

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-08-09T09:20:11.330
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4079186769028654976
 2Mass ID (if available) : 18413460-2236139

Saturn 2048-08-09T09:20:11 K9.51 G13.26 PgtRgt

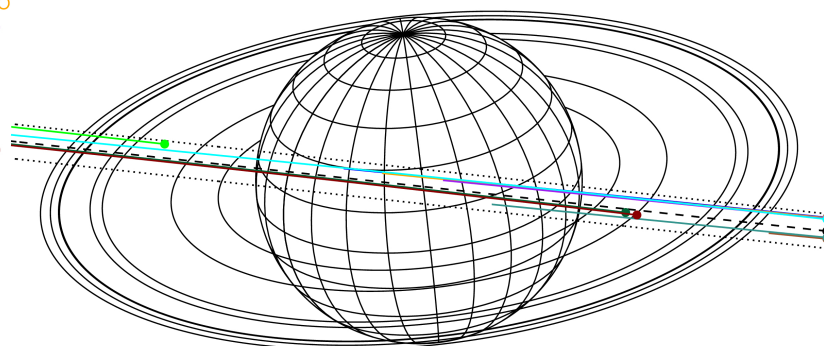
ICRS Star Coord at Epoch: 18h 41m 34.58490s -22:36:14.12131s

RUWE (>1.4 is poor) : 0.90
 K magnitude : 9.509
 G magnitude : 13.260
 RP magnitude : 12.205
 BP magnitude : 14.342
 DUPflag : 0
 Distance (au) : 9.208
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.14
 Sun-Target sep (deg) : 142.79
 Sun-Moon sep (deg) : 146.82
 B (ring opening deg) : 25.75
 PA of pole (deg) : 6.24
 # a(km) ring



2048-08-09T09:20:11.3300 at: 18 41 34.5849 s: -22 36 14.121 3 C/A 0.312° PA 353.71 deg v_sky -14.14 km/s D 09.21 AU
 Credit: Styled after SORA/Lucky Star

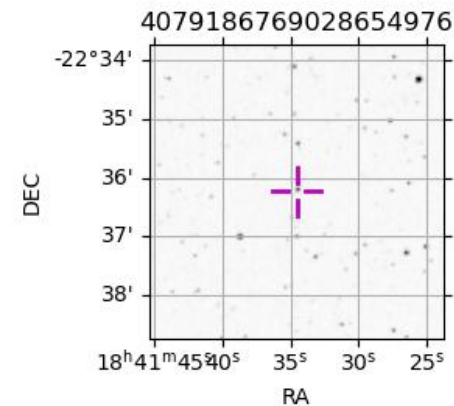
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 RIO
 ESO
 AAT
 MSO



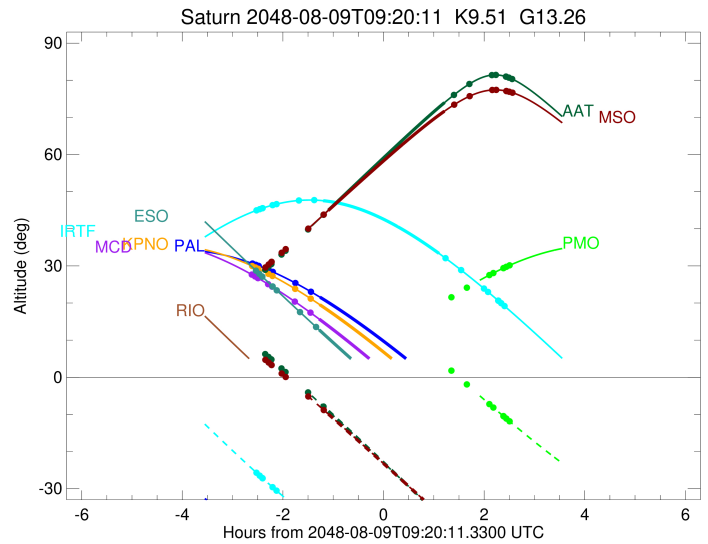
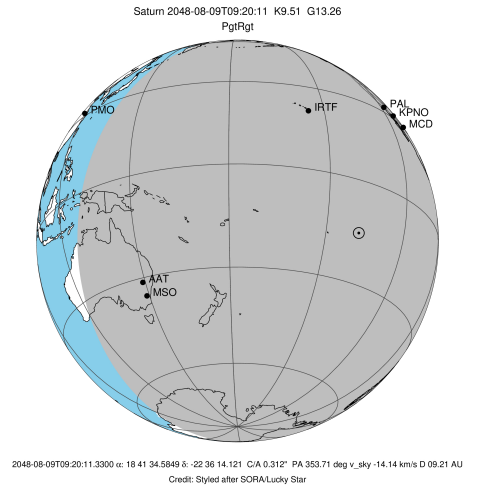
- 1 74490.6 C (IER)
- 2 91984.7 B (IER)
- 3 117571.2 B (OER)
- 4 122050.4 A (IER)
- 5 133423.3 Encke (IEG)
- 6 133744.9 Encke (OEG)
- 7 136774.4 A (OER)
- 8 140461.0 F ring

