

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-18T14:39:24.020
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4069858370572479232
 2Mass ID (if available) : 18040699-2221094

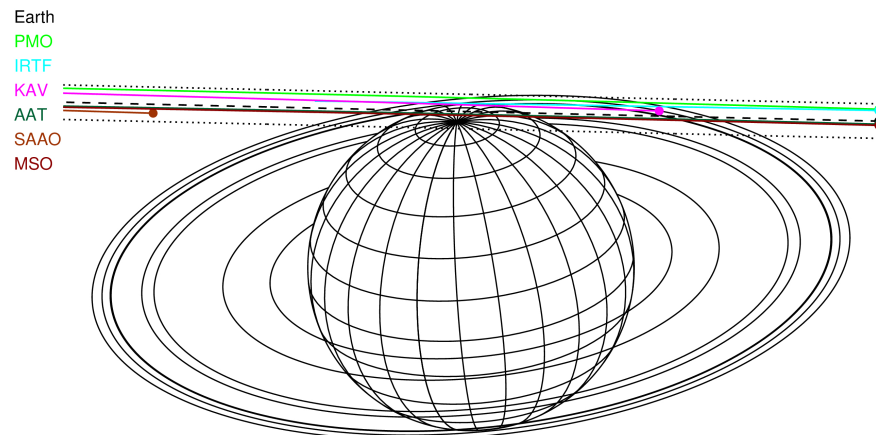
Saturn 2047-06-18T14:39:24 K6.92 G12.49 PgtRgt

ICRS Star Coord at Epoch: 18h 04m 06.99505s -22:21:09.54486s

RUWE (>1.4 is poor) : 1.04
 K magnitude : 6.923
 G magnitude : 12.488
 RP magnitude : 11.152
 BP magnitude : 14.632
 DUPflag : 0
 Distance (au) : 9.033
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.10
 Sun-Target sep (deg) : 175.57
 Sun-Moon sep (deg) : 121.58
 B (ring opening deg) : 26.40
 PA of pole (deg) : 5.59



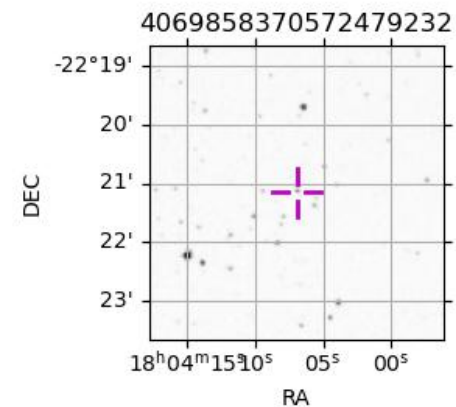
2047-06-18T14:39:24.0200 at: 18 04 06.9951 s: -22 21 09.545 C/A 8.781" PA 178.67 deg v_sky -20.10 km/s D 09.03 AU
 Credit: Styled after SORA/Lucky Star



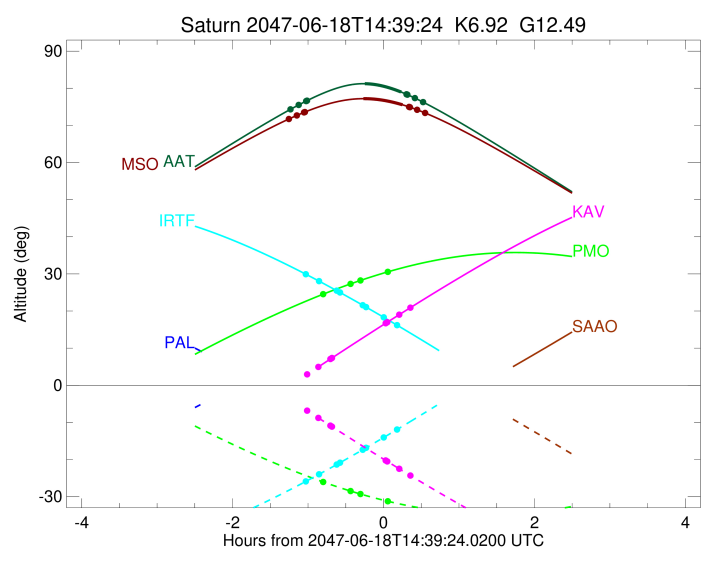
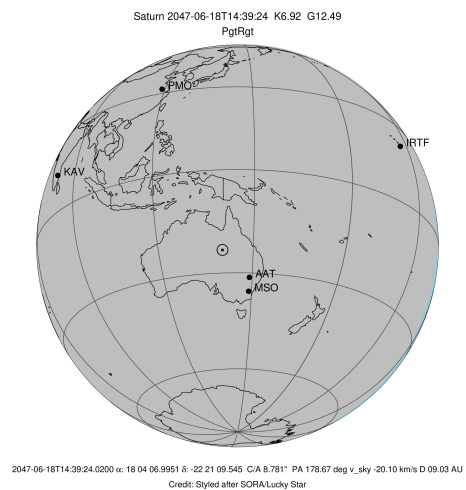
#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring

