

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2030-10-18T10:05:26.650
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 48089752381241856
 2Mass ID (if available) : 04253852+1933367

Saturn 2030-10-18T10:05:26 K8.39 G11.91 PgtRgt

ICRS Star Coord at Epoch: 04h 25m 38.54924s +19:33:36.54734s

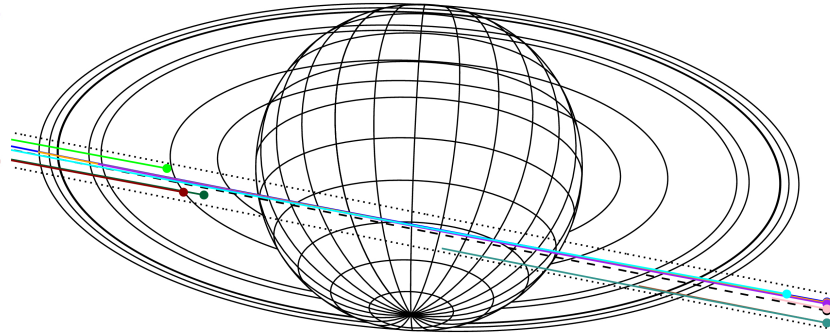
RUWE (>1.4 is poor) : 1.54
 K magnitude : 8.395
 G magnitude : 11.909
 RP magnitude : 10.924
 BP magnitude : 12.909
 DUPflag : 0
 Distance (au) : 8.322
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.02
 Sun-Target sep (deg) : 136.77
 Sun-Moon sep (deg) : 33.60
 B (ring opening deg) : -25.38
 PA of pole (deg) : -3.13
 # 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



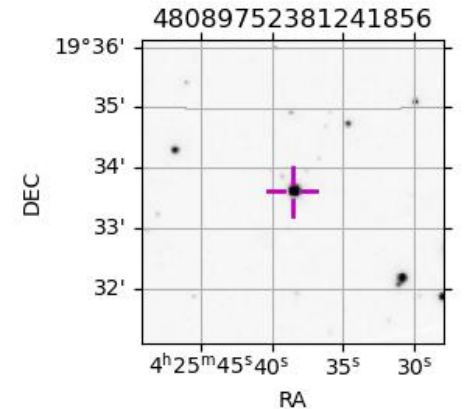
2030-10-18T10:05:26.6500 α: 04 25 38.5492 δ: +19 33 36.547 C/A 3.762° PA 348.83 deg v_sky -12.02 km/s D 08.32 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 PMO
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 AAT
 MSO



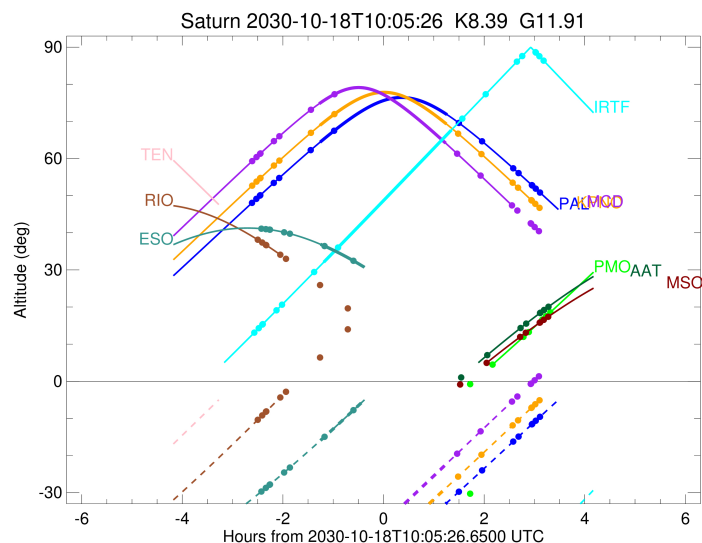
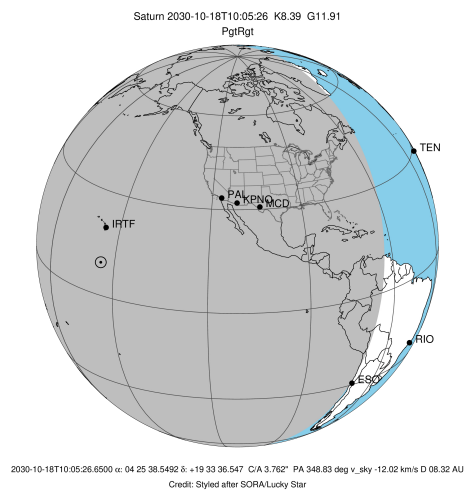
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEncode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1	+ + + + + + +	+ +	+ + + + + + + +	OCT 18 07:28 - OCT 18 13:12	PieRie
PMO	Purple Mtn Obs	32.1	118.8			+ + + + + + +	OCT 18 12:52 - OCT 18 13:24	PnnRne
KPNO	Kitt Peak Natl	32.0	248.4	+ + + + + + +	+ +	+ + + + + + + +	OCT 18 07:28 - OCT 18 13:11	PieRie
MCD	McDonald Obs.	30.7	256.0	+ + + + + + +	+ +	+ + +	OCT 18 07:28 - OCT 18 12:38	PieRie
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ + + + + + +	+ +	+ + + + + + + +	OCT 18 07:31 - OCT 18 13:16	PieRie
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+ + + +			OCT 18 07:35 - OCT 18 07:45	PnnRin
ESO	European South	-29.3	289.3	+ + + + + + +	+		OCT 18 07:39 - OCT 18 08:50	PinRin
AAT	Siding Spring	-31.3	149.1			+ + + + + + +	OCT 18 12:09 - OCT 18 13:22	PnnRne
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0			+ + + + + + +	OCT 18 12:48 - OCT 18 13:21	PnnRne



```

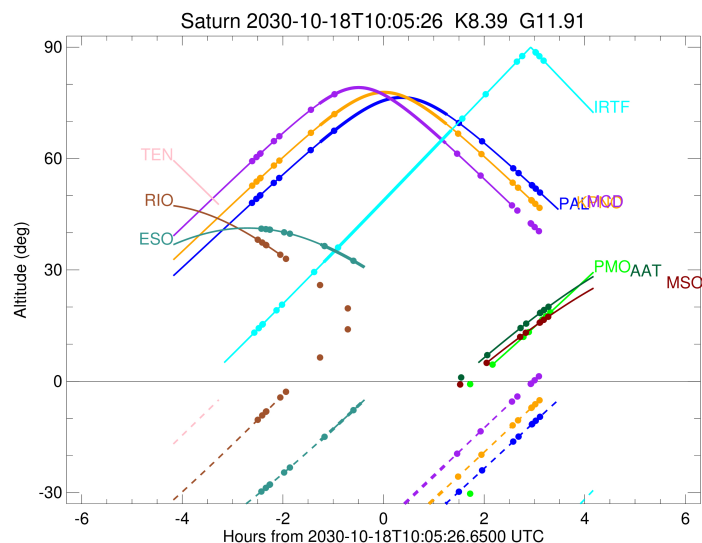
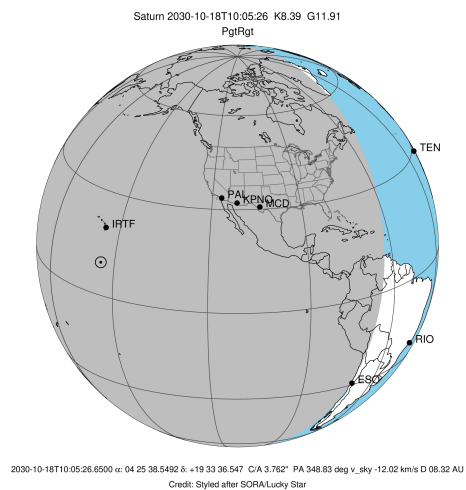
target                : Saturn
target radius (km)   : 60268.00
C/A epoch             : 2030-10-18T10:05:31.610
Event type            : PgtRgt
: Saturn occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code         : PAL
Location               : Palomar Mt (200")
Latitude (deg)        : 33.35622
E. Longitude (deg)    : 243.13601
Altitude (km)         : 1.706
Gaia source ID        : 48089752381241856
2Mass ID (if available) : 04253852+1933367
