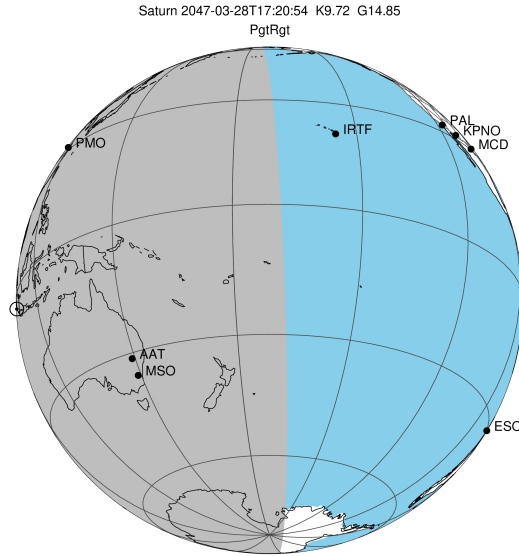


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-03-28T17:20:54.620
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4090524314472389888
 2Mass ID (if available) : 18161159-2218186

Saturn 2047-03-28T17:20:54 K9.72 G14.85 PgtRgt

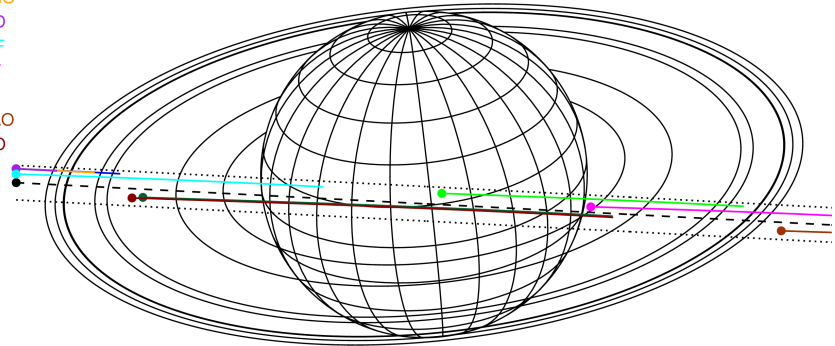
ICRS Star Coord at Epoch: 18h 16m 11.58167s -22:18:18.84621s

RUWE (>1.4 is poor) : 3.69
 K magnitude : 9.718
 G magnitude : 14.850
 RP magnitude : 13.459
 BP magnitude : 16.387
 DUPflag : 0
 Distance (au) : 9.934
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.73
 Sun-Target sep (deg) : 93.55
 Sun-Moon sep (deg) : 117.68
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.81
 # a(km) ring



2047-03-28T17:20:54.6200 α: 18 16 11.5817 δ: -22 18 18.846 C/A 1.497° PA 357.03 deg v_sky + 7.73 km/s D 09.93 AU
 Credit: Styled after SORA/Lucky Star

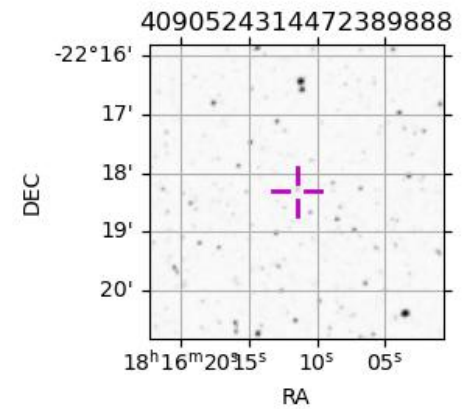
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 KAV
 AAT
 SAAO
 MSO



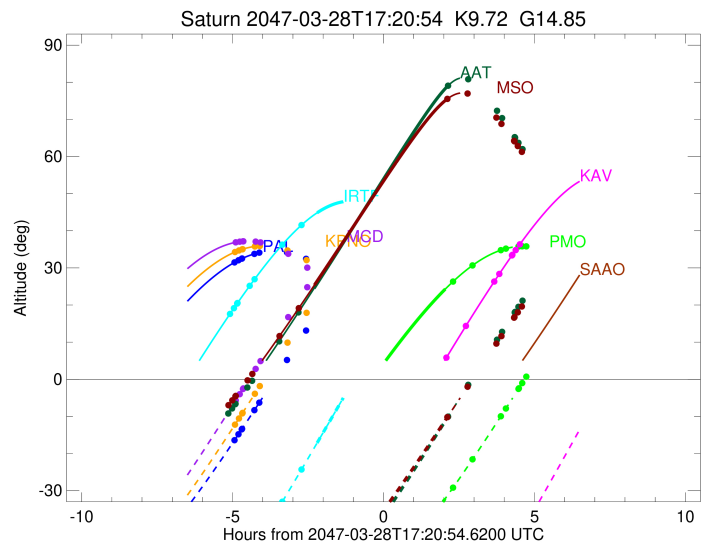
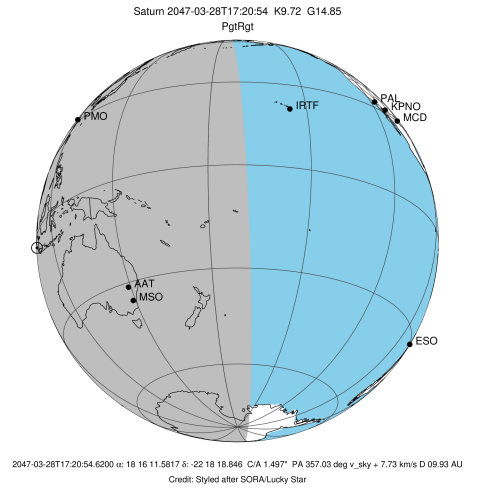
- 1 74490.6 C (IER)
- 2 91984.7 B (IER)
- 3 117571.2 B (OER)
- 4 122050.4 A (IER)
- 5 133423.3 Encke (IEG)
- 6 133744.9 Encke (OEG)
- 7 136774.4 A (OER)
- 8 140461.0 F ring

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	OEncode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1	+ + + + +			MAR 28 12:24 - MAR 28 13:14	PnnRin
PMO	Purple Mtn Obs	32.1	118.8		+	+ + + +	MAR 28 19:23 - MAR 28 21:24	PneRne
KPNO	Kitt Peak Natl	32.0	248.4	+ + + +			MAR 28 12:25 - MAR 28 12:40	PnnRin
MCD	McDonald Obs.	30.7	256.0	+			MAR 28 12:27 - MAR 28 12:27	PnnRin
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ + + + + + + +	+		MAR 28 12:15 - MAR 28 15:08	PinRin
KAV	Kavalur Observ	12.6	78.8			+ + + + + + + +	MAR 28 19:25 - MAR 28 21:51	PnnRne
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3					PnnRnn
AAT	Siding Spring	-31.3	149.1	+ +	+ +	+	MAR 28 13:53 - MAR 28 19:29	PieRie
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0	+ +	+ +	+	MAR 28 13:54 - MAR 28 19:27	PieRie



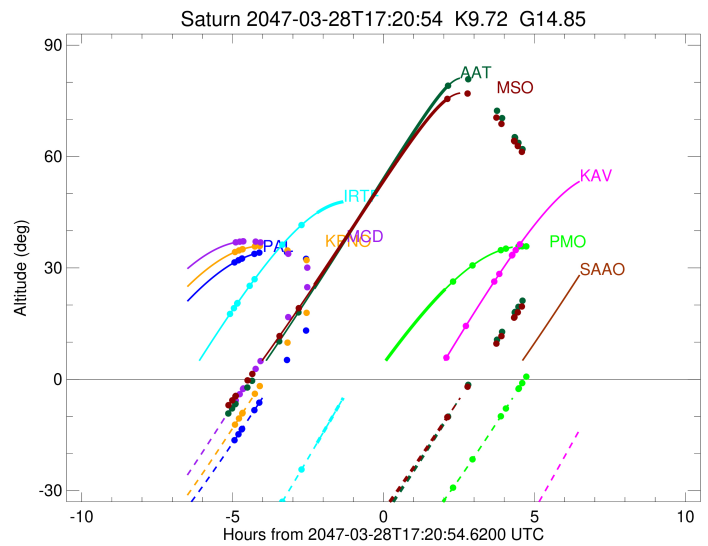
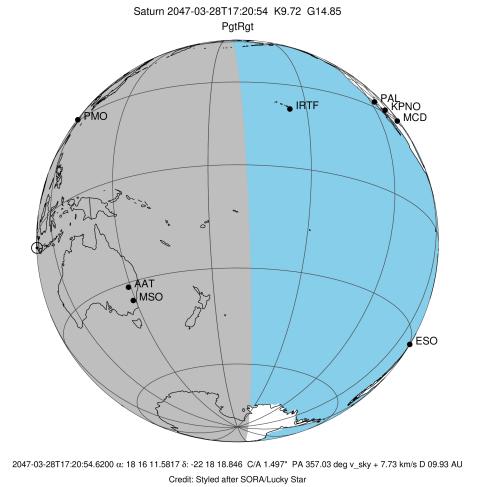
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-03-28T17:30:49.760
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4090524314472389888