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	OEcode
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	+		+	JUN 18 13:51 - JUN 18 14:43	PnnRie
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	+		+	JUN 18 13:37 - JUN 18 14:50	PnnRie
KAV	Kavalur Observ	12.6	78.8	+		+	JUN 18 13:56 - JUN 18 15:00	PnnRie
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 18 13:25 - JUN 18 15:10	PieRie
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0	+	+	+	JUN 18 13:24 - JUN 18 15:12	PieRie



target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-18T14:41:05.970
 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 : 4069858370572479232
 2Mass ID (if available) : 18040699-2221094
 ICRS Star Coord at Epoch: 18h 04m 06.99505s -22:21:09.54486s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 6.923
 G magnitude : 12.488
 RP magnitude : 11.152
 BP magnitude : 14.632
 DUPflag : 0
 Distance (au) : 9.033
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.10
 Sun-Target sep (deg) : 175.57
 Sun-Moon sep (deg) : 121.83
 B (ring opening deg) : 26.40
 PA of pole (deg) : 5.59
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 9.549
 C/A sky separation (km) : 62559.9
 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

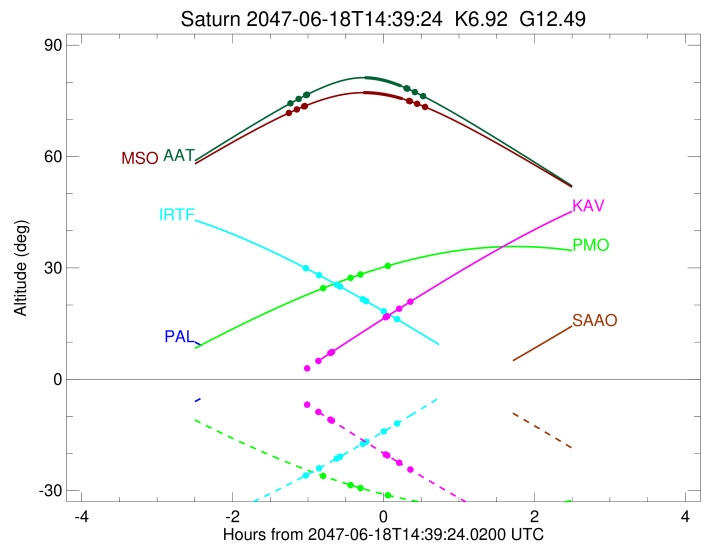
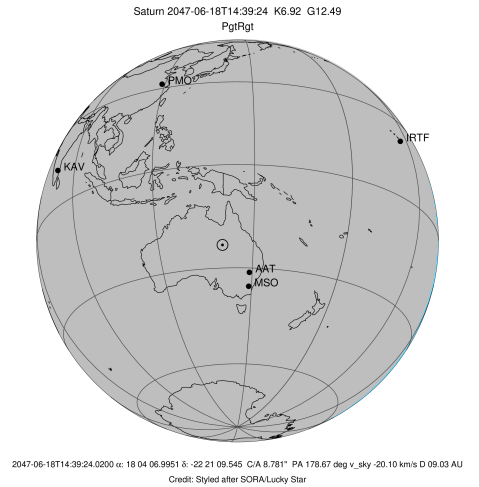


b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-06-18T13:51:02.716		24.49	-26.00	140461.00	-4.89		
A (OER)	I	2047-06-18T14:11:31.921		27.11	-28.32	136775.13	-1.06		
No planet occultations									
A (OER)	E	2047-06-18T14:22:29.841		28.40	-29.43	136774.75	1.06		
F ring	E	2047-06-18T14:42:59.820		30.57	-31.26	140461.00	4.88		

