

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-10T07:14:43.500
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4069682659190601728
 2Mass ID (if available) : 18064326-2220240

Saturn 2047-06-10T07:14:43 K7.43 G14.36 PgtRgt

ICRS Star Coord at Epoch: 18h 06m 43.26503s -22:20:24.03665s

RUWE (>1.4 is poor) : 1.07
 K magnitude : 7.426
 G magnitude : 14.361
 RP magnitude : 12.820
 BP magnitude : 17.908
 DUPflag : 0
 Distance (au) : 9.054
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.42
 Sun-Target sep (deg) : 167.12
 Sun-Moon sep (deg) : 16.90
 B (ring opening deg) : 26.32
 PA of pole (deg) : 5.64

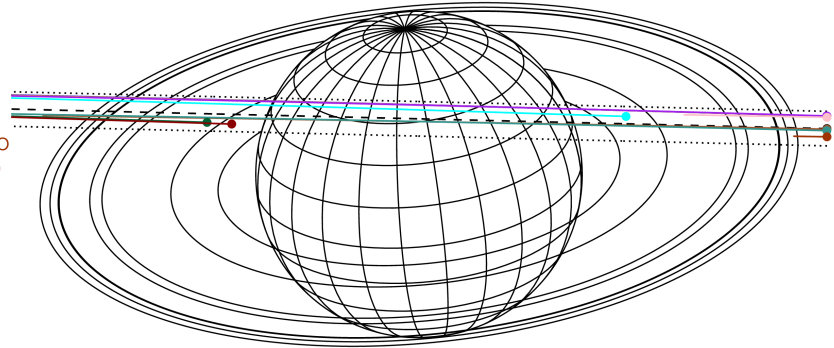
a(km) ring

- 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



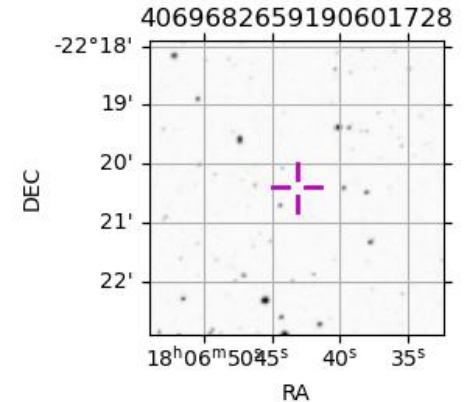
2047-06-10T07:14:43.5000 at: 18 06 43.2650 8: -22 20 24.037 C/A 3.129° PA 178.63 deg v_sky -19.42 km/s D 09.05 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 AAT
 SAAO
 MSO

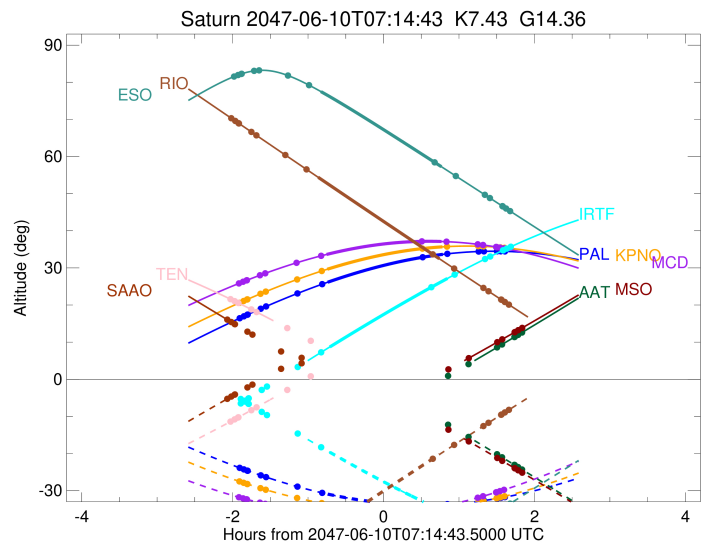
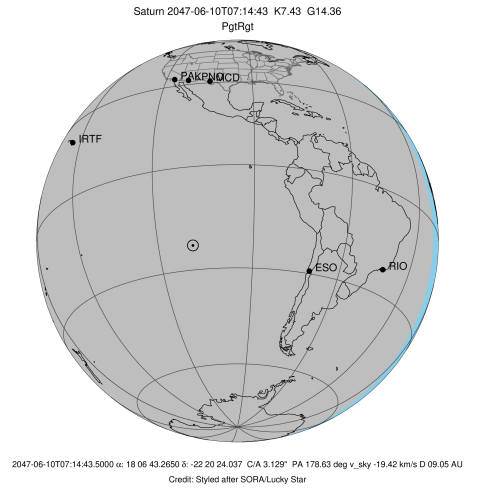


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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 10 05:20 - JUN 10 08:51	PieRie
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4	+	+	+	JUN 10 05:20 - JUN 10 08:50	PieRie
MCD	McDonald Obs.	30.7	256.0	+	+	+	JUN 10 05:19 - JUN 10 08:50	PieRie
TEN	Teide Obs./Ten	28.3	343.5	+	+	+	JUN 10 05:13 - JUN 10 05:33	PnnRin
IRTF	Mauna Kea/IRTF	19.8	204.5		+	+	JUN 10 06:25 - JUN 10 08:55	PieRie
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+	+	+	JUN 10 05:13 - JUN 10 08:54	PieRie
ESO	European South	-29.3	289.3	+	+	+	JUN 10 05:15 - JUN 10 08:55	PieRie
AAT	Siding Spring	-31.3	149.1			+	JUN 10 08:45 - JUN 10 09:04	PnnRne
SAAO	So. Afr. Astro	-32.4	20.8	+			JUN 10 05:10 - JUN 10 05:10	PnnRin
MSO	Mt. Stromlo Ob	-35.3	149.0			+	JUN 10 08:22 - JUN 10 09:04	PnnRne