 2Mass ID (if available) : 18161159-2218186
 ICRS Star Coord at Epoch: 18h 16m 11.58167s -22:18:18.84621s
 RUWE (>1.4 is poor) : 3.69
 K magnitude : 9.718
 G magnitude : 14.850
 RP magnitude : 13.459
 BP magnitude : 16.387
 DUPflag : 0
 Distance (au) : 9.934
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.73
 Sun-Target sep (deg) : 93.55
 Sun-Moon sep (deg) : 118.20
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.81
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.933
 C/A sky separation (km) : 6721.5
 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	2047-03-28T12:24:50.630		31.49	-16.40	140461.00	-7.78		
A (OER)	I	2047-03-28T12:32:44.693		32.06	-14.79	136774.40	-7.77		
Encke (OEG)	I	2047-03-28T12:39:14.547		32.49	-13.47	133744.89	-7.77		
Encke (IEG)	I	2047-03-28T12:39:55.944		32.54	-13.33	133423.31	-7.77		
A (IER)	I	2047-03-28T13:04:21.716		33.78	-8.31	122050.38	-7.75		
B (OER)	I	2047-03-28T13:13:59.879		34.11	-6.31	117571.16	-7.74		
B (IER)	I	2047-03-28T14:09:11.413		34.17	5.21x	91984.69	-7.71		
C (IER)	I	2047-03-28T14:47:06.169		32.44	13.14x	74490.58	-7.67		
Saturn	I	2047-03-28T15:17:10.293		30.12	19.39x	60264.52		2.87	3.52
Saturn	E	2047-03-28T19:41:53.243		-12.00x	59.92x	60180.10		-14.57	-17.69
C (IER)	E	2047-03-28T19:52:26.813		-14.10x	60.02x	74490.58	8.00		
B (IER)	E	2047-03-28T20:28:38.495		-21.42x	58.85x	91984.69	8.10		
B (OER)	E	2047-03-28T21:20:56.716		-32.21x	53.58x	117571.16	8.20		
A (IER)	E	2047-03-28T21:30:02.693		-34.11x	52.33x	122050.38	8.21		
Encke (IEG)	E	2047-03-28T21:53:05.387		-38.93x	48.85x	133423.31	8.24		
Encke (OEG)	E	2047-03-28T21:53:44.415		-39.06x	48.75x	133744.89	8.24		
A (OER)	E	2047-03-28T21:59:51.932		-40.35x	47.76x	136774.40	8.25		
F ring	E	2047-03-28T22:07:18.771		-41.91x	46.52x	140461.00	8.25		

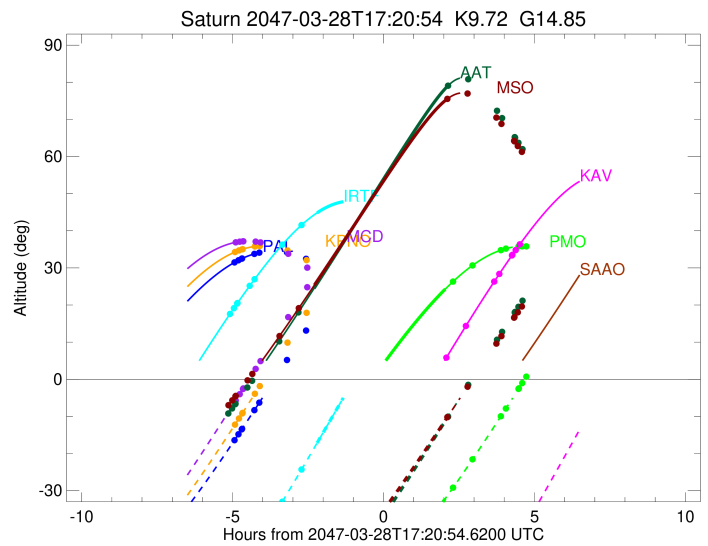
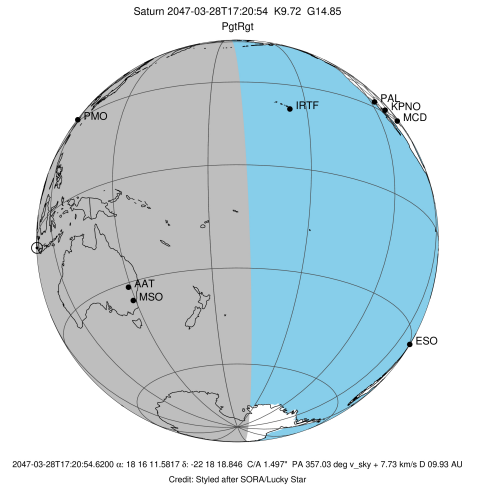
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-03-28T17:10:32.390
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 4090524314472389888
 2Mass ID (if available) : 18161159-2218186
 ICRS Star Coord at Epoch: 18h 16m 11.58167s -22:18:18.84621s
 RUWE (>1.4 is poor) : 3.69
 K magnitude : 9.718
 G magnitude : 14.850
 RP magnitude : 13.459
 BP magnitude : 16.387
 DUPflag : 0
 Distance (au) : 9.934
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.73