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	+	+		AUG 09 06:44 - AUG 09 08:04	PinRin
PMO	Purple Mtn Obs	32.1	118.8			+	AUG 09 11:26 - AUG 09 11:50	PnnRne
KPNO	Kitt Peak Natl	32.0	248.4	+	+		AUG 09 06:43 - AUG 09 08:04	PinRin
MCD	McDonald Obs.	30.7	256.0	+	+		AUG 09 06:43 - AUG 09 08:03	PinRin
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+	+	+	AUG 09 06:48 - AUG 09 11:44	PieRie
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3	+	+		AUG 09 06:48 - AUG 09 08:03	PinRin
AAT	Siding Spring	-31.3	149.1		+	+	AUG 09 08:08 - AUG 09 11:53	PieRie
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0	+	+	+	AUG 09 07:50 - AUG 09 11:53	PieRie



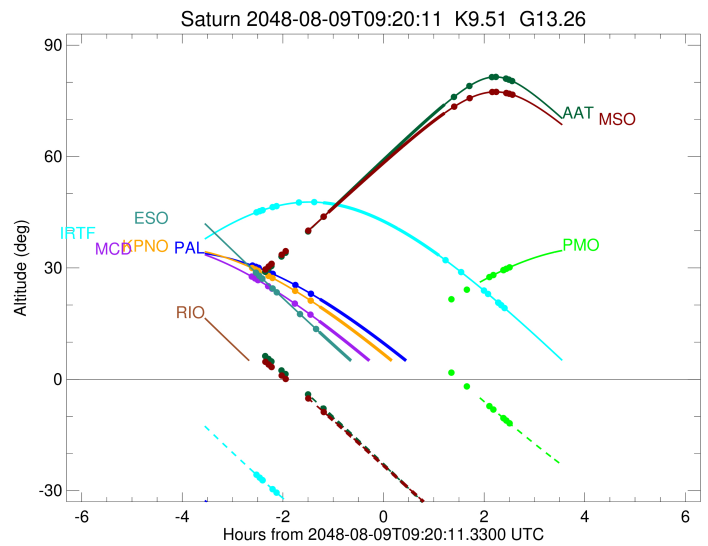
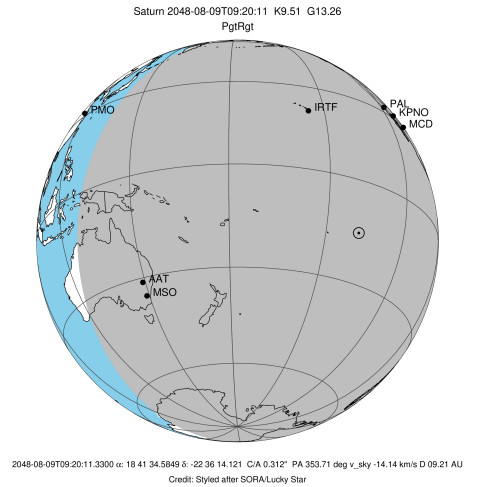
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-08-09T09:14:16.080
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4079186769028654976
 2Mass ID (if available) : 18413460-2236139
 ICRS Star Coord at Epoch: 18h 41m 34.58490s -22:36:14.12131s
 RUWE (>1.4 is poor) : 0.90
 K magnitude : 9.509
 G magnitude : 13.260
 RP magnitude : 12.205
 BP magnitude : 14.342
 DUPflag : 0
 Distance (au) : 9.208
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.14
 Sun-Target sep (deg) : 142.79
 Sun-Moon sep (deg) : 146.26
 B (ring opening deg) : 25.75
 PA of pole (deg) : 6.24
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.246
 C/A sky separation (km) : 1641.1
 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_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	2048-08-09T06:44:01.137		30.62	-38.51	140461.00	-15.84		
A (OER)	I	2048-08-09T06:47:53.984		30.30	-38.80	136774.40	-15.83		
Encke (OEG)	I	2048-08-09T06:51:05.395		30.02	-39.02	133744.89	-15.82		
Encke (IEG)	I	2048-08-09T06:51:25.716		29.99	-39.05	133423.31	-15.82		
A (IER)	I	2048-08-09T07:03:24.845		28.87	-39.80	122050.38	-15.81		
B (OER)	I	2048-08-09T07:08:08.316		28.39	-40.05	117571.16	-15.80		
B (IER)	I	2048-08-09T07:35:10.460		25.38	-41.03	91984.69	-15.75		
C (IER)	I	2048-08-09T07:53:42.728		23.03	-41.21	74490.58	-15.71		
Saturn	I	2048-08-09T08:04:28.062		21.57	-41.14	60232.49		-9.33	-11.41
Saturn	E	2048-08-09T10:24:37.121		-1.91x	-29.26	60208.79		12.09	14.73
C (IER)	E	2048-08-09T10:32:49.103		-3.46x	-28.08	74490.58	15.40		
B (IER)	E	2048-08-09T10:51:46.249		-7.11x	-25.20	91984.69	15.37		
B (OER)	E	2048-08-09T11:19:33.559		-12.56x	-20.67	117571.16	15.32		
A (IER)	E	2048-08-09T11:24:25.980		-13.53x	-19.84	122050.38	15.31		
Encke (IEG)	E	2048-08-09T11:36:49.185		-16.01x	-17.70	133423.31	15.29		
Encke (OEG)	E	2048-08-09T11:37:10.215		-16.08x	-17.64	133744.89	15.29		
A (OER)	E	2048-08-09T11:40:28.375		-16.75x	-17.06	136774.40	15.29		
F ring	E	2048-08-09T11:44:29.616		-17.56x	-16.35	140461.00	15.28		