ICRS Star Coord at Epoch: 04h 25m 38.54924s +19:33:36.54734s
RUWE (>1.4 is poor) : 1.54
K magnitude           : 8.395
G magnitude           : 11.909
RP magnitude          : 10.924
BP magnitude          : 12.909
DUPflag              : 0
Distance (au)         : 8.322
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -12.02
Sun-Target sep (deg) : 136.77
Sun-Moon sep (deg)   : 34.14
B (ring opening deg) : -25.38
PA of pole (deg)     : -3.13
Pole direction: RA (deg): 40.60000
Dec (deg): 83.50000
C/A sky separation (") : 3.501
C/A sky separation (km) : 21131.5
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
  
```



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2030-10-18T07:28:31.045		48.04	-66.47	140461.00	-11.91		
A (OER)	I	2030-10-18T07:33:40.956		49.11	-66.49	136774.40	-11.88		
Encke (OEG)	I	2030-10-18T07:37:56.344		50.00	-66.46	133744.89	-11.85		
Encke (IEG)	I	2030-10-18T07:38:23.493		50.09	-66.45	133423.31	-11.84		
A (IER)	I	2030-10-18T07:54:29.512		53.41	-65.96	122050.38	-11.70		
B (OER)	I	2030-10-18T08:00:53.689		54.72	-65.61	117571.16	-11.62		
B (IER)	I	2030-10-18T08:38:34.629		62.25	-62.03	91984.69	-10.92		
C (IER)	I	2030-10-18T09:06:31.253	b	67.48	-58.09	74490.58	-9.83		
Saturn	I	2030-10-18T08:49:49.214		64.41	-60.54	60031.58		-25.27	-30.01
Saturn	E	2030-10-18T11:21:16.256		71.82	-32.66	60215.87		-11.54	-14.07
C (IER)	E	2030-10-18T11:35:18.570		69.59	-29.77	74490.58	9.92		
B (IER)	E	2030-10-18T12:02:58.563		64.65	-24.01	91984.69	11.04		
B (OER)	E	2030-10-18T12:40:11.762		57.36	-16.23	117571.16	11.78		
A (IER)	E	2030-10-18T12:46:30.516		56.08	-14.91	122050.38	11.87		
Encke (IEG)	E	2030-10-18T13:02:21.973		52.84	-11.60	133423.31	12.03		
Encke (OEG)	E	2030-10-18T13:02:48.694		52.75	-11.51	133744.89	12.04		
A (OER)	E	2030-10-18T13:07:00.002		51.89	-10.64	136774.40	12.07		
F ring	E	2030-10-18T13:12:04.840		50.84	-9.58	140461.00	12.11		

```

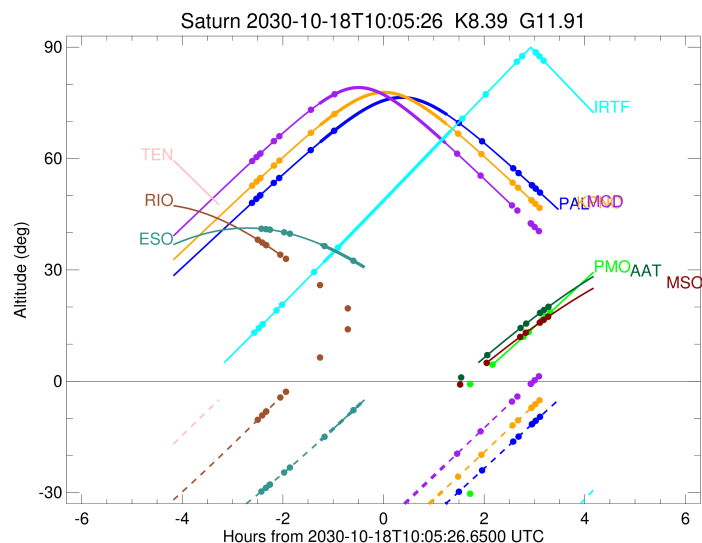
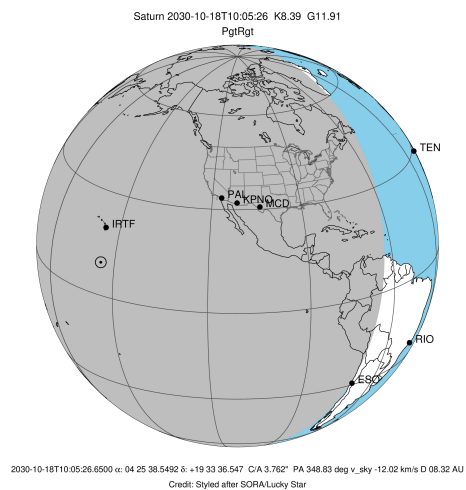
target                : Saturn
target radius (km)   : 60268.00
C/A epoch            : 2030-10-18T10:09:56.640
Event type           : PgtRgt
: Saturn occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : PMO
Location              : Purple Mtn Obs. Nanking
Latitude (deg)       : 32.06667
E. Longitude (deg)   : 118.82089
Altitude (km)        : 0.364
Gaia source ID       : 48089752381241856
2Mass ID (if available) : 04253852+1933367
ICRS Star Coord at Epoch: 04h 25m 38.54924s +19:33:36.54734s
RUWE (>1.4 is poor) : 1.54
K magnitude           : 8.395
G magnitude           : 11.909
RP magnitude          : 10.924