 Sun-Target sep (deg) : 93.55
 Sun-Moon sep (deg) : 117.45
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.81
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.938
 C/A sky separation (km) : 6755.7
 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	2047-03-28T12:19:03.146	-57.80x	-25.17	140461.00	-8.43			
A (OER)	I	2047-03-28T12:26:21.002	-56.26x	-26.60	136774.40	-8.41			
Encke (OEG)	I	2047-03-28T12:32:21.395	-54.99x	-27.78	133744.89	-8.40			
Encke (IEG)	I	2047-03-28T12:32:59.681	-54.86x	-27.90	133423.31	-8.40			
A (IER)	I	2047-03-28T12:55:37.799	-50.06x	-32.23	122050.38	-8.35			
B (OER)	I	2047-03-28T13:04:34.994	-48.15x	-33.89	117571.16	-8.33			
B (IER)	I	2047-03-28T13:56:12.742	-37.18x	-42.81	91984.69	-8.19			
C (IER)	I	2047-03-28T14:32:06.338	-29.60x	-48.03	74490.58	-8.05			
Saturn	I	2047-03-28T15:01:35.011	-23.44x	-51.44	60267.49			1.10	1.35
Saturn	E	2047-03-28T19:23:42.183	24.30	-32.14	60199.00			-12.88	-15.68
C (IER)	E	2047-03-28T19:39:01.927	26.30	-29.23	74490.58	7.52			
B (IER)	E	2047-03-28T20:17:43.497	30.65	-21.59	91984.69	7.54			
B (OER)	E	2047-03-28T21:14:11.887	34.78	-9.97	117571.16	7.56			
A (IER)	E	2047-03-28T21:24:04.531	35.19	-7.90	122050.38	7.56			
Encke (IEG)	E	2047-03-28T21:49:08.407	35.77	-2.62x	133423.31	7.57			
Encke (OEG)	E	2047-03-28T21:49:50.909	35.78	-2.47x	133744.89	7.57			
A (OER)	E	2047-03-28T21:56:31.244	35.82	-1.06x	136774.40	7.57			
F ring	E	2047-03-28T22:04:38.238	35.80	0.66x	140461.00	7.57			

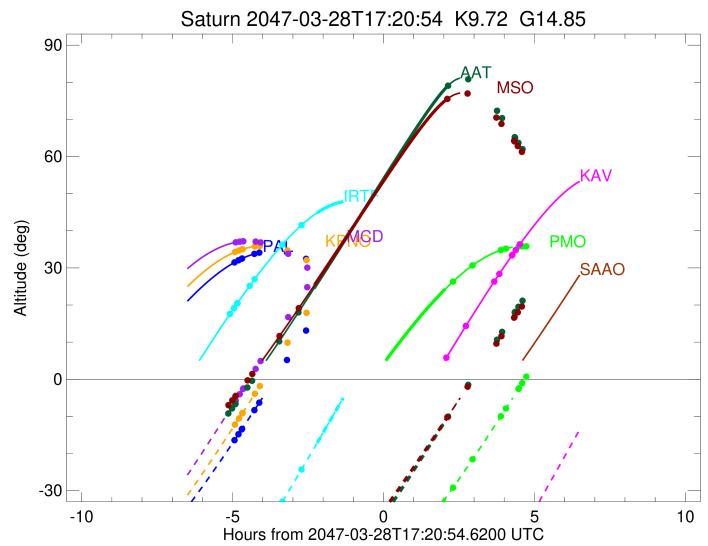
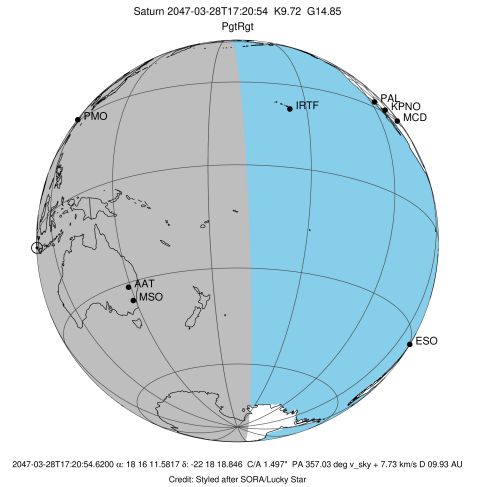
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-03-28T17:31:28.620
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 4090524314472389888
 2Mass ID (if available) : 18161159-2218186
 ICRS Star Coord at Epoch: 18h 16m 11.58167s -22:18:18.84621s
 RUWE (>1.4 is poor) : 3.69
 K magnitude : 9.718
 G magnitude : 14.850
 RP magnitude : 13.459
 BP magnitude : 16.387
 DUPflag : 0
 Distance (au) : 9.934
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.73
 Sun-Target sep (deg) : 93.55
 Sun-Moon sep (deg) : 118.19
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.81
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.973
 C/A sky separation (km) : 7011.1
 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	2047-03-28T12:25:47.237		34.28	-12.20	140461.00	-7.77		