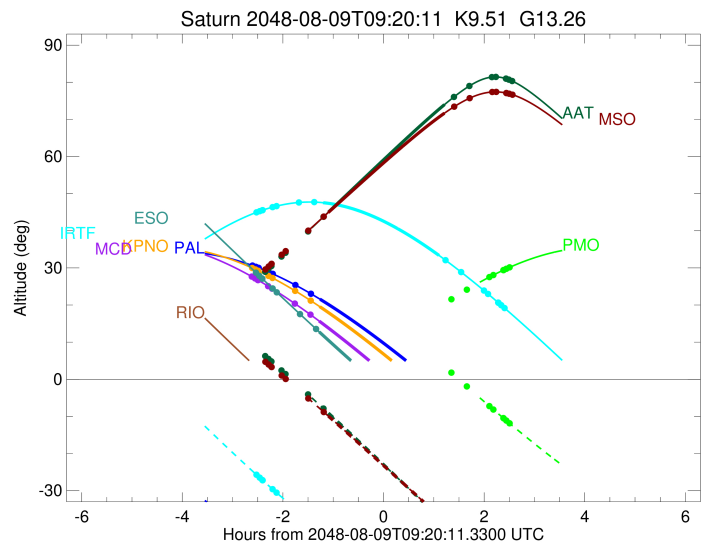
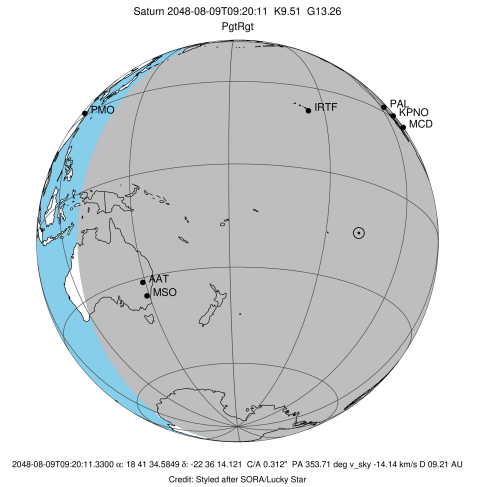
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-08-09T09:25:13.930
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 4079186769028654976
 2Mass ID (if available) : 18413460-2236139
 ICRS Star Coord at Epoch: 18h 41m 34.58490s -22:36:14.12131s
 RUWE (>1.4 is poor) : 0.90
 K magnitude : 9.509
 G magnitude : 13.260
 RP magnitude : 12.205
 BP magnitude : 14.342
 DUPflag : 0
 Distance (au) : 9.208
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.14
 Sun-Target sep (deg) : 142.79
 Sun-Moon sep (deg) : 147.38
 B (ring opening deg) : 25.75
 PA of pole (deg) : 6.24
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.377
 C/A sky separation (km) : 2518.0
 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_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	2048-08-09T06:54:06.606	-20.05x	49.40x	140461.00	-15.59			
A (OER)	I	2048-08-09T06:58:02.985	-19.24x	48.59x	136774.40	-15.60			
Encke (OEG)	I	2048-08-09T07:01:17.172	-18.58x	47.92x	133744.89	-15.60			
Encke (IEG)	I	2048-08-09T07:01:37.782	-18.51x	47.85x	133423.31	-15.60			
A (IER)	I	2048-08-09T07:13:46.269	-16.03x	45.32x	122050.38	-15.62			
B (OER)	I	2048-08-09T07:18:32.984	-15.05x	44.32x	117571.16	-15.63			
B (IER)	I	2048-08-09T07:45:48.875	-9.57x	38.58x	91984.69	-15.65			
C (IER)	I	2048-08-09T08:04:25.985	-5.89x	34.63x	74490.58	-15.66			
Saturn	I	2048-08-09T08:15:00.901	-3.83x	32.39x	60230.83	-9.55		-11.67	
Saturn	E	2048-08-09T10:34:58.455	20.64	3.05x	60192.05	13.73		16.69	
C (IER)	E	2048-08-09T10:41:07.283	21.54	1.80x	74490.58	15.81			
B (IER)	E	2048-08-09T10:59:32.527	24.12	-1.91x	91984.69	15.84			
B (OER)	E	2048-08-09T11:26:26.789	27.53	-7.23	117571.16	15.86			
A (IER)	E	2048-08-09T11:31:09.219	28.07	-8.14	122050.38	15.86			
Encke (IEG)	E	2048-08-09T11:43:06.190	29.38	-10.44	133423.31	15.86			
Encke (OEG)	E	2048-08-09T11:43:26.461	29.42	-10.51	133744.89	15.86			
A (OER)	E	2048-08-09T11:46:37.422	29.75	-11.12	136774.40	15.86			
F ring	E	2048-08-09T11:50:29.793	30.14	-11.85	140461.00	15.87			