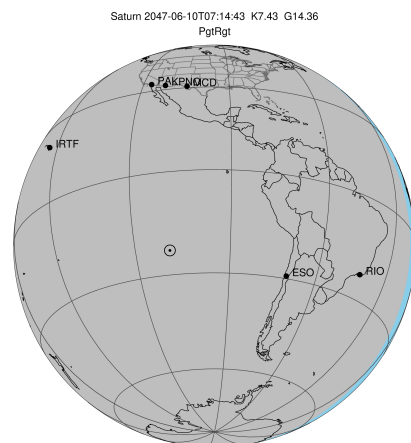
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-10T07:16:14.000
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4069682659190601728
 2Mass ID (if available) : 18064326-2220240
 ICRS Star Coord at Epoch: 18h 06m 43.26503s -22:20:24.03665s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 7.426
 G magnitude : 14.361
 RP magnitude : 12.820
 BP magnitude : 17.908
 DUPflag : 0
 Distance (au) : 9.054
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.42
 Sun-Target sep (deg) : 167.12
 Sun-Moon sep (deg) : 17.38
 B (ring opening deg) : 26.32
 PA of pole (deg) : 5.64
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.916
 C/A sky separation (km) : 25715.8
 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



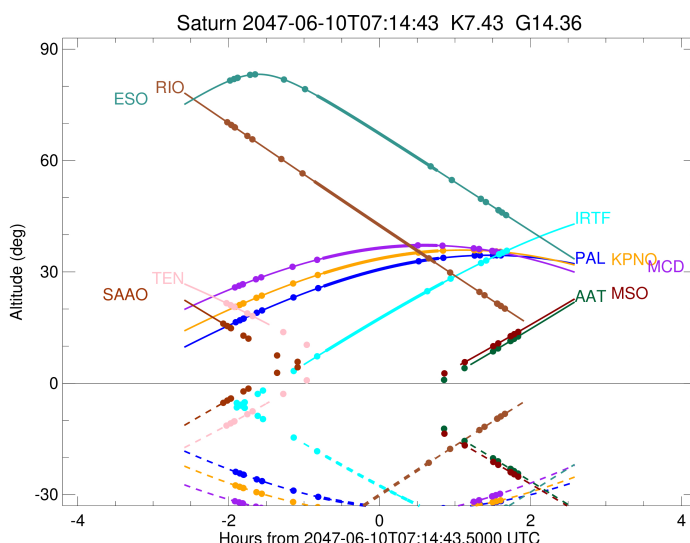
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-06-10T05:20:23.129		16.44	-23.87	140461.00	-18.58		
A (OER)	I	2047-06-10T05:23:42.087		16.96	-24.28	136774.40	-18.48		
Encke (OEG)	I	2047-06-10T05:26:26.373		17.38	-24.61	133744.89	-18.40		
Encke (IEG)	I	2047-06-10T05:26:43.857		17.42	-24.65	133423.31	-18.39		
A (IER)	I	2047-06-10T05:37:08.523		19.00	-25.88	122050.38	-18.01		
B (OER)	I	2047-06-10T05:41:18.550		19.61	-26.35	117571.17	-17.82		
B (IER)	I	2047-06-10T06:06:18.836		23.12	-28.92	91984.69	-16.07		
C (IER)	I	2047-06-10T06:25:57.849		25.62	-30.60	74490.58	-13.31		
Saturn	I	2047-06-10T06:30:21.012		26.14	-30.93	60157.21		16.22	19.64
Saturn	E	2047-06-10T08:01:50.571		33.65	-33.70	59940.83		28.77	33.87
C (IER)	E	2047-06-10T07:45:47.563	b	32.86	-33.81	74490.58	13.29		
B (IER)	E	2047-06-10T08:05:26.288		33.79	-33.64	91984.69	16.10		
B (OER)	E	2047-06-10T08:30:22.691		34.41	-32.86	117571.16	17.88		
A (IER)	E	2047-06-10T08:34:31.846		34.46	-32.67	122050.38	18.07		
Encke (IEG)	E	2047-06-10T08:44:54.105		34.48	-32.13	133423.31	18.46		
Encke (OEG)	E	2047-06-10T08:45:11.516		34.48	-32.11	133744.89	18.47		
A (OER)	E	2047-06-10T08:47:55.115		34.47	-31.95	136774.40	18.56		
F ring	E	2047-06-10T08:51:13.214		34.45	-31.75	140461.00	18.66		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-10T07:15:52.660
 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 : 4069682659190601728
 2Mass ID (if available) : 18064326-2220240
 ICRS Star Coord at Epoch: 18h 06m 43.26503s -22:20:24.03665s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 7.426
 G magnitude : 14.361
 RP magnitude : 12.820
 BP magnitude : 17.908
 DUPflag : 0
 Distance (au) : 9.054
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.42
 Sun-Target sep (deg) : 167.12
 Sun-Moon sep (deg) : 17.33
 B (ring opening deg) : 26.32
 PA of pole (deg) : 5.64
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.910
 C/A sky separation (km) : 25673.2
 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



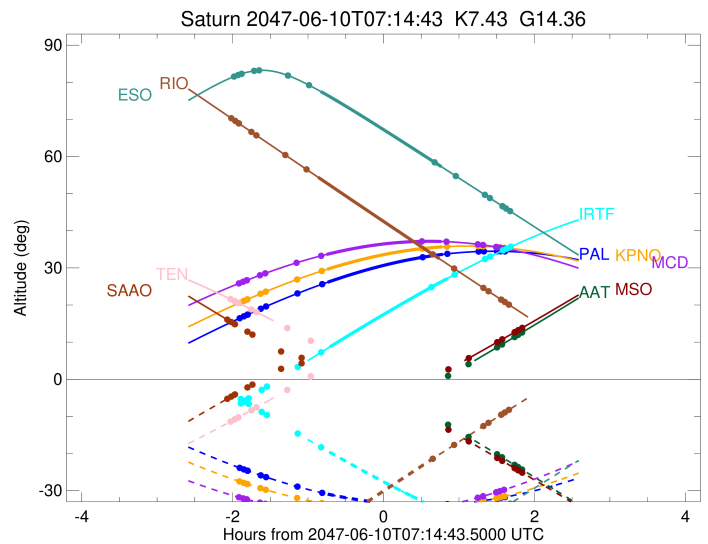
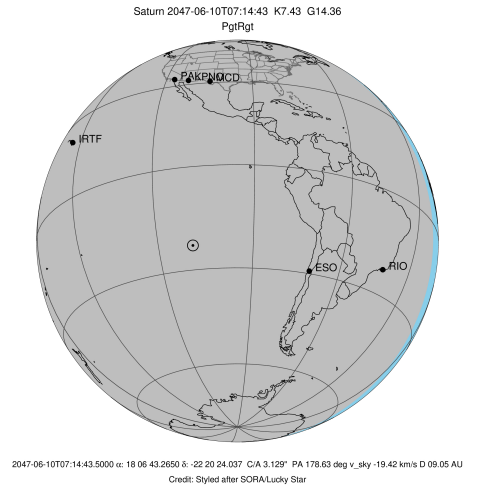
2047-06-10T07:14:43.5000 r: 18 06 43.2650 s: -22 20 24.037 C/A: 3.129° PA: 178.63 deg v_sky: -19.42 km/s D: 09.05 AU
 Credit: Styled after SORA/Lucky Star