A (OER)	I	2047-03-28T12:33:41.989		34.71	-10.54	136774.40	-7.76		
Encke (OEG)	I	2047-03-28T12:40:12.357		35.01	-9.18	133744.89	-7.76		
Encke (IEG)	I	2047-03-28T12:40:53.806		35.04	-9.04	133423.31	-7.76		
A (IER)	I	2047-03-28T13:05:21.084		35.78	-3.88x	122050.38	-7.74		
B (OER)	I	2047-03-28T13:14:59.668		35.90	-1.84x	117571.16	-7.74		
B (IER)	I	2047-03-28T14:10:11.965		34.69	9.89x	91984.69	-7.71		
C (IER)	I	2047-03-28T14:48:06.152		32.09	17.92x	74490.58	-7.67		
Saturn	I	2047-03-28T15:18:16.098		29.12	24.24x	60264.93		2.69	3.31
Saturn	E	2047-03-28T19:41:52.971		-15.80x	61.29x	60176.93		-14.84	-18.01
C (IER)	E	2047-03-28T19:51:46.732		-17.82x	61.00x	74490.58	8.02		
B (IER)	E	2047-03-28T20:27:52.478		-25.30x	58.47x	91984.69	8.13		
B (OER)	E	2047-03-28T21:20:01.630		-36.28x	51.67x	117571.16	8.22		
A (IER)	E	2047-03-28T21:29:06.083		-38.20x	50.22x	122050.38	8.23		
Encke (IEG)	E	2047-03-28T21:52:05.074		-43.09x	46.30x	133423.31	8.26		
Encke (OEG)	E	2047-03-28T21:52:44.003		-43.23x	46.19x	133744.89	8.26		
A (OER)	E	2047-03-28T21:58:50.582		-44.53x	45.10x	136774.40	8.27		
F ring	E	2047-03-28T22:06:16.311		-46.11x	43.74x	140461.00	8.27		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-03-28T17:32:11.100
 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 : 4090524314472389888
 2Mass ID (if available) : 18161159-2218186
 ICRS Star Coord at Epoch: 18h 16m 11.58167s -22:18:18.84621s
 RUWE (>1.4 is poor) : 3.69
 K magnitude : 9.718
 G magnitude : 14.850
 RP magnitude : 13.459
 BP magnitude : 16.387
 DUPflag : 0
 Distance (au) : 9.934
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.73
 Sun-Target sep (deg) : 93.55
 Sun-Moon sep (deg) : 118.14
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.81
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.026
 C/A sky separation (km) : 7389.9
 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

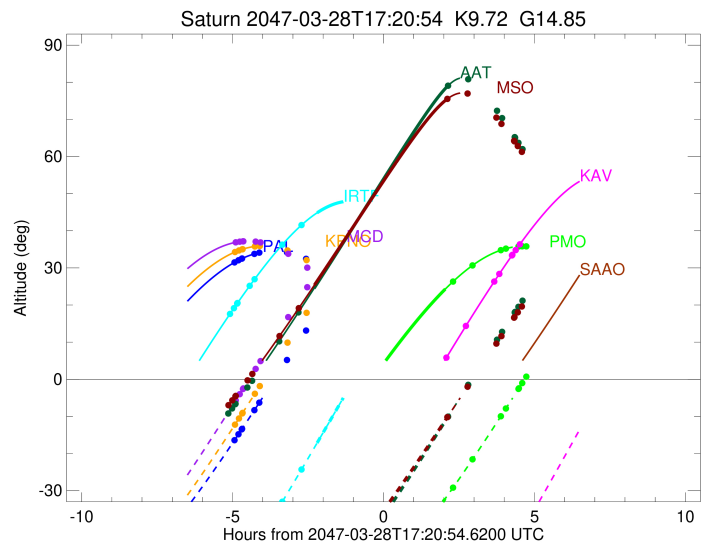
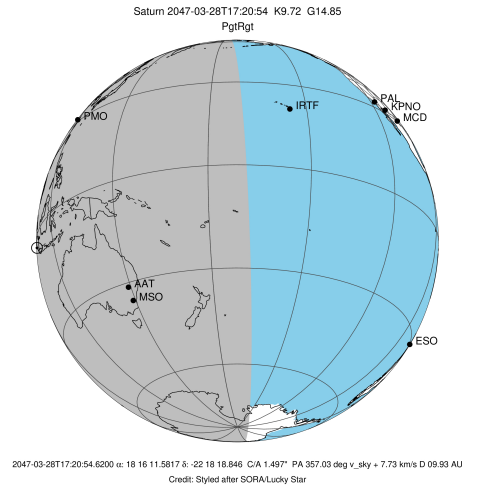


b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-03-28T12:27:16.388		36.89	-5.69	140461.00	-7.76		
A (OER)	I	2047-03-28T12:35:11.523		37.06	-3.99x	136774.40	-7.76		
Encke (OEG)	I	2047-03-28T12:41:42.130		37.16	-2.59x	133744.89	-7.75		
Encke (IEG)	I	2047-03-28T12:42:23.600		37.17	-2.45x	133423.31	-7.75		