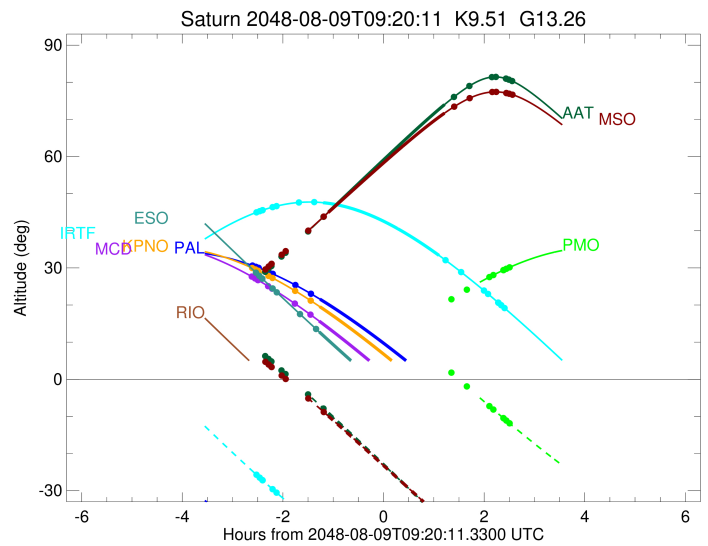
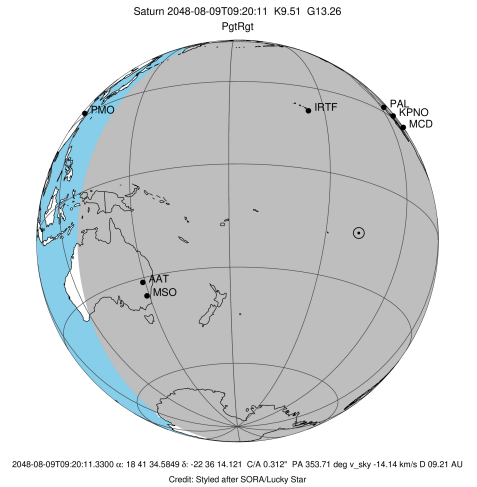
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-08-09T09:13:56.720
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 4079186769028654976
 2Mass ID (if available) : 18413460-2236139
 ICRS Star Coord at Epoch: 18h 41m 34.58490s -22:36:14.12131s
 RUWE (>1.4 is poor) : 0.90
 K magnitude : 9.509
 G magnitude : 13.260
 RP magnitude : 12.205
 BP magnitude : 14.342
 DUPflag : 0
 Distance (au) : 9.208
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.14
 Sun-Target sep (deg) : 142.79
 Sun-Moon sep (deg) : 146.21
 B (ring opening deg) : 25.75
 PA of pole (deg) : 6.24
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.201
 C/A sky separation (km) : 1339.3
 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_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	2048-08-09T06:43:39.600		29.97	-41.21	140461.00	-15.82		
A (OER)	I	2048-08-09T06:47:32.730		29.57	-41.42	136774.40	-15.81		
Encke (OEG)	I	2048-08-09T06:50:44.378		29.23	-41.58	133744.89	-15.81		
Encke (IEG)	I	2048-08-09T06:51:04.725		29.19	-41.60	133423.31	-15.80		
A (IER)	I	2048-08-09T07:03:04.787		27.84	-42.10	122050.38	-15.78		
B (OER)	I	2048-08-09T07:07:48.642		27.29	-42.25	117571.16	-15.78		
B (IER)	I	2048-08-09T07:34:53.117		23.81	-42.59	91984.69	-15.72		
C (IER)	I	2048-08-09T07:53:27.061		21.17	-42.32	74490.58	-15.68		
Saturn	I	2048-08-09T08:04:00.953		19.59	-41.98	60230.73		-9.56	-11.69
Saturn	E	2048-08-09T10:24:27.915		-5.34x	-27.11	60211.37		11.82	14.41
C (IER)	E	2048-08-09T10:32:58.671		-7.01x	-25.75	74490.58	15.37		
B (IER)	E	2048-08-09T10:51:58.339		-10.79x	-22.60	91984.69	15.33		
B (OER)	E	2048-08-09T11:19:49.509		-16.42x	-17.72	117571.16	15.29		
A (IER)	E	2048-08-09T11:24:42.613		-17.42x	-16.84	122050.38	15.28		
Encke (IEG)	E	2048-08-09T11:37:07.555		-19.97x	-14.56	133423.31	15.26		
Encke (OEG)	E	2048-08-09T11:37:28.634		-20.04x	-14.49	133744.89	15.26		
A (OER)	E	2048-08-09T11:40:47.256		-20.73x	-13.88	136774.40	15.25		
F ring	E	2048-08-09T11:44:49.058		-21.56x	-13.12	140461.00	15.24		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-08-09T09:13:35.790
 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 : 4079186769028654976
 2Mass ID (if available) : 18413460-2236139
 ICRS Star Coord at Epoch: 18h 41m 34.58490s -22:36:14.12131s
 RUWE (>1.4 is poor) : 0.90
 K magnitude : 9.509
 G magnitude : 13.260
 RP magnitude : 12.205
 BP magnitude : 14.342
 DUPflag : 0
 Distance (au) : 9.208
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.14
 Sun-Target sep (deg) : 142.79
 Sun-Moon sep (deg) : 146.13
 B (ring opening deg) : 25.75
 PA of pole (deg) : 6.24
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.142
 C/A sky separation (km) : 947.4
 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_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