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	2047-06-10T05:20:10.158		20.58	-27.52	140461.00	-18.60		
A (OER)	I	2047-06-10T05:23:28.819		21.08	-27.89	136774.40	-18.51		
Encke (OEG)	I	2047-06-10T05:26:12.860		21.48	-28.20	133744.89	-18.43		
Encke (IEG)	I	2047-06-10T05:26:30.317		21.52	-28.23	133423.31	-18.42		
A (IER)	I	2047-06-10T05:36:54.048		23.02	-29.34	122050.38	-18.03		
B (OER)	I	2047-06-10T05:41:03.695		23.60	-29.76	117571.16	-17.85		
B (IER)	I	2047-06-10T06:06:01.560		26.88	-31.98	91984.69	-16.10		
C (IER)	I	2047-06-10T06:25:38.082		29.17	-33.35	74490.58	-13.35		
Saturn	I	2047-06-10T06:30:01.387		29.64	-33.60	60157.34		16.21	19.63
Saturn	E	2047-06-10T08:01:28.477		35.67	-34.54	59942.31		28.70	33.79
C (IER)	E	2047-06-10T07:45:33.748	b	35.20	-35.00	74490.58	13.32		
B (IER)	E	2047-06-10T08:05:10.779		35.74	-34.39	91984.69	16.11		
B (OER)	E	2047-06-10T08:30:06.257		35.84	-33.08	117571.16	17.89		
A (IER)	E	2047-06-10T08:34:15.331		35.79	-32.80	122050.38	18.08		
Encke (IEG)	E	2047-06-10T08:44:37.461		35.59	-32.04	133423.31	18.47		
Encke (OEG)	E	2047-06-10T08:44:54.870		35.58	-32.02	133744.89	18.48		
A (OER)	E	2047-06-10T08:47:38.450		35.51	-31.80	136774.40	18.56		
F ring	E	2047-06-10T08:50:56.534		35.41	-31.53	140461.00	18.66		

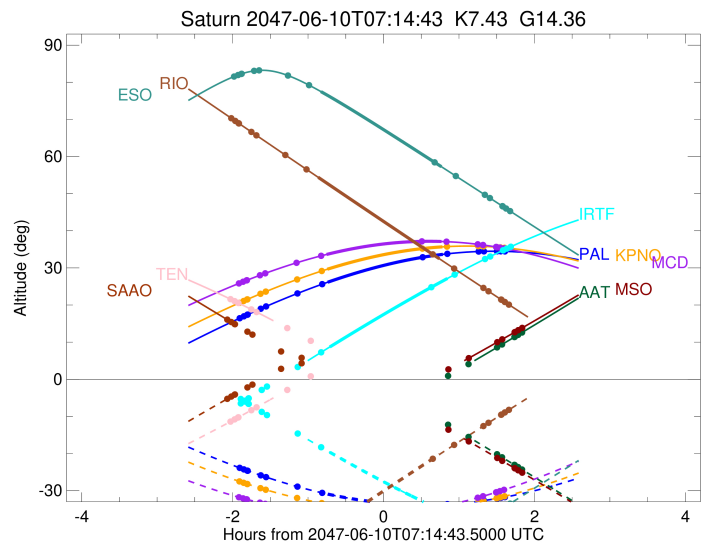
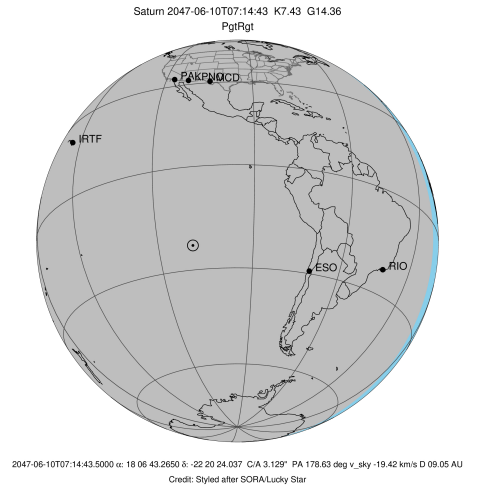
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-10T07:15:19.270
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 4069682659190601728
 2Mass ID (if available) : 18064326-2220240
 ICRS Star Coord at Epoch: 18h 06m 43.26503s -22:20:24.03665s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 7.426
 G magnitude : 14.361
 RP magnitude : 12.820
 BP magnitude : 17.908
 DUPflag : 0
 Distance (au) : 9.054
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.42
 Sun-Target sep (deg) : 167.12
 Sun-Moon sep (deg) : 17.24
 B (ring opening deg) : 26.32
 PA of pole (deg) : 5.64
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.903
 C/A sky separation (km) : 25627.1
 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	2047-06-10T05:19:46.875		25.82	-31.78	140461.00	-18.64		
A (OER)	I	2047-06-10T05:23:05.197		26.27	-32.09	136774.40	-18.54		
Encke (OEG)	I	2047-06-10T05:25:48.960		26.63	-32.34	133744.89	-18.46		
Encke (IEG)	I	2047-06-10T05:26:06.387		26.67	-32.36	133423.31	-18.45		
A (IER)	I	2047-06-10T05:36:29.072		28.01	-33.24	122050.38	-18.06		
B (OER)	I	2047-06-10T05:40:38.304		28.53	-33.56	117571.16	-17.88		
B (IER)	I	2047-06-10T06:05:33.608		31.37	-35.17	91984.69	-16.13		
C (IER)	I	2047-06-10T06:25:07.642		33.25	-36.00	74490.58	-13.38		
Saturn	I	2047-06-10T06:29:29.767		33.63	-36.13	60157.28		16.22	19.63
Saturn	E	2047-06-10T08:00:54.798		37.11	-34.23	59944.19		28.61	33.69
C (IER)	E	2047-06-10T07:45:09.891	b	37.14	-35.18	74490.58	13.34		
B (IER)	E	2047-06-10T08:04:45.640		37.06	-33.96	91984.69	16.12		
B (OER)	E	2047-06-10T08:29:40.813		36.36	-31.91	117571.16	17.89		
A (IER)	E	2047-06-10T08:33:49.922		36.17	-31.51	122050.38	18.07		
Encke (IEG)	E	2047-06-10T08:44:12.221		35.64	-30.47	133423.31	18.46		
Encke (OEG)	E	2047-06-10T08:44:29.637		35.62	-30.44	133744.89	18.47		
A (OER)	E	2047-06-10T08:47:13.281		35.47	-30.15	136774.40	18.55		
F ring	E	2047-06-10T08:50:31.451		35.26	-29.79	140461.00	18.65		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-10T07:10:05.970
 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 : 4069682659190601728
 2Mass ID (if available) : 18064326-2220240
 ICRS Star Coord at Epoch: 18h 06m 43.26503s -22:20:24.03665s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 7.426
 G magnitude : 14.361
 RP magnitude : 12.820
 BP magnitude : 17.908
 DUPflag : 0
 Distance (au) : 9.054
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.42
 Sun-Target sep (deg) : 167.12
 Sun-Moon sep (deg) : 16.10
 B (ring opening deg) : 26.32
 PA of pole (deg) : 5.64
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.601
 C/A sky separation (km) : 23643.1
 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