A (IER)	I	2047-03-28T13:06:51.143		37.08	2.82x	122050.38	-7.75		
B (OER)	I	2047-03-28T13:16:29.579		36.87	4.90x	117571.16	-7.74		
B (IER)	I	2047-03-28T14:11:38.718		33.80	16.76x	91984.69	-7.72		
C (IER)	I	2047-03-28T14:49:29.314		30.06	24.82x	74490.58	-7.68		
Saturn	I	2047-03-28T15:19:44.498		26.29	31.15x	60265.46		2.45	3.01
Saturn	E	2047-03-28T19:41:37.523		-21.66x	61.05x	60172.96		-15.17	-18.40
C (IER)	E	2047-03-28T19:50:41.871		-23.57x	60.27x	74490.58	8.05		
B (IER)	E	2047-03-28T20:26:39.855		-31.19x	56.01x	91984.69	8.16		
B (OER)	E	2047-03-28T21:18:37.695		-42.34x	47.57x	117571.16	8.25		
A (IER)	E	2047-03-28T21:27:40.319		-44.29x	45.92x	122050.38	8.26		
Encke (IEG)	E	2047-03-28T21:50:34.975		-49.24x	41.58x	133423.31	8.29		
Encke (OEG)	E	2047-03-28T21:51:13.788		-49.38x	41.46x	133744.89	8.29		
A (OER)	E	2047-03-28T21:57:19.299		-50.70x	40.27x	136774.40	8.29		
F ring	E	2047-03-28T22:04:43.780		-52.30x	38.81x	140461.00	8.30		

```

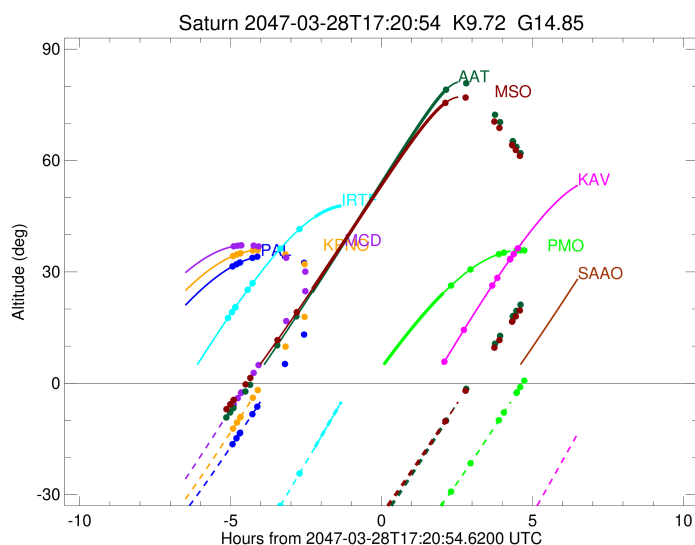
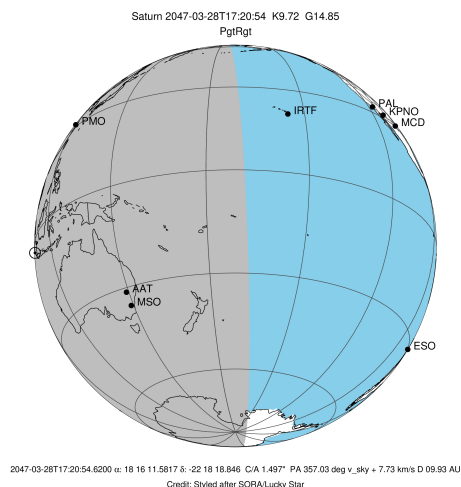
target                : Saturn
target radius (km)   : 60268.00
C/A epoch             : 2047-03-28T17:25:05.030
Event type            : PgtRgt
: Saturn occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : IRTF
Location              : Mauna Kea/IRTF
Latitude (deg)       : 19.82622
E. Longitude (deg)   : 204.52800
Altitude (km)        : 4.168
Gaia source ID       : 4090524314472389888
2Mass ID (if available) : 18161159-2218186
ICRS Star Coord at Epoch: 18h 16m 11.58167s -22:18:18.84621s
RUWE (>1.4 is poor) : 3.69
K magnitude           : 9.718
G magnitude           : 14.850
RP magnitude          : 13.459
BP magnitude          : 16.387
DUPflag              : 0
Distance (au)        : 9.934
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : 7.73
Sun-Target sep (deg) : 93.55
Sun-Moon sep (deg)   : 118.39
B (ring opening deg) : 26.07
PA of pole (deg)     : 5.81
Pole direction: RA (deg): 40.60000
Dec (deg): 83.50000
C/A sky separation (") : 0.933
C/A sky separation (km) : 6723.3
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	2047-03-28T12:15:53.113		17.62	-54.85	140461.00	-7.88		
A (OER)	I	2047-03-28T12:23:41.611		19.17	-53.36	136774.40	-7.86		
Encke (OEG)	I	2047-03-28T12:30:07.327		20.42	-52.11	133744.89	-7.85		