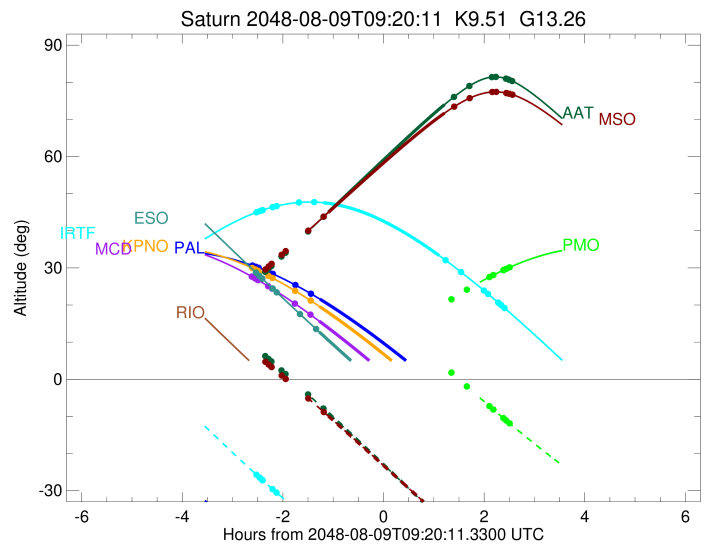
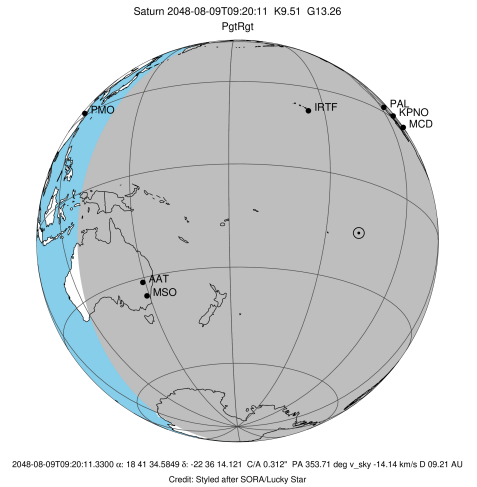


b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2048-08-09T06:43:10.410		27.65	-43.67	140461.00	-15.78		
A (OER)	I	2048-08-09T06:47:04.076		27.16	-43.75	136774.40	-15.77		
Encke (OEG)	I	2048-08-09T06:50:16.170		26.74	-43.80	133744.89	-15.77		
Encke (IEG)	I	2048-08-09T06:50:36.564		26.70	-43.80	133423.31	-15.77		
A (IER)	I	2048-08-09T07:02:38.356		25.07	-43.88	122050.38	-15.75		
B (OER)	I	2048-08-09T07:07:22.914		24.41	-43.86	117571.16	-15.74		
B (IER)	I	2048-08-09T07:34:31.599		20.37	-43.21	91984.69	-15.68		
C (IER)	I	2048-08-09T07:53:08.550		17.40	-42.24	74490.58	-15.64		
Saturn	I	2048-08-09T08:03:27.228		15.68	-41.54	60228.31		-9.87	-12.06
Saturn	E	2048-08-09T10:24:22.574		-10.88x	-22.90	60214.53		11.48	14.00
C (IER)	E	2048-08-09T10:33:16.901		-12.69x	-21.33	74490.58	15.32		
B (IER)	E	2048-08-09T10:52:20.305		-16.61x	-17.88	91984.69	15.28		
B (OER)	E	2048-08-09T11:20:16.993		-22.44x	-12.62	117571.16	15.24		
A (IER)	E	2048-08-09T11:25:11.056		-23.47x	-11.67	122050.38	15.23		
Encke (IEG)	E	2048-08-09T11:37:38.406		-26.09x	-9.24	133423.31	15.21		
Encke (OEG)	E	2048-08-09T11:37:59.553		-26.17x	-9.17	133744.89	15.21		
A (OER)	E	2048-08-09T11:41:18.809		-26.87x	-8.52	136774.40	15.20		
F ring	E	2048-08-09T11:45:21.378		-27.72x	-7.72	140461.00	15.19		