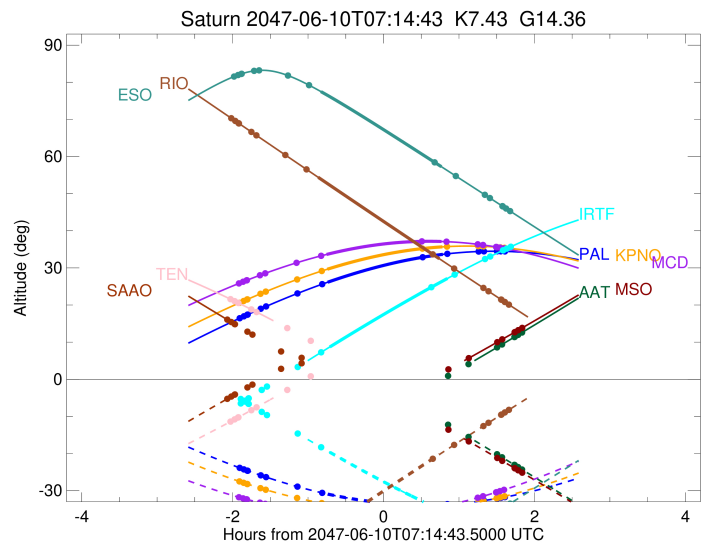
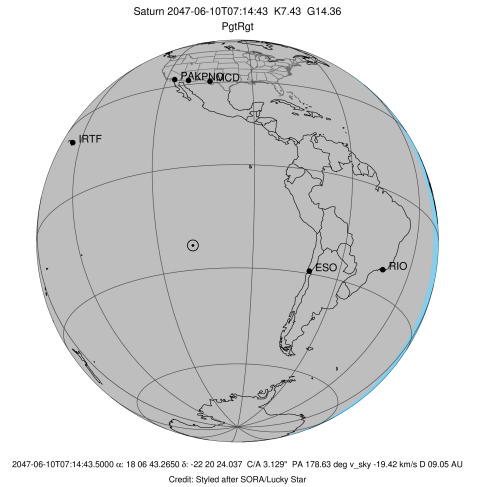