BP magnitude          : 12.909
DUPflag              : 0
Distance (au)         : 8.322
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -12.02
Sun-Target sep (deg) : 136.77
Sun-Moon sep (deg)   : 33.87
B (ring opening deg) : -25.38
PA of pole (deg)     : -3.13
Pole direction: RA (deg): 40.60000
Dec (deg): 83.50000
C/A sky separation (") : 2.927
C/A sky separation (km) : 17667.7
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

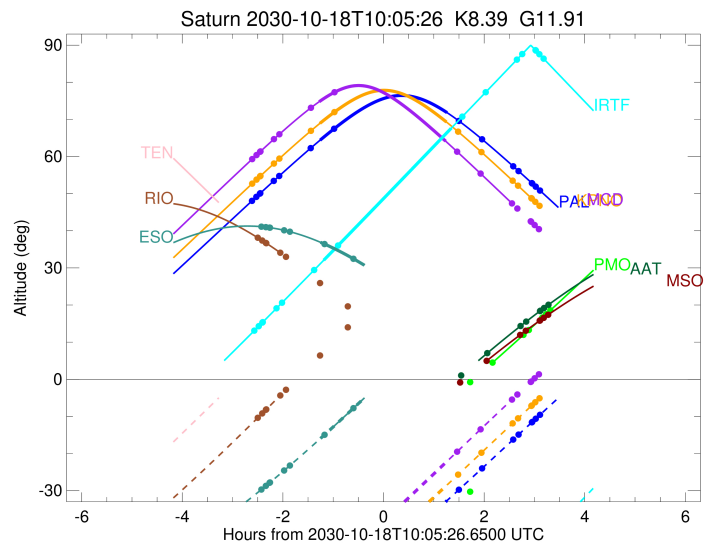
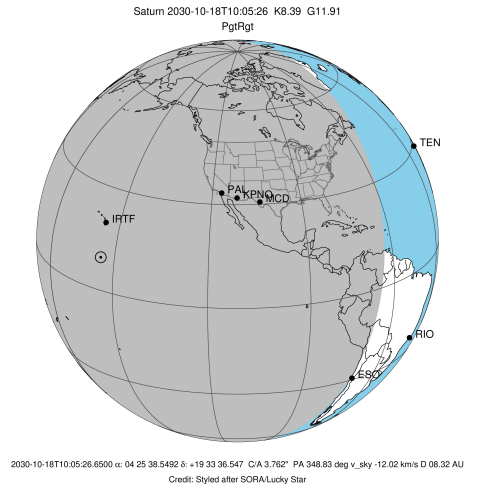
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2030-10-18T07:19:41.112		-37.80x	24.92x	140461.00	-11.67		
A (OER)	I	2030-10-18T07:24:57.445		-37.59x	23.95x	136774.40	-11.64		
Encke (OEG)	I	2030-10-18T07:29:17.974		-37.39x	23.15x	133744.89	-11.62		
Encke (IEG)	I	2030-10-18T07:29:45.661		-37.36x	23.06x	133423.31	-11.61		
A (IER)	I	2030-10-18T07:46:09.343		-36.42x	19.96x	122050.38	-11.51		
B (OER)	I	2030-10-18T07:52:39.527		-35.97x	18.71x	117571.16	-11.45		
B (IER)	I	2030-10-18T08:30:34.038		-32.57x	11.24x	91984.69	-10.99		
C (IER)	I	2030-10-18T08:57:51.081	b	-29.39x	5.70x	74490.58	-10.31		
Saturn	I	2030-10-18T08:48:16.010		-30.57x	7.66x	60078.23		-22.47	-26.86
Saturn	E	2030-10-18T11:31:01.680		-4.20x	-26.54	60239.72		-8.47	-10.36
C (IER)	E	2030-10-18T11:48:43.961		-0.79x	-30.28	74490.58	10.50		
B (IER)	E	2030-10-18T12:15:28.654		4.49x	-35.88	91984.69	11.23		
B (OER)	E	2030-10-18T12:52:26.559		11.97	-43.46	117571.16	11.78		
A (IER)	E	2030-10-18T12:58:45.694		13.26	-44.73	122050.38	11.85		
Encke (IEG)	E	2030-10-18T13:14:39.870		16.54	-47.88	133423.31	11.99		
Encke (OEG)	E	2030-10-18T13:15:06.693		16.64	-47.96	133744.89	11.99		
A (OER)	E	2030-10-18T13:19:19.006		17.51	-48.78	136774.40	12.02		
F ring	E	2030-10-18T13:24:25.153		18.57	-49.77	140461.00	12.06		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2030-10-18T10:04:56.610
 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 : 48089752381241856
 2Mass ID (if available) : 04253852+1933367
 ICRS Star Coord at Epoch: 04h 25m 38.54924s +19:33:36.54734s
 RUWE (>1.4 is poor) : 1.54
 K magnitude : 8.395
 G magnitude : 11.909
 RP magnitude : 10.924
 BP magnitude : 12.909
 DUPflag : 0
 Distance (au) : 8.322
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.02
 Sun-Target sep (deg) : 136.77
 Sun-Moon sep (deg) : 34.08
 B (ring opening deg) : -25.38
 PA of pole (deg) : -3.13
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.542
 C/A sky separation (km) : 21377.5
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2030-10-18T07:28:42.965		52.67	-67.52	140461.00	-11.92		