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target                : Saturn
target radius (km)   : 60268.00
C/A epoch            : 2047-06-18T14:35:26.970
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      : 4069858370572479232
2Mass ID (if available) : 18040699-2221094
ICRS Star Coord at Epoch: 18h 04m 06.99505s -22:21:09.54486s
RUWE (>1.4 is poor) : 1.04
K magnitude         : 6.923
G magnitude         : 12.488
RP magnitude        : 11.152
BP magnitude        : 14.632
DUPflag            : 0
Distance (au)       : 9.033
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -20.10
Sun-Target sep (deg) : 175.57
Sun-Moon sep (deg)  : 122.24
B (ring opening deg) : 26.40
PA of pole (deg)    : 5.59
Pole direction: RA (deg): 40.60000
Dec (deg): 83.50000
C/A sky separation (") : 9.246
C/A sky separation (km) : 60570.4
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
    
```



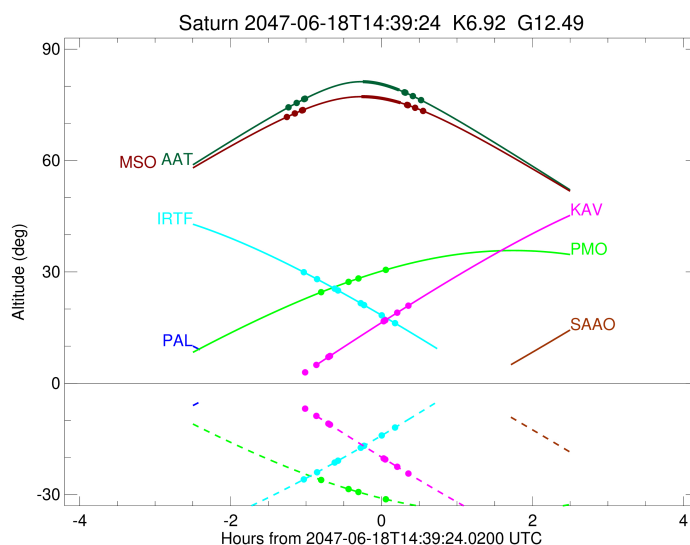
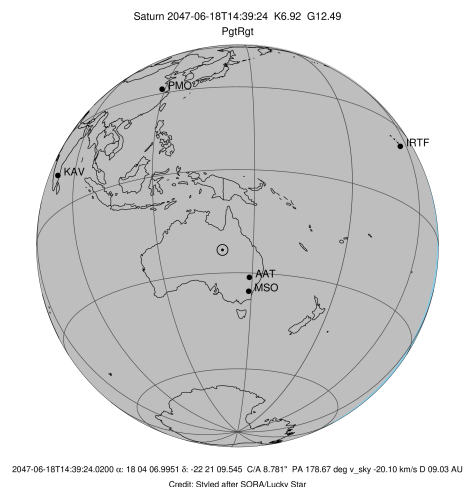
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-06-18T13:37:20.956		29.97	-25.95	140461.00	-6.78		
A (OER)	I	2047-06-18T13:47:48.103		28.12	-24.05	136774.40	-4.95		
Encke (OEG)	I	2047-06-18T14:01:30.921		25.61	-21.49	133744.89	-2.38		
Encke (IEG)	I	2047-06-18T14:04:01.234		25.15	-21.01	133423.32	-1.90		

No planet occultations

Encke (IEG)	E	2047-06-18T14:23:26.287		21.46	-17.26	133423.31	1.89		
Encke (OEG)	E	2047-06-18T14:25:57.038		20.98	-16.77	133744.89	2.37		
A (OER)	E	2047-06-18T14:39:43.824		18.27	-14.03	136774.40	4.92		
F ring	E	2047-06-18T14:50:15.428		16.17	-11.91	140461.00	6.73		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-18T14:43:39.750
 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 : 4069858370572479232
 2Mass ID (if available) : 18040699-2221094
 ICRS Star Coord at Epoch: 18h 04m 06.99505s -22:21:09.54486s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 6.923
 G magnitude : 12.488
 RP magnitude : 11.152
 BP magnitude : 14.632