b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-06-10T05:13:04.463		21.58	-11.40	140461.00	-18.76		
A (OER)	I	2047-06-10T05:16:21.412		21.04	-10.80	136774.40	-18.68		
Encke (OEG)	I	2047-06-10T05:19:03.962		20.59	-10.30	133744.89	-18.60		
Encke (IEG)	I	2047-06-10T05:19:21.256		20.55	-10.25	133423.31	-18.59		
A (IER)	I	2047-06-10T05:29:38.433		18.82	-8.34	122050.38	-18.25		
B (OER)	I	2047-06-10T05:33:44.960		18.11	-7.56	117571.16	-18.09		
B (IER)	I	2047-06-10T05:58:12.725		13.79	-2.88x	91984.69	-16.60		
C (IER)	I	2047-06-10T06:16:53.575		10.36	0.79x	74490.58	-14.38		
Saturn	I	2047-06-10T06:22:53.978		9.23	1.99x	60174.89		14.83	18.00
Saturn	E	2047-06-10T07:57:18.878		-9.55x	21.51x	59988.45		26.40	31.27
C (IER)	E	2047-06-10T07:45:37.811	b	-7.14x	19.03x	74490.58	14.25		
B (IER)	E	2047-06-10T08:04:30.142		-11.05x	23.04x	91984.69	16.42		
B (OER)	E	2047-06-10T08:29:16.751		-16.25x	28.35x	117571.16	17.83		
A (IER)	E	2047-06-10T08:33:26.954		-17.13x	29.25x	122050.38	17.98		
Encke (IEG)	E	2047-06-10T08:43:53.996		-19.35x	31.51x	133423.31	18.28		
Encke (OEG)	E	2047-06-10T08:44:11.580		-19.42x	31.57x	133744.89	18.29		
A (OER)	E	2047-06-10T08:46:56.892		-20.00x	32.17x	136774.40	18.36		
F ring	E	2047-06-10T08:50:17.276		-20.72x	32.89x	140461.00	18.44		


```

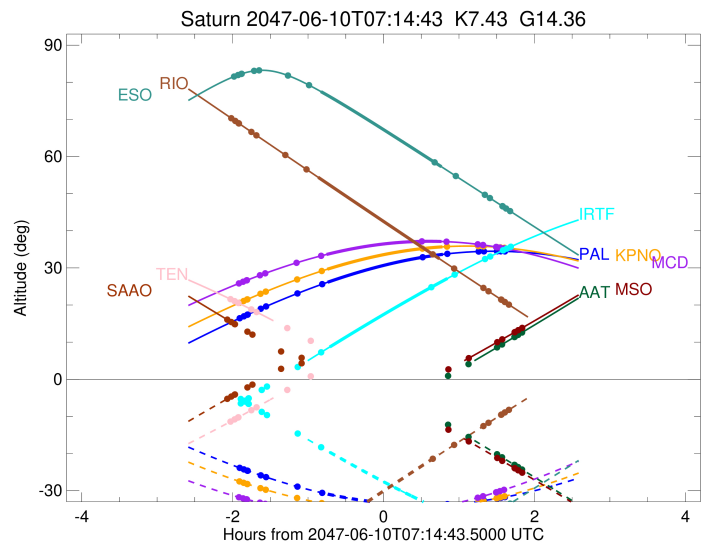
target                : Saturn
target radius (km)   : 60268.00
C/A epoch            : 2047-06-10T07:18:56.730
Event type          : PgtRgt
: Ring occs: geocentric, topocentric
Observer code       : IRTF
Location            : Mauna Kea/IRTF
Latitude (deg)      : 19.82622
E. Longitude (deg)  : 204.52800
Altitude (km)       : 4.168
Gaia source ID      : 4069682659190601728
2Mass ID (if available) : 18064326-2220240
ICRS Star Coord at Epoch: 18h 06m 43.26503s -22:20:24.03665s
RUWE (>1.4 is poor) : 1.07
K magnitude          : 7.426
G magnitude          : 14.361
RP magnitude         : 12.820
BP magnitude         : 17.908
DUPflag             : 0
Distance (au)       : 9.054
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -19.42
Sun-Target sep (deg) : 167.12
Sun-Moon sep (deg)  : 17.77
B (ring opening deg) : 26.32
PA of pole (deg)    : 5.64
Pole direction: RA (deg): 40.60000
Dec (deg): 83.50000
C/A sky separation (") : 3.632
C/A sky separation (km) : 23846.6
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	2047-06-10T05:21:15.028		-6.51x	-5.31	140461.00	-18.65		
A (OER)	I	2047-06-10T05:24:33.138		-5.79x	-6.00	136774.40	-18.57		
Encke (OEG)	I	2047-06-10T05:27:16.567		-5.19x	-6.57	133744.89	-18.50		
Encke (IEG)	I	2047-06-10T05:27:33.950		-5.13x	-6.64	133423.31	-18.50		
A (IER)	I	2047-06-10T05:37:53.788		-2.87x	-8.78	122050.38	-18.19		
B (OER)	I	2047-06-10T05:42:01.092		-1.97x	-9.64	117571.16	-18.04		
B (IER)	I	2047-06-10T06:06:30.196		3.30x	-14.62	91984.69	-16.62		
C (IER)	I	2047-06-10T06:25:08.573		7.26	-18.31	74490.58	-14.43		
Saturn	I	2047-06-10T06:31:57.147		8.69	-19.64	60181.97		14.25	17.30
Saturn	E	2047-06-10T08:05:33.256		27.16	-35.96	59970.54		27.31	32.27
C (IER)	E	2047-06-10T07:52:41.976	b	24.79	-33.98	74490.58	14.49		
B (IER)	E	2047-06-10T08:11:13.156		28.18	-36.79	91984.69	16.76		
B (OER)	E	2047-06-10T08:35:26.745		32.39	-40.09	117571.16	18.26		
A (IER)	E	2047-06-10T08:39:30.884		33.06	-40.59	122050.38	18.43		
Encke (IEG)	E	2047-06-10T08:49:42.139		34.72	-41.79	133423.31	18.77		
Encke (OEG)	E	2047-06-10T08:49:59.268		34.76	-41.83	133744.89	18.78		