A (OER)	I	2030-10-18T07:33:52.654		53.76	-67.28	136774.40	-11.89		
Encke (OEG)	I	2030-10-18T07:38:07.888		54.65	-67.04	133744.89	-11.85		
Encke (IEG)	I	2030-10-18T07:38:35.022		54.74	-67.01	133423.31	-11.85		
A (IER)	I	2030-10-18T07:54:40.736		58.09	-65.73	122050.38	-11.70		
B (OER)	I	2030-10-18T08:01:04.927		59.41	-65.09	117571.16	-11.62		
B (IER)	I	2030-10-18T08:38:48.330		66.91	-60.05	91984.69	-10.89		
C (IER)	I	2030-10-18T09:06:51.681	b	71.96	-55.36	74490.58	-9.77		
Saturn	I	2030-10-18T08:49:27.407		68.91	-58.34	60027.11		-25.53	-30.30
Saturn	E	2030-10-18T11:20:32.379		69.29	-28.62	60214.26		-11.72	-14.28
C (IER)	E	2030-10-18T11:34:22.368		66.71	-25.70	74490.58	9.85		
B (IER)	E	2030-10-18T12:02:11.842		61.21	-19.80	91984.69	10.99		
B (OER)	E	2030-10-18T12:39:32.620		53.48	-11.87	117571.16	11.75		
A (IER)	E	2030-10-18T12:45:52.402		52.15	-10.53	122050.38	11.83		
Encke (IEG)	E	2030-10-18T13:01:46.275		48.79	-7.17	133423.31	12.00		
Encke (OEG)	E	2030-10-18T13:02:13.061		48.70	-7.08	133744.89	12.01		
A (OER)	E	2030-10-18T13:06:24.976		47.81	-6.20	136774.40	12.04		
F ring	E	2030-10-18T13:11:30.537		46.72	-5.12	140461.00	12.09		

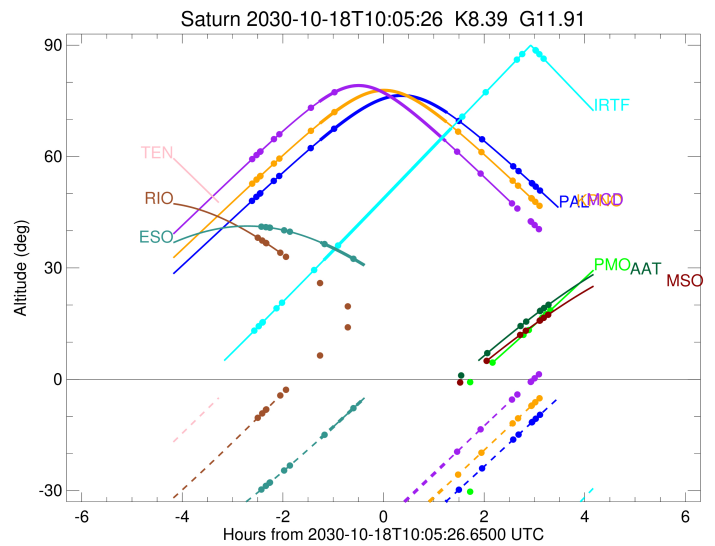
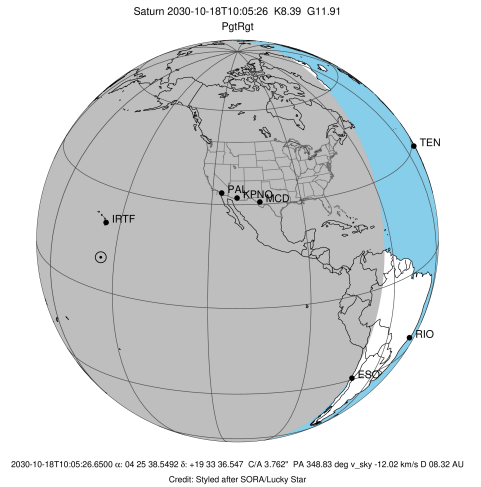
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2030-10-18T10:04:03.470
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 48089752381241856
 2Mass ID (if available) : 04253852+1933367
 ICRS Star Coord at Epoch: 04h 25m 38.54924s +19:33:36.54734s
 RUWE (>1.4 is poor) : 1.54
 K magnitude : 8.395
 G magnitude : 11.909
 RP magnitude : 10.924
 BP magnitude : 12.909
 DUPflag : 0
 Distance (au) : 8.322
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.02
 Sun-Target sep (deg) : 136.77
 Sun-Moon sep (deg) : 34.00
 B (ring opening deg) : -25.38
 PA of pole (deg) : -3.13
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.585
 C/A sky separation (km) : 21635.5
 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	2030-10-18T07:28:43.889		59.29	-66.41	140461.00	-11.94		
A (OER)	I	2030-10-18T07:33:53.175		60.37	-65.83	136774.40	-11.90		
Encke (OEG)	I	2030-10-18T07:38:08.109		61.26	-65.31	133744.89	-11.87		
Encke (IEG)	I	2030-10-18T07:38:35.214		61.35	-65.25	133423.31	-11.86		
A (IER)	I	2030-10-18T07:54:40.129		64.67	-63.05	122050.38	-11.70		
B (OER)	I	2030-10-18T08:01:04.164		65.96	-62.09	117571.16	-11.62		
B (IER)	I	2030-10-18T08:38:49.363		73.12	-55.63	91984.69	-10.87		
C (IER)	I	2030-10-18T09:06:59.496	b	77.32	-50.24	74490.58	-9.71		
Saturn	I	2030-10-18T08:48:47.316		74.78	-53.76	60021.96		-25.82	-30.62
Saturn	E	2030-10-18T11:19:32.483		64.14	-22.46	60212.78		-11.88	-14.48