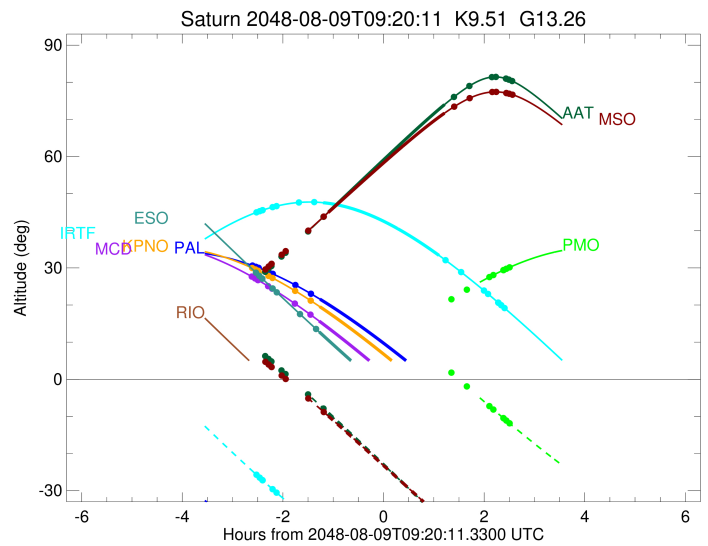
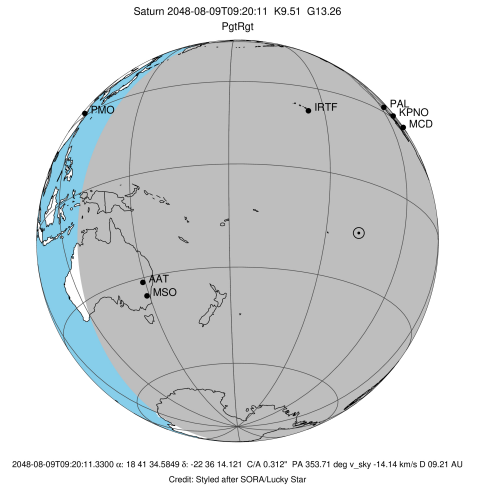
```

target                : Saturn
target radius (km)   : 60268.00
C/A epoch             : 2048-08-09T09:17:05.730
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       : 4079186769028654976
2Mass ID (if available) : 18413460-2236139
ICRS Star Coord at Epoch: 18h 41m 34.58490s -22:36:14.12131s
RUWE (>1.4 is poor) : 0.90
K magnitude           : 9.509
G magnitude           : 13.260
RP magnitude          : 12.205
BP magnitude          : 14.342
DUPflag              : 0
Distance (au)        : 9.208
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -14.14
Sun-Target sep (deg) : 142.79
Sun-Moon sep (deg)   : 146.80
B (ring opening deg) : 25.75
PA of pole (deg)     : 6.24
Pole direction: RA (deg): 40.60000
Dec (deg): 83.50000
C/A sky separation (") : 0.267
C/A sky separation (km) : 1780.8
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
    
```



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2048-08-09T06:48:45.596		44.97	-25.73	140461.00	-15.99		
A (OER)	I	2048-08-09T06:52:36.233		45.29	-26.52	136774.40	-15.98		
Encke (OEG)	I	2048-08-09T06:55:45.783		45.53	-27.16	133744.89	-15.98		
Encke (IEG)	I	2048-08-09T06:56:05.904		45.56	-27.23	133423.31	-15.98		
A (IER)	I	2048-08-09T07:07:57.687		46.37	-29.62	122050.38	-15.97		
B (OER)	I	2048-08-09T07:12:38.118		46.64	-30.54	117571.16	-15.97		
B (IER)	I	2048-08-09T07:39:21.365		47.62	-35.69	91984.69	-15.95		
C (IER)	I	2048-08-09T07:57:39.310		47.72	-39.02	74490.58	-15.92		
Saturn	I	2048-08-09T08:08:11.246		47.57	-40.86	60231.82		-9.42	-11.52
Saturn	E	2048-08-09T10:26:17.541		33.38	-54.72	60206.61		12.31	15.00
C (IER)	E	2048-08-09T10:34:05.924		32.09	-54.68	74490.58	15.68		
B (IER)	E	2048-08-09T10:52:42.309		28.89	-54.18	91984.69	15.66		
B (OER)	E	2048-08-09T11:19:59.121		23.90	-52.42	117571.16	15.61		
A (IER)	E	2048-08-09T11:24:46.219		23.00	-52.00	122050.38	15.60		
Encke (IEG)	E	2048-08-09T11:36:55.966		20.67	-50.79	133423.31	15.57		
Encke (OEG)	E	2048-08-09T11:37:16.617		20.60	-50.76	133744.89	15.57		
A (OER)	E	2048-08-09T11:40:31.211		19.97	-50.40	136774.40	15.56		
F ring	E	2048-08-09T11:44:28.125		19.20	-49.95	140461.00	15.56		

