening deg) : 26.28
PA of pole (deg)     : 5.67
Pole direction: RA (deg): 40.60000
Dec (deg): 83.50000
C/A sky separation (") : 3.060
C/A sky separation (km) : 20154.4
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
  
```



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-06-04T11:54:27.156	-34.57x	15.79x	140461.00	-18.04			
A (OER)	I	2047-06-04T11:57:51.813	-33.78x	15.01x	136774.40	-17.99			
Encke (OEG)	I	2047-06-04T12:00:40.413	-33.13x	14.37x	133744.89	-17.95			
Encke (IEG)	I	2047-06-04T12:00:58.334	-33.06x	14.30x	133423.31	-17.94			
A (IER)	I	2047-06-04T12:11:35.491	-30.60x	11.87x	122050.38	-17.75			
B (OER)	I	2047-06-04T12:15:48.551	-29.62x	10.91x	117571.16	-17.65			
B (IER)	I	2047-06-04T12:40:30.734	-23.90x	5.30x	91984.69	-16.76			
C (IER)	I	2047-06-04T12:58:33.056	-19.73x	1.22x	74490.58	-15.42			
Saturn	I	2047-06-04T13:08:51.126	-17.36x	-1.09x	60219.05			10.72	13.08
Saturn	E	2047-06-04T14:50:24.541	5.72	-23.17	60031.29			24.20	28.81
C (IER)	E	2047-06-04T14:42:40.355	b	3.99x	-21.55	74490.58	15.57		
B (IER)	E	2047-06-04T15:00:29.754		7.96	-25.26	91984.69	17.00		
B (OER)	E	2047-06-04T15:24:47.063		13.31	-30.17	117571.16	18.00		
A (IER)	E	2047-06-04T15:28:55.129		14.21	-30.99	122050.38	18.11		
Encke (IEG)	E	2047-06-04T15:39:18.795		16.47	-33.02	133423.31	18.35		
Encke (OEG)	E	2047-06-04T15:39:36.317		16.53	-33.08	133744.89	18.36		
A (OER)	E	2047-06-04T15:42:21.123		17.12	-33.61	136774.40	18.41		
F ring	E	2047-06-04T15:45:41.054		17.84	-34.24	140461.00	18.47		

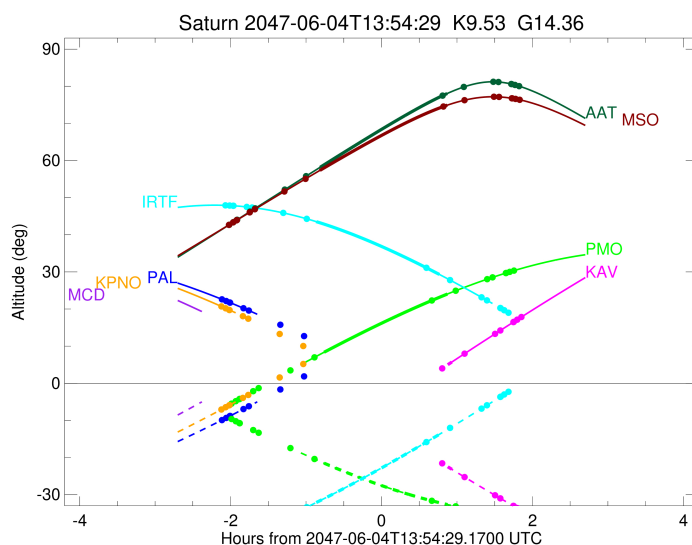
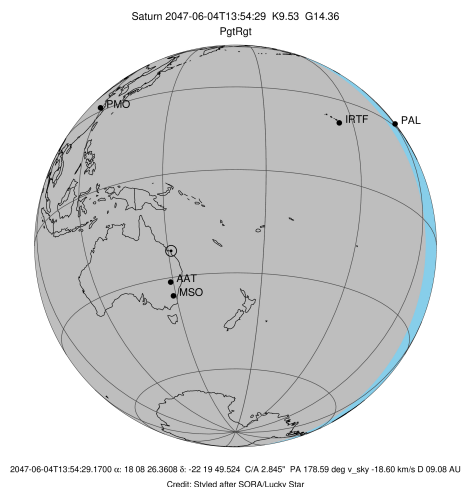
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-04T13:56:17.270
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 4069732343364137856
 2Mass ID (if available) : 18082634-2219494
 ICRS Star Coord at Epoch: 18h 08m 26.36079s -22:19:49.52407s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 9.529
 G magnitude : 14.355
 RP magnitude : 13.147
 BP magnitude : 15.937
 DUPflag : 0
 Distance (au) : 9.080
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -18.60
 Sun-Target sep (deg) : 161.26
 Sun-Moon sep (deg) : 68.53
 B (ring opening deg) : 26.28
 PA of pole (deg) : 5.67
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.684
 C/A sky separation (km) : 17676.3
 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	2047-06-04T11:53:25.889		42.70	-60.15	140461.00	-18.69		
A (OER)	I	2047-06-04T11:56:43.335		43.40	-60.84	136774.40	-18.65		
Encke (OEG)	I	2047-06-04T11:59:25.904		43.98	-61.41	133744.89	-18.62		
Encke (IEG)	I	2047-06-04T11:59:43.179		44.05	-61.47	133423.31	-18.61		
A (IER)	I	2047-06-04T12:09:56.615		46.24	-63.62	122050.38	-18.46		
B (OER)	I	2047-06-04T12:13:59.781		47.11	-64.47	117571.16	-18.38		