C (IER)	E	2030-10-18T11:33:12.281		61.32	-19.52	74490.58	9.76		
B (IER)	E	2030-10-18T12:01:12.717		55.41	-13.49	91984.69	10.93		
B (OER)	E	2030-10-18T12:38:43.014		47.37	-5.46	117571.16	11.71		
A (IER)	E	2030-10-18T12:45:04.169		46.00	-4.11x	122050.38	11.79		
Encke (IEG)	E	2030-10-18T13:01:01.351		42.55	-0.73x	133423.31	11.96		
Encke (OEG)	E	2030-10-18T13:01:28.228		42.46	-0.63x	133744.89	11.97		
A (OER)	E	2030-10-18T13:05:40.993		41.55	0.26x	136774.40	12.00		
F ring	E	2030-10-18T13:10:47.577		40.44	1.34x	140461.00	12.05		

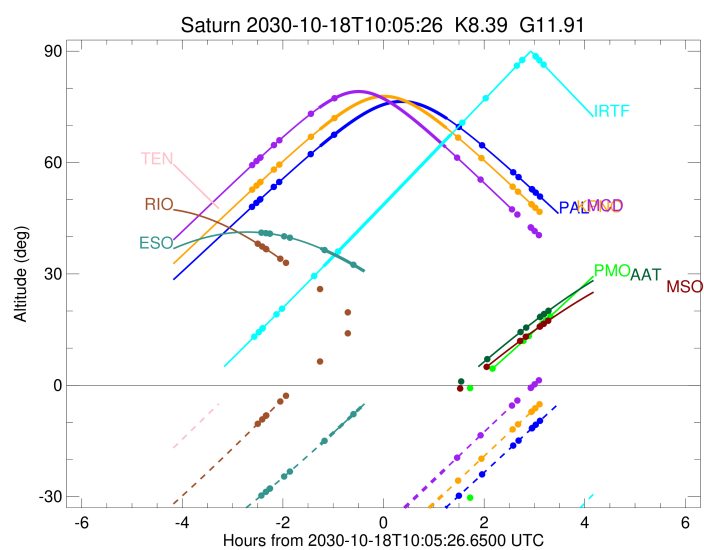
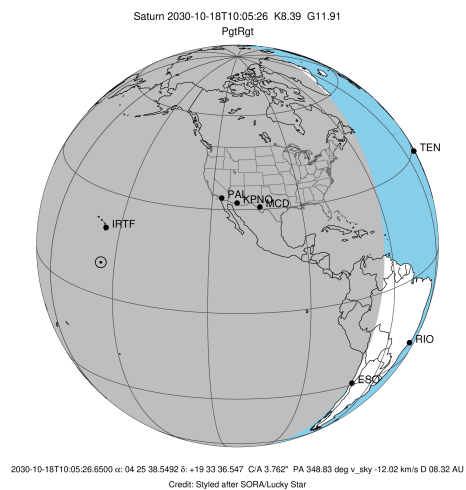
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2030-10-18T10:10:27.910
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 48089752381241856
 2Mass ID (if available) : 04253852+1933367
 ICRS Star Coord at Epoch: 04h 25m 38.54924s +19:33:36.54734s
 RUWE (>1.4 is poor) : 1.54
 K magnitude : 8.395
 G magnitude : 11.909
 RP magnitude : 10.924
 BP magnitude : 12.909
 DUPflag : 0
 Distance (au) : 8.322
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.02
 Sun-Target sep (deg) : 136.77
 Sun-Moon sep (deg) : 34.47
 B (ring opening deg) : -25.38
 PA of pole (deg) : -3.13
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.544
 C/A sky separation (km) : 21389.2
 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_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	2030-10-18T07:31:15.815		13.08	-51.12	140461.00	-11.69		
A (OER)	I	2030-10-18T07:36:31.658		14.27	-52.34	136774.40	-11.66		
Encke (OEG)	I	2030-10-18T07:40:51.921		15.25	-53.34	133744.89	-11.62		
Encke (IEG)	I	2030-10-18T07:41:19.587		15.36	-53.45	133423.31	-11.62		
A (IER)	I	2030-10-18T07:57:43.940		19.09	-57.23	122050.38	-11.48		
B (OER)	I	2030-10-18T08:04:15.377		20.59	-58.72	117571.16	-11.41		
B (IER)	I	2030-10-18T08:42:39.464		29.41	-67.30	91984.69	-10.71		
C (IER)	I	2030-10-18T09:11:11.313	b	36.02	-73.21	74490.58	-9.61		
Saturn	I	2030-10-18T08:54:10.775		32.08	-69.76	60031.96		-25.25	-29.99
Saturn	E	2030-10-18T11:26:16.292		67.65	-68.43	60210.51		-12.13	-14.77
C (IER)	E	2030-10-18T11:39:23.799		70.74	-65.58	74490.58	9.80		
B (IER)	E	2030-10-18T12:07:17.413		77.31	-59.32	91984.69	10.98		
B (OER)	E	2030-10-18T12:44:34.850		86.11	-50.73	117571.16	11.79		
A (IER)	E	2030-10-18T12:50:53.200		87.60	-49.26	122050.38	11.88		
Encke (IEG)	E	2030-10-18T13:06:42.453		88.66	-45.57	133423.31	12.07		
Encke (OEG)	E	2030-10-18T13:07:09.089		88.55	-45.46	133744.89	12.08		
A (OER)	E	2030-10-18T13:11:19.536		87.57	-44.49	136774.40	12.12		