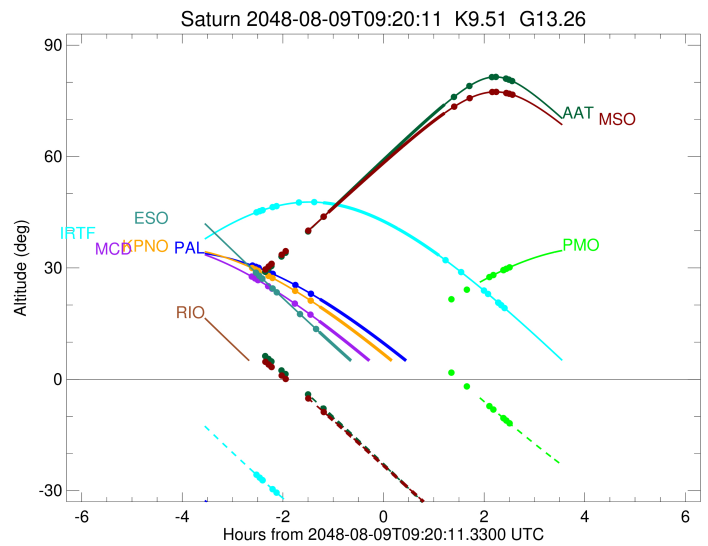
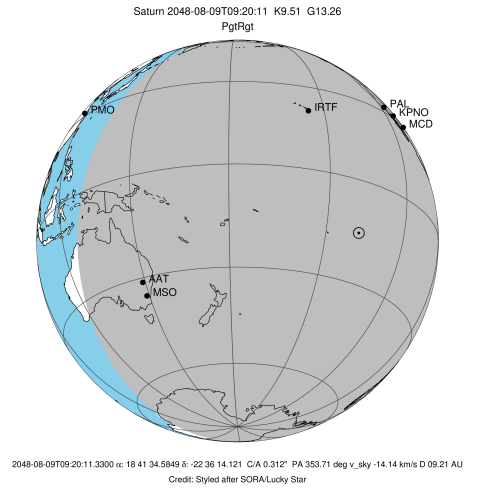
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-08-09T09:14:17.280
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4079186769028654976
 2Mass ID (if available) : 18413460-2236139
 ICRS Star Coord at Epoch: 18h 41m 34.58490s -22:36:14.12131s
 RUWE (>1.4 is poor) : 0.90
 K magnitude : 9.509
 G magnitude : 13.260
 RP magnitude : 12.205
 BP magnitude : 14.342
 DUPflag : 0
 Distance (au) : 9.208
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.14
 Sun-Target sep (deg) : 142.79
 Sun-Moon sep (deg) : 146.24
 B (ring opening deg) : 25.75
 PA of pole (deg) : 6.24
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.913
 C/A sky separation (km) : 6096.5
 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_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	2048-08-09T06:48:10.309		28.70	-59.31	140461.00	-15.48		
A (OER)	I	2048-08-09T06:52:08.592		27.85	-58.49	136774.40	-15.47		
Encke (OEG)	I	2048-08-09T06:55:24.548		27.15	-57.82	133744.89	-15.46		
Encke (IEG)	I	2048-08-09T06:55:45.355		27.07	-57.74	133423.31	-15.45		
A (IER)	I	2048-08-09T07:08:02.236		24.45	-55.17	122050.38	-15.41		
B (OER)	I	2048-08-09T07:12:53.009		23.42	-54.14	117571.16	-15.40		
B (IER)	I	2048-08-09T07:40:41.053		17.54	-48.19	91984.69	-15.28		
C (IER)	I	2048-08-09T07:59:50.665		13.53	-44.04	74490.58	-15.15		
Saturn	I	2048-08-09T08:03:26.478		12.79	-43.26	60166.74		-15.91	-19.27
Saturn	E	2048-08-09T10:25:55.477		-14.83x	-12.28	60255.24		5.58	6.84
C (IER)	E	2048-08-09T10:40:10.594		-17.29x	-9.23	74490.58	14.88		
B (IER)	E	2048-08-09T10:59:43.586		-20.52x	-5.08	91984.69	14.94		
B (OER)	E	2048-08-09T11:28:14.251		-24.92x	0.89x	117571.16	14.97		
A (IER)	E	2048-08-09T11:33:13.462		-25.64x	1.92x	122050.38	14.97		
Encke (IEG)	E	2048-08-09T11:45:53.015		-27.42x	4.52x	133423.31	14.97		
Encke (OEG)	E	2048-08-09T11:46:14.490		-27.47x	4.60x	133744.89	14.97		
A (OER)	E	2048-08-09T11:49:36.793		-27.92x	5.29x	136774.40	14.98		
F ring	E	2048-08-09T11:53:42.965		-28.47x	6.12x	140461.00	14.98		