Encke (IEG)	I	2047-03-28T12:30:48.308		20.56	-51.98	133423.31	-7.85		
A (IER)	I	2047-03-28T12:55:02.322		25.18	-47.07	122050.38	-7.80		
B (OER)	I	2047-03-28T13:04:37.465		26.95	-45.06	117571.16	-7.78		
B (IER)	I	2047-03-28T13:59:49.899		36.27	-32.97	91984.69	-7.67		
C (IER)	I	2047-03-28T14:38:03.392		41.55	-24.28	74490.58	-7.58		
Saturn	I	2047-03-28T15:08:51.897		44.84	-17.17	60265.81		2.28	2.80
Saturn	E	2047-03-28T19:40:32.973		24.80	46.24x	60182.42		-14.38	-17.46
C (IER)	E	2047-03-28T19:51:57.901		22.64	48.80x	74490.58	7.73		
B (IER)	E	2047-03-28T20:29:23.008		15.26	56.96x	91984.69	7.84		
B (OER)	E	2047-03-28T21:23:18.250		4.04x	67.39x	117571.16	7.97		
A (IER)	E	2047-03-28T21:32:39.702		2.04x	68.89x	122050.38	7.99		
Encke (IEG)	E	2047-03-28T21:56:19.413		-3.08x	71.93x	133423.31	8.03		
Encke (OEG)	E	2047-03-28T21:56:59.439		-3.22x	72.00x	133744.89	8.03		
A (OER)	E	2047-03-28T22:03:16.215		-4.59x	72.56x	136774.40	8.05		
F ring	E	2047-03-28T22:10:53.981		-6.27x	73.09x	140461.00	8.06		

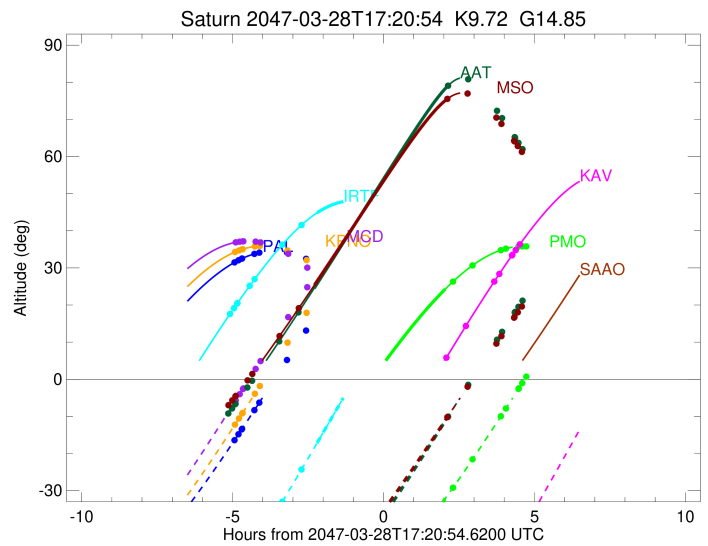
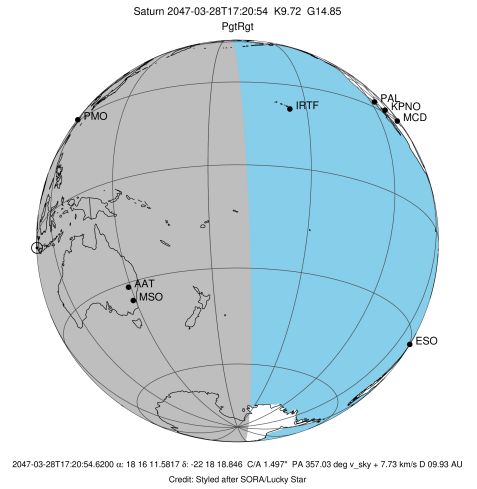
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-03-28T17:09:02.900
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 4090524314472389888
 2Mass ID (if available) : 18161159-2218186
 ICRS Star Coord at Epoch: 18h 16m 11.58167s -22:18:18.84621s
 RUWE (>1.4 is poor) : 3.69
 K magnitude : 9.718
 G magnitude : 14.850
 RP magnitude : 13.459
 BP magnitude : 16.387
 DUPflag : 0
 Distance (au) : 9.934
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.73
 Sun-Target sep (deg) : 93.55
 Sun-Moon sep (deg) : 117.01
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.81
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.400
 C/A sky separation (km) : 10089.7
 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	2047-03-28T12:24:50.632	-79.55x	6.71x	140461.00	-8.53			
A (OER)	I	2047-03-28T12:32:03.058	-80.02x	4.95x	136774.40	-8.52			
Encke (OEG)	I	2047-03-28T12:37:58.846	-80.19x	3.50x	133744.89	-8.51			
Encke (IEG)	I	2047-03-28T12:38:36.636	-80.20x	3.35x	133423.31	-8.51			
A (IER)	I	2047-03-28T13:00:56.491	-79.02x	-2.09x	122050.38	-8.47			
B (OER)	I	2047-03-28T13:09:46.210	-77.92x	-4.24x	117571.16	-8.45			
B (IER)	I	2047-03-28T14:00:42.289	-68.42x	-16.61	91984.69	-8.28			
C (IER)	I	2047-03-28T14:36:16.546	-60.61x	-25.20	74490.58	-8.09			