F ring	E	2030-10-18T13:16:23.187		86.37	-43.30	140461.00	12.16		

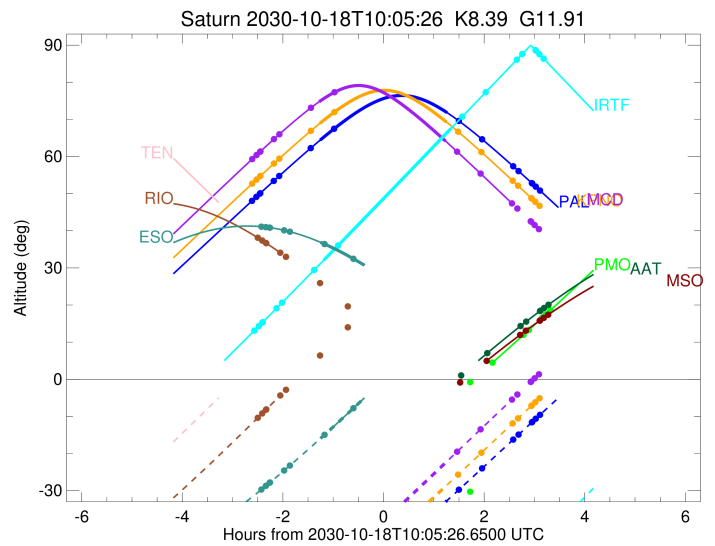
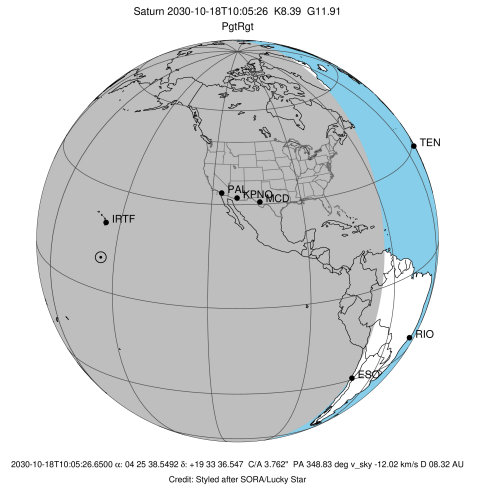
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2030-10-18T09:59:13.040
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 48089752381241856
 2Mass ID (if available) : 04253852+1933367
 ICRS Star Coord at Epoch: 04h 25m 38.54924s +19:33:36.54734s
 RUWE (>1.4 is poor) : 1.54
 K magnitude : 8.395
 G magnitude : 11.909
 RP magnitude : 10.924
 BP magnitude : 12.909
 DUPflag : 0
 Distance (au) : 8.322
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.02
 Sun-Target sep (deg) : 136.77
 Sun-Moon sep (deg) : 33.10
 B (ring opening deg) : -25.38
 PA of pole (deg) : -3.13
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.437
 C/A sky separation (km) : 26779.3
 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	2030-10-18T07:35:20.984		38.15	-10.41	140461.00	-11.62		
A (OER)	I	2030-10-18T07:40:39.304		37.39	-9.23	136774.40	-11.55		
Encke (OEG)	I	2030-10-18T07:45:02.420		36.75	-8.25	133744.89	-11.48		
Encke (IEG)	I	2030-10-18T07:45:30.436		36.68	-8.14	133423.31	-11.47		
A (IER)	I	2030-10-18T08:02:13.606		34.10	-4.39x	122050.38	-11.19		
B (OER)	I	2030-10-18T08:08:56.508		33.02	-2.88x	117571.16	-11.05		
B (IER)	I	2030-10-18T08:49:40.835	b	25.93	6.38x	91984.69	-9.73		
C (IER)	I	2030-10-18T09:22:54.059	b	19.63	14.00x	74490.58	-7.60		
Saturn	I	2030-10-18T08:46:17.666		26.55	5.61x	59921.14		-31.18	-36.47
Saturn	E	2030-10-18T11:13:07.054		-3.28x	39.38x	60168.42		-16.06	-19.45
C (IER)	E	2030-10-18T11:19:35.593		-4.69x	40.87x	74490.58	7.57		
B (IER)	E	2030-10-18T11:53:08.043		-12.07x	48.50x	91984.69	9.60		
B (OER)	E	2030-10-18T12:34:35.671		-21.33x	57.74x	117571.16	10.82		
A (IER)	E	2030-10-18T12:41:27.306		-22.88x	59.24x	122050.38	10.94		
Encke (IEG)	E	2030-10-18T12:58:33.951		-26.75x	62.89x	133423.31	11.20		
Encke (OEG)	E	2030-10-18T12:59:02.656		-26.86x	62.99x	133744.89	11.21		
A (OER)	E	2030-10-18T13:03:32.334		-27.88x	63.92x	136774.40	11.26		
F ring	E	2030-10-18T13:08:58.799		-29.11x	65.04x	140461.00	11.32		

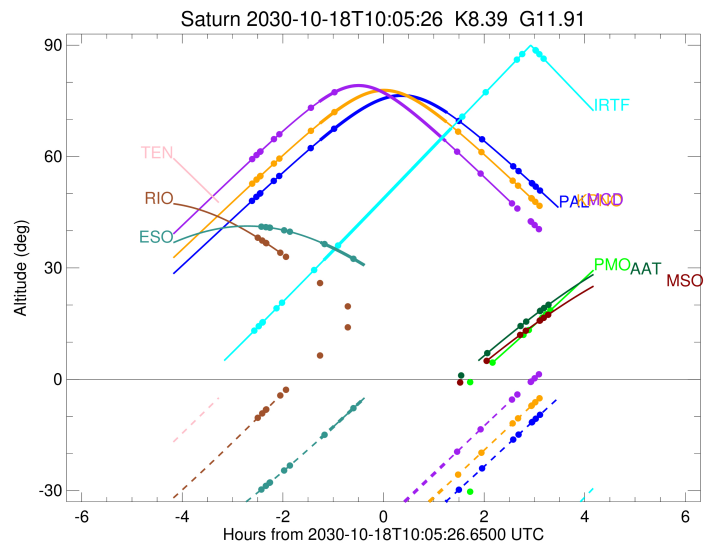
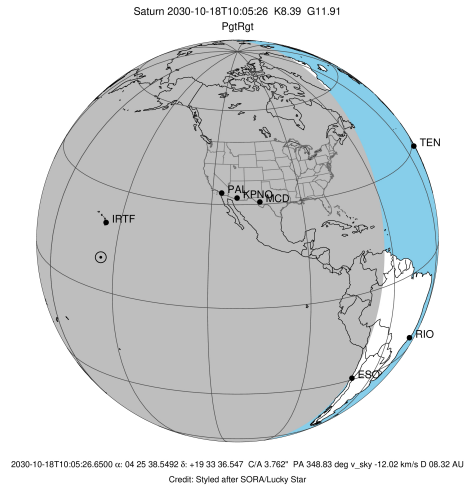
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2030-10-18T10:01:49.540
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 48089752381241856
 2Mass ID (if available) : 04253852+1933367
 ICRS Star Coord at Epoch: 04h 25m 38.54924s +19:33:36.54734s
 RUWE (>1.4 is poor) : 1.54
 K magnitude : 8.395
 G magnitude : 11.909
 RP magnitude : 10.924
 BP magnitude : 12.909
 DUPflag : 0
 Distance (au) : 8.322