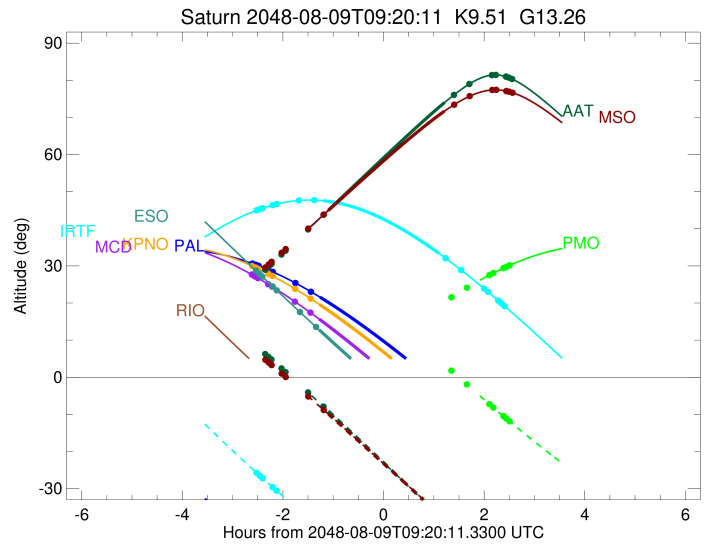
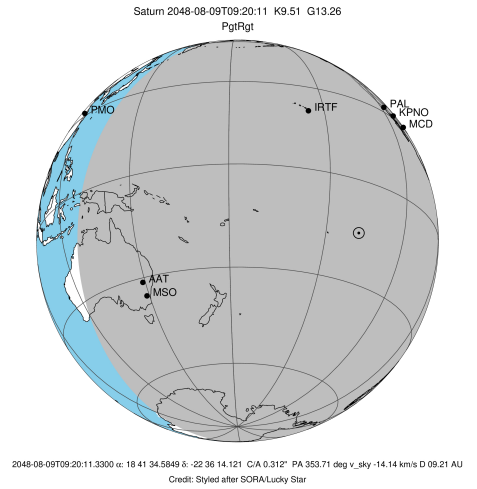
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-08-09T09:23:48.540
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 4079186769028654976
 2Mass ID (if available) : 18413460-2236139
 ICRS Star Coord at Epoch: 18h 41m 34.58490s -22:36:14.12131s
 RUWE (>1.4 is poor) : 0.90
 K magnitude : 9.509
 G magnitude : 13.260
 RP magnitude : 12.205
 BP magnitude : 14.342
 DUPflag : 0
 Distance (au) : 9.208
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.14
 Sun-Target sep (deg) : 142.79
 Sun-Moon sep (deg) : 147.64
 B (ring opening deg) : 25.75
 PA of pole (deg) : 6.24
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.450
 C/A sky separation (km) : 3007.5
 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	2048-08-09T06:59:11.606		28.97	6.23x	140461.00	-15.80		
A (OER)	I	2048-08-09T07:03:04.947		29.79	5.46x	136774.40	-15.80		
Encke (OEG)	I	2048-08-09T07:06:16.661		30.46	4.83x	133744.89	-15.80		
Encke (IEG)	I	2048-08-09T07:06:37.010		30.54	4.76x	133423.31	-15.80		
A (IER)	I	2048-08-09T07:18:36.429		33.08	2.36x	122050.38	-15.81		
B (OER)	I	2048-08-09T07:23:19.666		34.08	1.41x	117571.16	-15.82		
B (IER)	I	2048-08-09T07:50:16.879		39.84	-4.09x	91984.69	-15.82		
C (IER)	I	2048-08-09T08:08:42.625		43.78	-7.91	74490.58	-15.82		
Saturn	I	2048-08-09T08:14:28.728		45.02	-9.11	60188.62		-14.04	-17.06
Saturn	E	2048-08-09T10:32:58.806		74.00	-38.55	60236.79		8.74	10.70
C (IER)	E	2048-08-09T10:44:08.933		76.04	-40.93	74490.58	15.84		
B (IER)	E	2048-08-09T11:02:32.861		79.00	-44.83	91984.69	15.85		
B (OER)	E	2048-08-09T11:29:26.962		81.40	-50.47	117571.16	15.85		
A (IER)	E	2048-08-09T11:34:09.600		81.45	-51.45	122050.38	15.85		
Encke (IEG)	E	2048-08-09T11:46:07.429		81.00	-53.91	133423.31	15.84		
Encke (OEG)	E	2048-08-09T11:46:27.731		80.97	-53.98	133744.89	15.84		
A (OER)	E	2048-08-09T11:49:39.005		80.72	-54.63	136774.40	15.84		
F ring	E	2048-08-09T11:53:31.803		80.35	-55.42	140461.00	15.83		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-08-09T09:23:43.190
 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 : 4079186769028654976
 2Mass ID (if available) : 18413460-2236139
 ICRS Star Coord at Epoch: 18h 41m 34.58490s -22:36:14.12131s
 RUWE (>1.4 is poor) : 0.90
 K magnitude : 9.509
 G magnitude : 13.260
 RP magnitude : 12.205
 BP magnitude : 14.342
 DUPflag : 0
 Distance (au) : 9.208
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.14
 Sun-Target sep (deg) : 142.79
 Sun-Moon sep (deg) : 147.63
 B (ring opening deg) : 25.75
 PA of pole (deg) : 6.24
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.516
 C/A sky separation (km) : 3446.0
 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_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	2048-08-09T06:59:23.445		29.60	4.69x	140461.00	-15.78		
A (OER)	I	2048-08-09T07:03:17.049		30.39	3.95x	136774.40	-15.78		
Encke (OEG)	I	2048-08-09T07:06:28.985		31.04	3.34x	133744.89	-15.79		
Encke (IEG)	I	2048-08-09T07:06:49.357		31.11	3.28x	133423.31	-15.79		
A (IER)	I	2048-08-09T07:18:49.657		33.56	0.99x	122050.38	-15.79		
B (OER)	I	2048-08-09T07:23:33.264		34.52	0.08x	117571.16	-15.79		
B (IER)	I	2048-08-09T07:50:32.904		40.05	-5.19	91984.69	-15.80		
C (IER)	I	2048-08-09T08:09:00.762		43.83	-8.84	74490.58	-15.78		
Saturn	I	2048-08-09T08:14:21.217		44.93	-9.91	60184.54		-14.40	-17.49
Saturn	E	2048-08-09T10:32:56.778		71.69	-38.06	60239.41		8.37	10.24
C (IER)	E	2048-08-09T10:44:27.019		73.43	-40.39	74490.58	15.80		
B (IER)	E	2048-08-09T11:02:53.229		75.72	-44.08	91984.69	15.82		
B (OER)	E	2048-08-09T11:29:50.091		77.39	-49.38	117571.16	15.82		
A (IER)	E	2048-08-09T11:34:33.167		77.41	-50.29	122050.38	15.82		
Encke (IEG)	E	2048-08-09T11:46:32.060		77.11	-52.58	133423.31	15.82		
Encke (OEG)	E	2048-08-09T11:46:52.391		77.09	-52.64	133744.89	15.82		
A (OER)	E	2048-08-09T11:50:03.938		76.92	-53.24	136774.40	15.82		
F ring	E	2048-08-09T11:53:57.062		76.66	-53.97	140461.00	15.81		