A (OER)	E	2047-06-10T08:52:40.276		35.18	-42.13	136774.40	18.85		
F ring	E	2047-06-10T08:55:55.369		35.69	-42.48	140461.00	18.94		

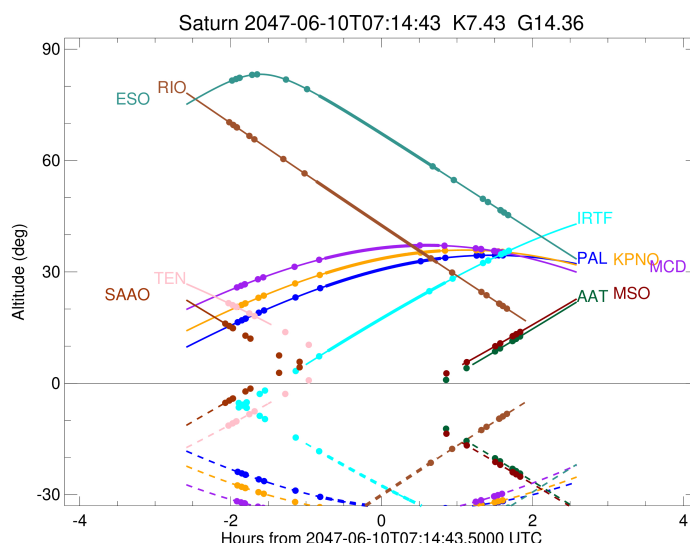
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-10T07:10:57.360
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 4069682659190601728
 2Mass ID (if available) : 18064326-2220240
 ICRS Star Coord at Epoch: 18h 06m 43.26503s -22:20:24.03665s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 7.426
 G magnitude : 14.361
 RP magnitude : 12.820
 BP magnitude : 17.908
 DUPflag : 0
 Distance (au) : 9.054
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.42
 Sun-Target sep (deg) : 167.12
 Sun-Moon sep (deg) : 16.40
 B (ring opening deg) : 26.32
 PA of pole (deg) : 5.64
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.977
 C/A sky separation (km) : 19551.9
 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	2047-06-10T05:13:42.075		70.32	-57.50	140461.00	-19.37		
A (OER)	I	2047-06-10T05:16:52.714		69.58	-56.77	136774.40	-19.31		
Encke (OEG)	I	2047-06-10T05:19:29.816		68.98	-56.18	133744.89	-19.26		
Encke (IEG)	I	2047-06-10T05:19:46.517		68.92	-56.11	133423.31	-19.25		
A (IER)	I	2047-06-10T05:29:40.606		66.63	-53.85	122050.38	-19.02		
B (OER)	I	2047-06-10T05:33:36.711		65.72	-52.96	117571.16	-18.92		
B (IER)	I	2047-06-10T05:56:40.668		60.41	-47.71	91984.69	-17.94		
C (IER)	I	2047-06-10T06:13:30.611		56.54	-43.89	74490.58	-16.56		
Saturn	I	2047-06-10T06:22:47.953		54.41	-41.79	60215.97		11.03	13.46
Saturn	E	2047-06-10T07:59:07.838		32.47	-20.26	60056.02		22.76	27.19
C (IER)	E	2047-06-10T07:53:50.539	b	33.66	-21.43	74490.58	16.41		
B (IER)	E	2047-06-10T08:10:50.049		29.83	-17.69	91984.69	17.76		
B (OER)	E	2047-06-10T08:34:10.489		24.61	-12.61	117571.16	18.66		
A (IER)	E	2047-06-10T08:38:09.833		23.72	-11.74	122050.38	18.76		
Encke (IEG)	E	2047-06-10T08:48:12.629		21.48	-9.58	133423.31	18.96		
Encke (OEG)	E	2047-06-10T08:48:29.586		21.42	-9.51	133744.89	18.97		
A (OER)	E	2047-06-10T08:51:09.129		20.83	-8.94	136774.40	19.01		
F ring	E	2047-06-10T08:54:22.806		20.11	-8.25	140461.00	19.06		

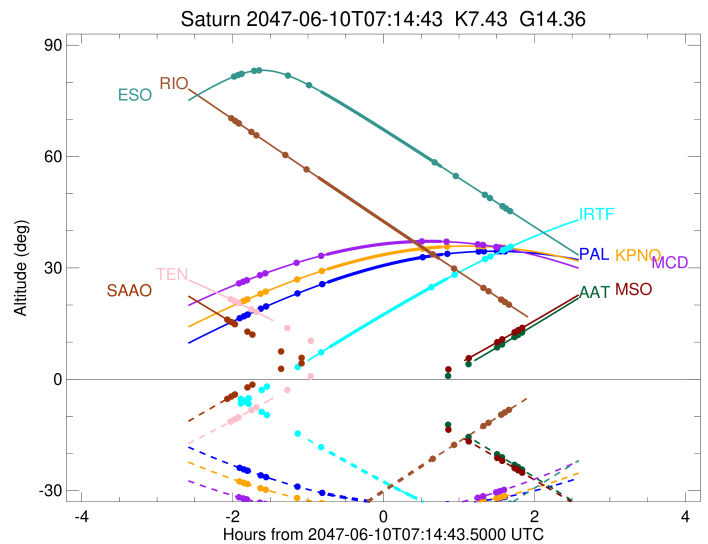
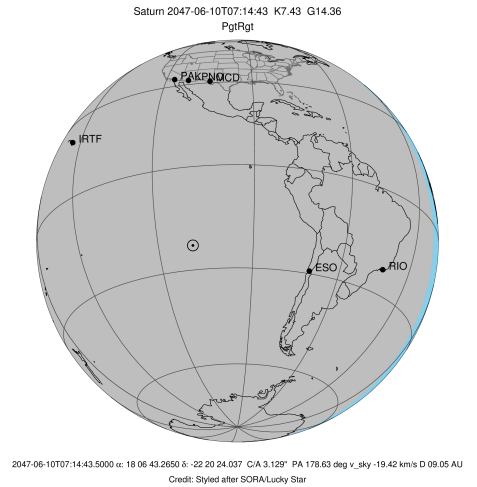
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-10T07:12:53.320
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4069682659190601728
 2Mass ID (if available) : 18064326-2220240
 ICRS Star Coord at Epoch: 18h 06m 43.26503s -22:20:24.03665s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 7.426
 G magnitude : 14.361
 RP magnitude : 12.820
 BP magnitude : 17.908
 DUPflag : 0
 Distance (au) : 9.054
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.42
 Sun-Target sep (deg) : 167.12
 Sun-Moon sep (deg) : 16.82
 B (ring opening deg) : 26.32
 PA of pole (deg) : 5.64
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.978
 C/A sky separation (km) : 19556.0
 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	2047-06-10T05:15:55.379		81.55	-80.30	140461.00	-19.41		
A (OER)	I	2047-06-10T05:19:05.612		81.96	-79.74	136774.40	-19.35		
Encke (OEG)	I	2047-06-10T05:21:42.358		82.26	-79.26	133744.89	-19.30		
Encke (IEG)	I	2047-06-10T05:21:59.020		82.29	-79.21	133423.31	-19.30		
A (IER)	I	2047-06-10T05:31:51.599		83.08	-77.32	122050.38	-19.08		
B (OER)	I	2047-06-10T05:35:47.033		83.21	-76.54	117571.16	-18.97		
B (IER)	I	2047-06-10T05:58:46.228		81.82	-71.80	91984.69	-18.02		
C (IER)	I	2047-06-10T06:15:31.721		79.23	-68.24	74490.58	-16.64		