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.02
 Sun-Target sep (deg) : 136.77
 Sun-Moon sep (deg) : 33.47
 B (ring opening deg) : -25.38
 PA of pole (deg) : -3.13
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.583
 C/A sky separation (km) : 27658.8
 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	2030-10-18T07:39:39.248		41.11	-29.73	140461.00	-11.51		
A (OER)	I	2030-10-18T07:45:00.570		40.98	-28.74	136774.40	-11.44		
Encke (OEG)	I	2030-10-18T07:49:26.238		40.86	-27.91	133744.89	-11.37		
Encke (IEG)	I	2030-10-18T07:49:54.530		40.84	-27.82	133423.31	-11.36		
A (IER)	I	2030-10-18T08:06:48.295		40.14	-24.60	122050.38	-11.06		
B (OER)	I	2030-10-18T08:13:35.961		39.76	-23.28	117571.16	-10.91		
B (IER)	I	2030-10-18T08:55:02.457	b	36.43	-14.97	91984.69	-9.49		
C (IER)	I	2030-10-18T09:29:38.912	b	32.45	-7.78	74490.58	-7.11		
Saturn	I	2030-10-18T08:50:08.805		36.91	-15.97	59910.66		-31.71	-37.03
Saturn	E	2030-10-18T11:14:11.985		15.86	14.73x	60154.37		-17.19	-20.77
C (IER)	E	2030-10-18T11:17:29.347		15.26	15.45x	74490.58	7.12		
B (IER)	E	2030-10-18T11:52:10.588		8.74	23.03x	91984.69	9.44		
B (OER)	E	2030-10-18T12:33:56.038		0.49x	32.13x	117571.16	10.81		
A (IER)	E	2030-10-18T12:40:47.675		-0.90x	33.62x	122050.38	10.95		
Encke (IEG)	E	2030-10-18T12:57:52.167		-4.39x	37.30x	133423.31	11.24		
Encke (OEG)	E	2030-10-18T12:58:20.775		-4.49x	37.41x	133744.89	11.24		
A (OER)	E	2030-10-18T13:02:49.449		-5.41x	38.37x	136774.40	11.31		
F ring	E	2030-10-18T13:08:14.503		-6.53x	39.53x	140461.00	11.38		

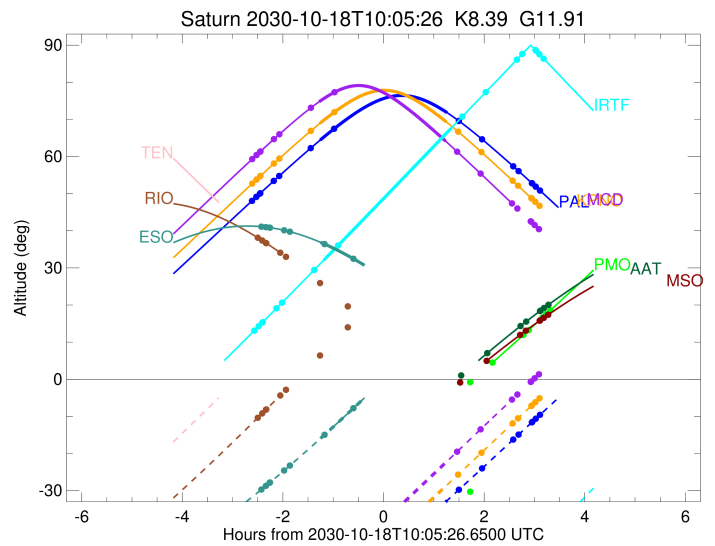
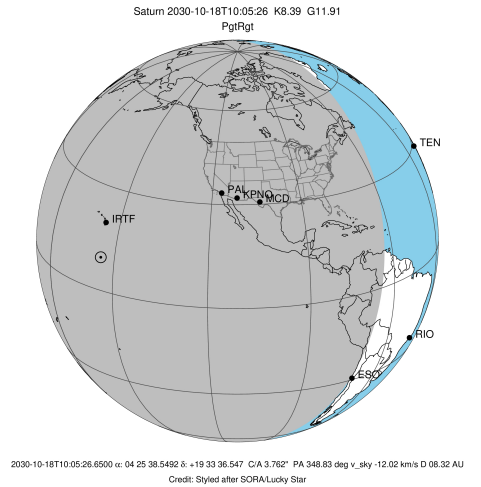
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2030-10-18T10:13:13.170
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 48089752381241856
 2Mass ID (if available) : 04253852+1933367
 ICRS Star Coord at Epoch: 04h 25m 38.54924s +19:33:36.54734s
 RUWE (>1.4 is poor) : 1.54
 K magnitude : 8.395
 G magnitude : 11.909
 RP magnitude : 10.924
 BP magnitude : 12.909
 DUPflag : 0
 Distance (au) : 8.322
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.02
 Sun-Target sep (deg) : 136.77
 Sun-Moon sep (deg) : 34.12
 B (ring opening deg) : -25.38
 PA of pole (deg) : -3.13
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.056
 C/A sky separation (km) : 24477.9
 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_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	2030-10-18T07:36:31.955		-49.61x	7.60x	140461.00	-11.23		
A (OER)	I	2030-10-18T07:42:00.933		-48.44x	6.43x	136774.40	-11.18		
Encke (OEG)	I	2030-10-18T07:46:32.456		-47.47x	5.48x	133744.89	-11.13		