Saturn	I	2047-03-28T15:05:36.888	-53.95x	-32.24	60266.69			-1.76	-2.16
Saturn	E	2047-03-28T19:16:32.583	3.73x	-72.94	60170.69			-15.35	-18.62
C (IER)	E	2047-03-28T19:25:47.976	5.79	-71.91	74490.58	7.50			
B (IER)	E	2047-03-28T20:04:32.267	14.33	-65.64	91984.69	7.54			
B (OER)	E	2047-03-28T21:01:03.820	26.32	-53.75	117571.16	7.53			
A (IER)	E	2047-03-28T21:10:58.515	28.35	-51.52	122050.38	7.53			
Encke (IEG)	E	2047-03-28T21:36:10.638	33.34	-45.73	133423.31	7.51			
Encke (OEG)	E	2047-03-28T21:36:53.442	33.48	-45.56	133744.89	7.51			
A (OER)	E	2047-03-28T21:43:36.823	34.77	-44.00	136774.40	7.51			
F ring	E	2047-03-28T21:51:48.016	36.32	-42.08	140461.00	7.50			

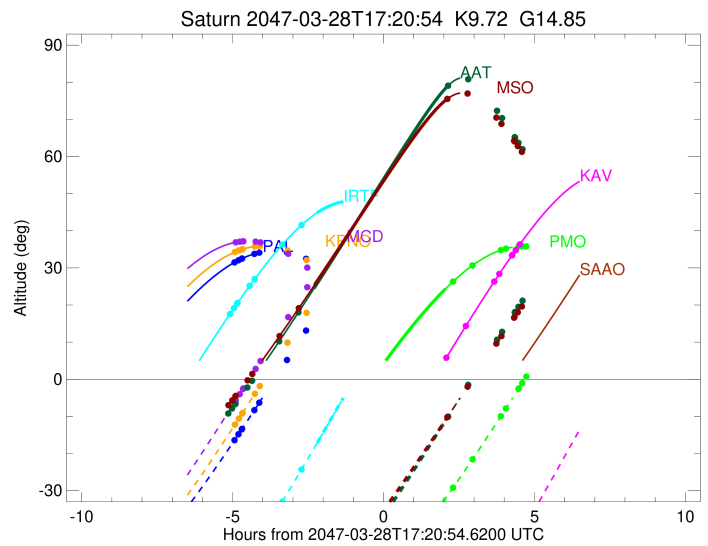
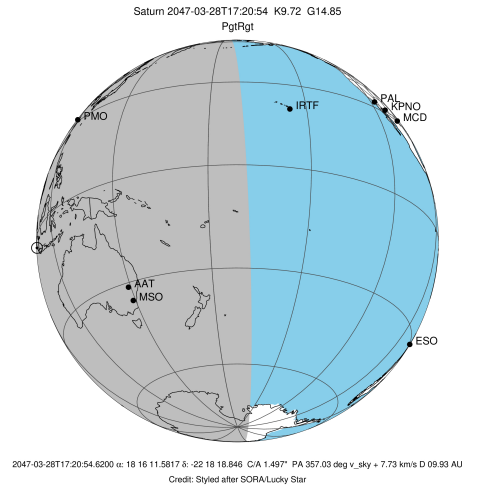
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-03-28T17:13:15.880
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 4090524314472389888
 2Mass ID (if available) : 18161159-2218186
 ICRS Star Coord at Epoch: 18h 16m 11.58167s -22:18:18.84621s
 RUWE (>1.4 is poor) : 3.69
 K magnitude : 9.718
 G magnitude : 14.850
 RP magnitude : 13.459
 BP magnitude : 16.387
 DUPflag : 0
 Distance (au) : 9.934
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.73
 Sun-Target sep (deg) : 93.55
 Sun-Moon sep (deg) : 118.08
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.81
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.675
 C/A sky separation (km) : 12068.8
 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	2047-03-28T12:12:28.575		-9.21x	-50.81	140461.00	-8.16		
A (OER)	I	2047-03-28T12:20:00.822		-7.84x	-52.03	136774.40	-8.14		
Encke (OEG)	I	2047-03-28T12:26:13.440		-6.71x	-53.01	133744.89	-8.12		
Encke (IEG)	I	2047-03-28T12:26:53.045		-6.59x	-53.11	133423.31	-8.12		
A (IER)	I	2047-03-28T12:50:20.691		-2.20x	-56.44	122050.38	-8.04		
B (OER)	I	2047-03-28T12:59:39.053		-0.43x	-57.60	117571.16	-8.00		
B (IER)	I	2047-03-28T13:53:41.559		10.23	-61.77	91984.69	-7.76		
C (IER)	I	2047-03-28T14:31:50.815		18.03	-61.48	74490.58	-7.50		
Saturn	I	2047-03-28T15:02:51.898		24.49	-59.23	60263.40		-3.30	-4.05
Saturn	E	2047-03-28T19:26:42.983		78.74	-10.61	60136.95		-17.90	-21.61
C (IER)	E	2047-03-28T19:29:03.974		79.06	-10.11	74490.58	7.17		
B (IER)	E	2047-03-28T20:09:10.194		80.83	-1.53x	91984.69	7.35		