Saturn	I	2047-06-10T06:24:55.952		77.50	-66.21	60217.51		10.86	13.26
Saturn	E	2047-06-10T08:00:46.390		57.26	-45.33	60053.39		22.91	27.36
C (IER)	E	2047-06-10T07:55:19.294	b	58.45	-46.52	74490.58	16.55		
B (IER)	E	2047-06-10T08:12:10.500		54.76	-42.85	91984.69	17.91		
B (OER)	E	2047-06-10T08:35:19.131		49.69	-37.83	117571.16	18.83		
A (IER)	E	2047-06-10T08:39:16.402		48.83	-36.98	122050.38	18.93		
Encke (IEG)	E	2047-06-10T08:49:13.910		46.64	-34.83	133423.31	19.13		
Encke (OEG)	E	2047-06-10T08:49:30.717		46.58	-34.76	133744.89	19.14		
A (OER)	E	2047-06-10T08:52:08.843		46.01	-34.20	136774.40	19.18		
F ring	E	2047-06-10T08:55:20.791		45.31	-33.51	140461.00	19.23		

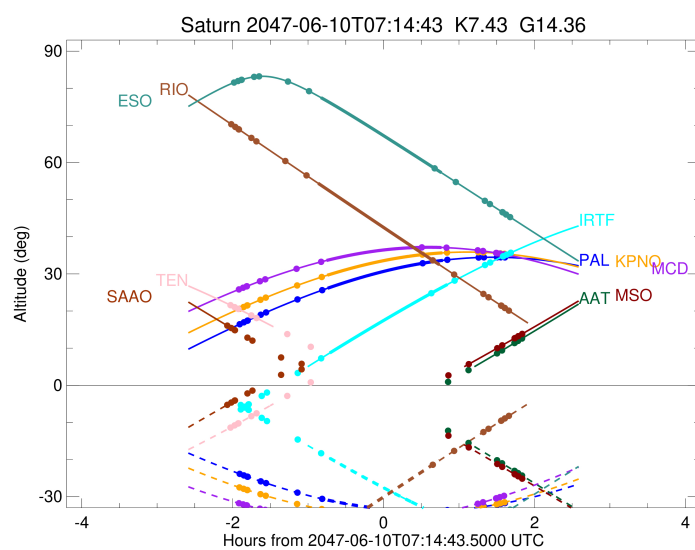
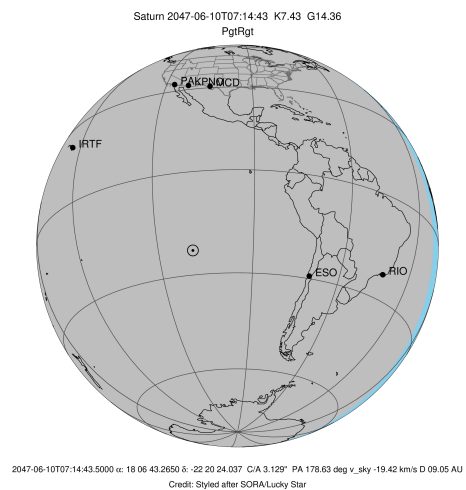
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-10T07:18:57.640
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 4069682659190601728
 2Mass ID (if available) : 18064326-2220240
 ICRS Star Coord at Epoch: 18h 06m 43.26503s -22:20:24.03665s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 7.426
 G magnitude : 14.361
 RP magnitude : 12.820
 BP magnitude : 17.908
 DUPflag : 0
 Distance (au) : 9.054
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.42
 Sun-Target sep (deg) : 167.12
 Sun-Moon sep (deg) : 17.57
 B (ring opening deg) : 26.32
 PA of pole (deg) : 5.64
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.554
 C/A sky separation (km) : 16774.0
 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	2047-06-10T05:17:42.860		-27.09x	18.58x	140461.00	-19.03		
A (OER)	I	2047-06-10T05:20:56.722		-26.68x	18.08x	136774.40	-19.00		
Encke (OEG)	I	2047-06-10T05:23:36.300		-26.34x	17.66x	133744.89	-18.97		
Encke (IEG)	I	2047-06-10T05:23:53.254		-26.30x	17.61x	133423.31	-18.97		
A (IER)	I	2047-06-10T05:33:54.996		-24.96x	16.00x	122050.38	-18.83		
B (OER)	I	2047-06-10T05:37:53.322		-24.41x	15.35x	117571.16	-18.76		
B (IER)	I	2047-06-10T06:00:57.119		-21.05x	11.45x	91984.69	-18.14		
C (IER)	I	2047-06-10T06:17:23.353		-18.49x	8.56x	74490.58	-17.24		
Saturn	I	2047-06-10T06:28:46.407		-16.65x	6.51x	60241.35		7.87	9.63
Saturn	E	2047-06-10T08:08:47.616		1.44x	-12.80	60085.01		21.06	25.25
C (IER)	E	2047-06-10T08:06:00.393	b	0.90x	-12.24	74490.58	17.39		
B (IER)	E	2047-06-10T08:22:16.465		4.07x	-15.53	91984.69	18.36		
B (OER)	E	2047-06-10T08:45:01.041		8.59	-20.20	117571.16	19.06		
A (IER)	E	2047-06-10T08:48:55.517		9.37	-21.01	122050.38	19.14		
Encke (IEG)	E	2047-06-10T08:58:46.865		11.36	-23.05	133423.31	19.31		
Encke (OEG)	E	2047-06-10T08:59:03.513		11.42	-23.11	133744.89	19.32		
A (OER)	E	2047-06-10T09:01:40.169		11.95	-23.65	136774.40	19.36		
F ring	E	2047-06-10T09:04:50.392		12.59	-24.31	140461.00	19.40		

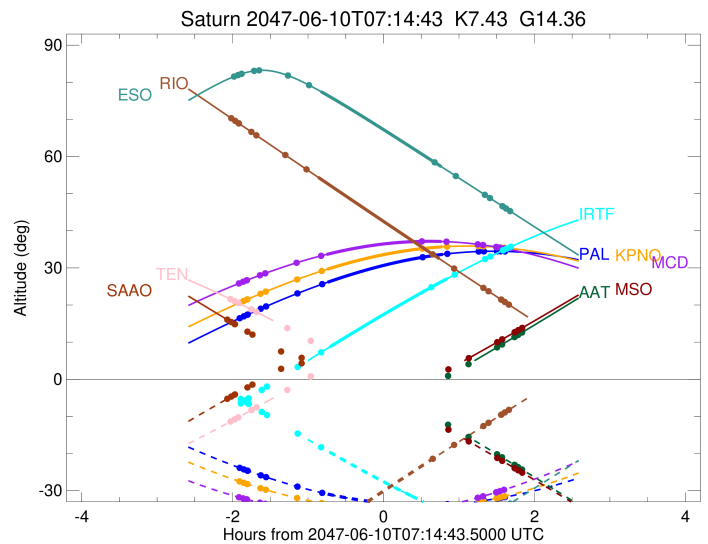
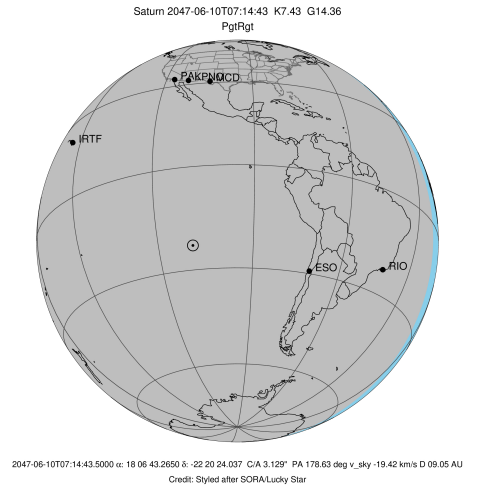
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-10T07:10:42.960
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : SAAO
 Location : So. Afr. Astro. Obs. (Sutherland)
 Latitude (deg) : -32.37953
 E. Longitude (deg) : 20.81070
 Altitude (km) : 1.768
 Gaia source ID : 4069682659190601728
 2Mass ID (if available) : 18064326-2220240
 ICRS Star Coord at Epoch: 18h 06m 43.26503s -22:20:24.03665s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 7.426
 G magnitude : 14.361
 RP magnitude : 12.820
 BP magnitude : 17.908
 DUPflag : 0
 Distance (au) : 9.054
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.42
 Sun-Target sep (deg) : 167.12
 Sun-Moon sep (deg) : 16.14