 DUPflag : 0
 Distance (au) : 9.033
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.10
 Sun-Target sep (deg) : 175.57
 Sun-Moon sep (deg) : 121.40
 B (ring opening deg) : 26.40
 PA of pole (deg) : 5.59
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 9.152
 C/A sky separation (km) : 59959.4
 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



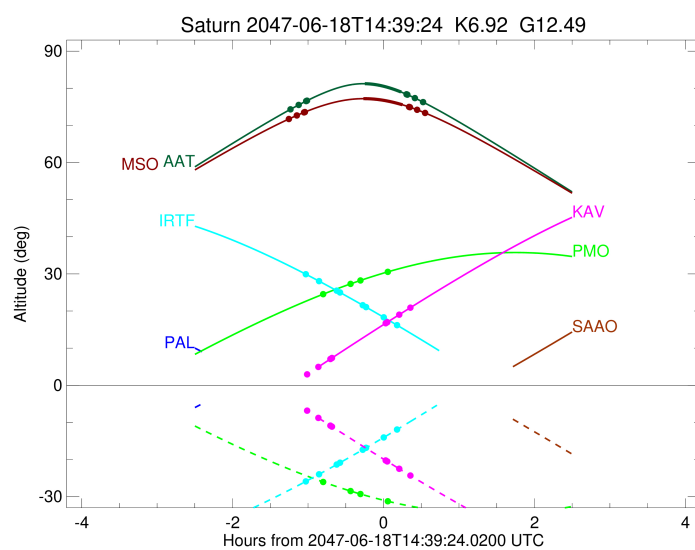
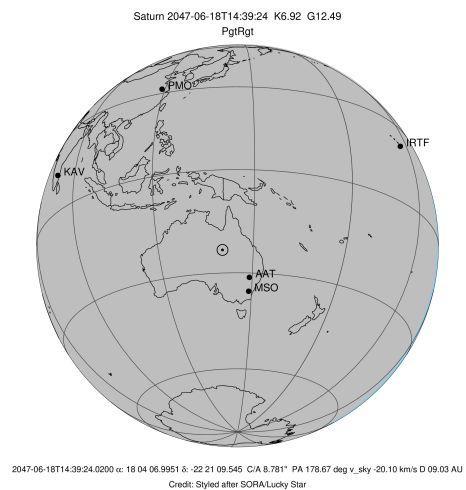
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-06-18T13:38:26.535	2.89x	-6.78	140461.00	-7.65			
A (OER)	I	2047-06-18T13:47:19.214	4.88x	-8.73	136774.40	-6.17			
Encke (OEG)	I	2047-06-18T13:56:47.628	6.99	-10.79	133744.89	-4.47			
Encke (IEG)	I	2047-06-18T13:58:01.493	7.26	-11.06	133423.31	-4.24			

No planet occultations

Encke (IEG)	E	2047-06-18T14:41:19.464	16.74	-20.29	133423.31	4.24			
Encke (OEG)	E	2047-06-18T14:42:33.239	17.01	-20.55	133744.89	4.47			
A (OER)	E	2047-06-18T14:52:00.636	19.04	-22.52	136774.40	6.19			
F ring	E	2047-06-18T15:00:51.701	20.92	-24.33	140461.00	7.68			

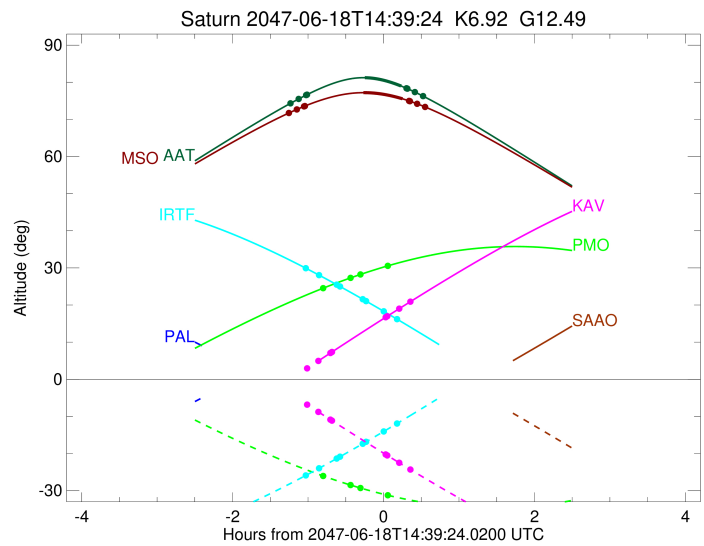
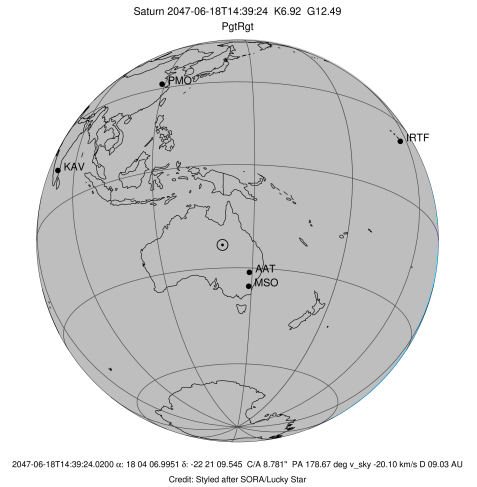
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-18T14:39:09.850
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 4069858370572479232
 2Mass ID (if available) : 18040699-2221094
 ICRS Star Coord at Epoch: 18h 04m 06.99505s -22:21:09.54486s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 6.923
 G magnitude : 12.488
 RP magnitude : 11.152
 BP magnitude : 14.632
 DUPflag : 0
 Distance (au) : 9.033
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.10
 Sun-Target sep (deg) : 175.57
 Sun-Moon sep (deg) : 122.35
 B (ring opening deg) : 26.40
 PA of pole (deg) : 5.59
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 8.631
 C/A sky separation (km) : 56544.2
 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	2047-06-18T13:25:15.647		74.30	-78.32	140461.00	-9.96		
A (OER)	I	2047-06-18T13:31:44.637		75.48	-79.36	136774.40	-8.98		