B (OER)	E	2047-03-28T21:06:33.001		72.33	10.65x	117571.16	7.50		
A (IER)	E	2047-03-28T21:16:29.384		70.38	12.74x	122050.38	7.52		
Encke (IEG)	E	2047-03-28T21:41:36.758		65.26	17.97x	133423.31	7.57		
Encke (OEG)	E	2047-03-28T21:42:19.244		65.11	18.11x	133744.89	7.57		
A (OER)	E	2047-03-28T21:48:59.144		63.72	19.48x	136774.40	7.58		
F ring	E	2047-03-28T21:57:04.934		62.02	21.14x	140461.00	7.60		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-03-28T17:13:33.730
 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 : 4090524314472389888
 2Mass ID (if available) : 18161159-2218186
 ICRS Star Coord at Epoch: 18h 16m 11.58167s -22:18:18.84621s
 RUWE (>1.4 is poor) : 3.69
 K magnitude : 9.718
 G magnitude : 14.850
 RP magnitude : 13.459
 BP magnitude : 16.387
 DUPflag : 0
 Distance (au) : 9.934
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.73
 Sun-Target sep (deg) : 93.55
 Sun-Moon sep (deg) : 118.09
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.81
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.734
 C/A sky separation (km) : 12493.7
 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	2047-03-28T12:12:50.536		-6.97x	-48.15	140461.00	-8.15		
A (OER)	I	2047-03-28T12:20:23.646		-5.67x	-49.26	136774.40	-8.12		
Encke (OEG)	I	2047-03-28T12:26:36.978		-4.59x	-50.13	133744.89	-8.10		
Encke (IEG)	I	2047-03-28T12:27:16.659		-4.47x	-50.22	133423.31	-8.10		
A (IER)	I	2047-03-28T12:50:47.065		-0.28x	-53.18	122050.38	-8.02		
B (OER)	I	2047-03-28T13:00:06.566		1.42x	-54.20	117571.16	-7.99		
B (IER)	I	2047-03-28T13:54:16.826		11.65	-57.79	91984.69	-7.74		
C (IER)	I	2047-03-28T14:32:34.250		19.17	-57.51	74490.58	-7.47		
Saturn	I	2047-03-28T15:03:31.060		25.36	-55.57	60262.42		-3.63	-4.46
Saturn	E	2047-03-28T19:26:30.470		75.39	-10.49	60131.53		-18.28	-22.05
C (IER)	E	2047-03-28T19:27:42.878		75.51	-10.24	74490.58	7.15		
B (IER)	E	2047-03-28T20:07:53.343		76.97	-2.04x	91984.69	7.34		
B (OER)	E	2047-03-28T21:05:17.473		70.50	9.60x	117571.16	7.50		
A (IER)	E	2047-03-28T21:15:13.827		68.82	11.59x	122050.38	7.52		
Encke (IEG)	E	2047-03-28T21:40:20.979		64.25	16.56x	133423.31	7.57		
Encke (OEG)	E	2047-03-28T21:41:03.457		64.12	16.70x	133744.89	7.57		
A (OER)	E	2047-03-28T21:47:43.278		62.85	18.00x	136774.40	7.58		
F ring	E	2047-03-28T21:55:48.968		61.29	19.58x	140461.00	7.60		