 B (ring opening deg) : 26.32
 PA of pole (deg) : 5.64
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.499
 C/A sky separation (km) : 16411.6
 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	2047-06-10T05:10:32.352		16.06	-5.27	140461.00	-19.29		
A (OER)	I	2047-06-10T05:13:43.713		15.41	-4.65x	136774.40	-19.24		
Encke (OEG)	I	2047-06-10T05:16:21.293		14.88	-4.14x	133744.89	-19.21		
Encke (IEG)	I	2047-06-10T05:16:38.038		14.82	-4.09x	133423.31	-19.20		
A (IER)	I	2047-06-10T05:26:32.738		12.82	-2.20x	122050.38	-19.04		
B (OER)	I	2047-06-10T05:30:28.477		12.03	-1.45x	117571.16	-18.96		
B (IER)	I	2047-06-10T05:53:19.301		7.49	2.81x	91984.69	-18.29		
C (IER)	I	2047-06-10T06:09:37.803		4.30x	5.78x	74490.58	-17.37		
Saturn	I	2047-06-10T06:20:37.979		2.17x	7.74x	60238.55		8.27	10.12
Saturn	E	2047-06-10T08:00:51.987		-15.75x	23.48x	60101.60		20.04	24.08
C (IER)	E	2047-06-10T07:59:23.028	b	-15.51x	23.28x	74490.58	17.23		
B (IER)	E	2047-06-10T08:15:50.310		-18.13x	25.40x	91984.69	18.11		
B (OER)	E	2047-06-10T08:38:56.528		-21.61x	28.08x	117571.16	18.73		
A (IER)	E	2047-06-10T08:42:55.295		-22.18x	28.51x	122050.38	18.79		
Encke (IEG)	E	2047-06-10T08:52:58.132		-23.58x	29.52x	133423.31	18.93		
Encke (OEG)	E	2047-06-10T08:53:15.116		-23.62x	29.55x	133744.89	18.94		
A (OER)	E	2047-06-10T08:55:54.974		-23.98x	29.81x	136774.40	18.97		
F ring	E	2047-06-10T08:59:09.170		-24.41x	30.11x	140461.00	19.00		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-10T07:18:46.810
 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 : 4069682659190601728
 2Mass ID (if available) : 18064326-2220240
 ICRS Star Coord at Epoch: 18h 06m 43.26503s -22:20:24.03665s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 7.426
 G magnitude : 14.361
 RP magnitude : 12.820
 BP magnitude : 17.908
 DUPflag : 0
 Distance (au) : 9.054
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.42
 Sun-Target sep (deg) : 167.12
 Sun-Moon sep (deg) : 17.54
 B (ring opening deg) : 26.32
 PA of pole (deg) : 5.64
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.506
 C/A sky separation (km) : 16457.4
 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



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	2047-06-10T05:17:34.683		-23.86x	15.85x	140461.00	-19.07		
A (OER)	I	2047-06-10T05:20:48.164		-23.48x	15.38x	136774.40	-19.04		
Encke (OEG)	I	2047-06-10T05:23:27.417		-23.16x	14.98x	133744.89	-19.01		
Encke (IEG)	I	2047-06-10T05:23:44.336		-23.12x	14.94x	133423.31	-19.01		
A (IER)	I	2047-06-10T05:33:44.748		-21.88x	13.43x	122050.38	-18.87		
B (OER)	I	2047-06-10T05:37:42.494		-21.37x	12.81x	117571.16	-18.81		
B (IER)	I	2047-06-10T06:00:41.993		-18.24x	9.14x	91984.69	-18.21		
C (IER)	I	2047-06-10T06:17:03.376		-15.85x	6.41x	74490.58	-17.35		
Saturn	I	2047-06-10T06:28:32.058		-14.10x	4.45x	60243.10		7.60	9.31
Saturn	E	2047-06-10T08:08:41.012		3.10x	-14.04	60089.86		20.76	24.92
C (IER)	E	2047-06-10T08:06:17.532	b	2.66x	-13.57	74490.58	17.49		
B (IER)	E	2047-06-10T08:22:29.193		5.68	-16.73	91984.69	18.42		
B (OER)	E	2047-06-10T08:45:10.308		9.99	-21.20	117571.16	19.10		
A (IER)	E	2047-06-10T08:49:04.371		10.75	-21.98	122050.38	19.17		
Encke (IEG)	E	2047-06-10T08:58:54.842		12.65	-23.94	133423.31	19.34		
Encke (OEG)	E	2047-06-10T08:59:11.468		12.71	-23.99	133744.89	19.34		
A (OER)	E	2047-06-10T09:01:47.926		13.21	-24.51	136774.40	19.38		
F ring	E	2047-06-10T09:04:57.926		13.83	-25.15	140461.00	19.42		