Encke (OEG)	I	2047-06-18T13:37:41.305		76.51	-80.22	133744.89	-8.00		
Encke (IEG)	I	2047-06-18T13:38:21.790		76.63	-80.31	133423.31	-7.89		
Saturn	I	2047-06-18T14:24:31.270		81.24	-81.15	59337.48		54.62	59.63
Saturn	E	2047-06-18T14:53:23.589		79.00	-76.76	59184.85		61.80	66.10
Encke (IEG)	E	2047-06-18T14:57:44.931		78.38	-75.97	133423.31	7.86		
Encke (OEG)	E	2047-06-18T14:58:25.563		78.28	-75.84	133744.89	7.97		
A (OER)	E	2047-06-18T15:04:23.501		77.35	-74.72	136774.40	8.95		
F ring	E	2047-06-18T15:10:53.801		76.27	-73.46	140461.00	9.93		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-18T14:39:11.360
 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 : 4069858370572479232
 2Mass ID (if available) : 18040699-2221094
 ICRS Star Coord at Epoch: 18h 04m 06.99505s -22:21:09.54486s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 6.923
 G magnitude : 12.488
 RP magnitude : 11.152
 BP magnitude : 14.632
 DUPflag : 0
 Distance (au) : 9.033
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.10
 Sun-Target sep (deg) : 175.57
 Sun-Moon sep (deg) : 122.34
 B (ring opening deg) : 26.40
 PA of pole (deg) : 5.59
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 8.564
 C/A sky separation (km) : 56105.2
 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	2047-06-18T13:23:59.986		71.70	-75.26	140461.00	-10.22		
A (OER)	I	2047-06-18T13:30:17.906		72.66	-76.04	136774.40	-9.28		
Encke (OEG)	I	2047-06-18T13:36:01.396		73.48	-76.68	133744.89	-8.35		
Encke (IEG)	I	2047-06-18T13:36:40.147		73.57	-76.74	133423.31	-8.24		
Saturn	I	2047-06-18T14:23:24.142		77.21	-77.61	59358.27		53.70	58.79
Saturn	E	2047-06-18T14:54:33.918		75.55	-74.09	59194.96		61.29	65.65
Encke (IEG)	E	2047-06-18T14:59:47.263		74.98	-73.31	133423.31	8.22		
Encke (OEG)	E	2047-06-18T15:00:26.152		74.90	-73.20	133744.89	8.32		
A (OER)	E	2047-06-18T15:06:10.836		74.20	-72.29	136774.40	9.25		
F ring	E	2047-06-18T15:12:29.991		73.35	-71.24	140461.00	10.19		