B (IER)	I	2047-06-04T12:37:35.324		52.17	-69.31	91984.69	-17.68		
C (IER)	I	2047-06-04T12:54:30.971		55.80	-72.66	74490.58	-16.66		
Saturn	I	2047-06-04T13:05:37.113		58.16	-74.75	60234.82		8.80	10.77
Saturn	E	2047-06-04T14:46:42.816		78.06	-76.83	60076.56		21.62	25.89
C (IER)	E	2047-06-04T14:43:00.136	b	77.48	-77.44	74490.58	16.69		
B (IER)	E	2047-06-04T14:59:53.313		79.82	-74.49	91984.69	17.73		
B (OER)	E	2047-06-04T15:23:23.527		81.21	-69.95	117571.16	18.46		
A (IER)	E	2047-06-04T15:27:25.598		81.16	-69.13	122050.38	18.54		
Encke (IEG)	E	2047-06-04T15:37:36.050		80.62	-67.06	133423.31	18.71		
Encke (OEG)	E	2047-06-04T15:37:53.236		80.60	-67.00	133744.89	18.71		
A (OER)	E	2047-06-04T15:40:34.962		80.37	-66.45	136774.40	18.75		
F ring	E	2047-06-04T15:43:51.355		80.04	-65.77	140461.00	18.79		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-04T13:56:13.540
 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 : 4069732343364137856
 2Mass ID (if available) : 18082634-2219494
 ICRS Star Coord at Epoch: 18h 08m 26.36079s -22:19:49.52407s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 9.529
 G magnitude : 14.355
 RP magnitude : 13.147
 BP magnitude : 15.937
 DUPflag : 0
 Distance (au) : 9.080
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -18.60
 Sun-Target sep (deg) : 161.26
 Sun-Moon sep (deg) : 68.52
 B (ring opening deg) : 26.28
 PA of pole (deg) : 5.67
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.618
 C/A sky separation (km) : 17239.6
 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	2047-06-04T11:53:13.955		42.67	-59.20	140461.00	-18.71		
A (OER)	I	2047-06-04T11:56:31.131		43.34	-59.85	136774.40	-18.68		
Encke (OEG)	I	2047-06-04T11:59:13.461		43.89	-60.38	133744.89	-18.65		
Encke (IEG)	I	2047-06-04T11:59:30.709		43.95	-60.43	133423.31	-18.64		
A (IER)	I	2047-06-04T12:09:43.071		46.04	-62.41	122050.38	-18.49		
B (OER)	I	2047-06-04T12:13:45.726		46.87	-63.19	117571.16	-18.42		
B (IER)	I	2047-06-04T12:37:16.793		51.67	-67.55	91984.69	-17.76		
C (IER)	I	2047-06-04T12:54:06.330		55.07	-70.47	74490.58	-16.80		
Saturn	I	2047-06-04T13:05:23.684		57.33	-72.26	60237.62		8.42	10.31
Saturn	E	2047-06-04T14:46:49.162		74.92	-74.03	60083.02		21.23	25.45
C (IER)	E	2047-06-04T14:43:39.545	b	74.54	-74.44	74490.58	16.82		
B (IER)	E	2047-06-04T15:00:26.663		76.25	-72.07	91984.69	17.81		
B (OER)	E	2047-06-04T15:23:52.548		77.18	-68.17	117571.16	18.50		
A (IER)	E	2047-06-04T15:27:54.138		77.14	-67.45	122050.38	18.58		
Encke (IEG)	E	2047-06-04T15:38:03.602		76.77	-65.60	133423.31	18.74		
Encke (OEG)	E	2047-06-04T15:38:20.764		76.76	-65.54	133744.89	18.74		
A (OER)	E	2047-06-04T15:41:02.274		76.60	-65.04	136774.40	18.77		
F ring	E	2047-06-04T15:44:18.427		76.37	-64.43	140461.00	18.81		