Encke (IEG)	I	2030-10-18T07:47:01.344		-47.37x	5.37x	133423.31	-11.13		
A (IER)	I	2030-10-18T08:04:12.527		-43.68x	1.74x	122050.38	-10.92		
B (OER)	I	2030-10-18T08:11:04.660		-42.21x	0.30x	117571.16	-10.82		
B (IER)	I	2030-10-18T08:52:07.418		-33.40x	-8.22	91984.69	-9.84		
C (IER)	I	2030-10-18T09:24:01.575	b	-26.59x	-14.68	74490.58	-8.27		
Saturn	I	2030-10-18T08:56:26.692		-32.48x	-9.11	59976.63		-28.31	-33.36
Saturn	E	2030-10-18T11:29:23.049		-0.68x	-37.24	60181.41		-14.94	-18.13
C (IER)	E	2030-10-18T11:38:01.139		1.02x	-38.52	74490.58	8.45		
B (IER)	E	2030-10-18T12:09:10.248		7.03	-42.68	91984.69	10.10		
B (OER)	E	2030-10-18T12:48:57.147		14.36	-46.70	117571.16	11.21		
A (IER)	E	2030-10-18T12:55:34.522		15.53	-47.20	122050.38	11.33		
Encke (IEG)	E	2030-10-18T13:12:06.287		18.38	-48.20	133423.31	11.59		
Encke (OEG)	E	2030-10-18T13:12:34.021		18.46	-48.23	133744.89	11.60		
A (OER)	E	2030-10-18T13:16:54.563		19.19	-48.43	136774.40	11.66		
F ring	E	2030-10-18T13:22:09.925		20.06	-48.64	140461.00	11.72		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2030-10-18T10:12:59.470
 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 : 48089752381241856
 2Mass ID (if available) : 04253852+1933367
 ICRS Star Coord at Epoch: 04h 25m 38.54924s +19:33:36.54734s
 RUWE (>1.4 is poor) : 1.54
 K magnitude : 8.395
 G magnitude : 11.909
 RP magnitude : 10.924
 BP magnitude : 12.909
 DUPflag : 0
 Distance (au) : 8.322
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.02
 Sun-Target sep (deg) : 136.77
 Sun-Moon sep (deg) : 34.09
 B (ring opening deg) : -25.38
 PA of pole (deg) : -3.13
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.122
 C/A sky separation (km) : 24878.2
 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_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	2030-10-18T07:37:18.662		-48.92x	7.94x	140461.00	-11.21		
A (OER)	I	2030-10-18T07:42:48.264		-47.81x	6.83x	136774.40	-11.16		
Encke (OEG)	I	2030-10-18T07:47:20.355		-46.89x	5.91x	133744.89	-11.11		
Encke (IEG)	I	2030-10-18T07:47:49.306		-46.79x	5.81x	133423.31	-11.10		
A (IER)	I	2030-10-18T08:05:03.194		-43.29x	2.33x	122050.38	-10.89		
B (OER)	I	2030-10-18T08:11:56.688		-41.88x	0.95x	117571.16	-10.78		
B (IER)	I	2030-10-18T08:53:13.021		-33.42x	-7.22	91984.69	-9.76		
C (IER)	I	2030-10-18T09:25:31.826	b	-26.81x	-13.43	74490.58	-8.11		
Saturn	I	2030-10-18T08:56:31.013		-32.75x	-7.87	59969.30		-28.70	-33.79
Saturn	E	2030-10-18T11:28:54.283		-2.37x	-34.24	60177.42		-15.29	-18.55
C (IER)	E	2030-10-18T11:36:48.712		-0.88x	-35.32	74490.58	8.28		
B (IER)	E	2030-10-18T12:08:23.841		4.95x	-39.21	91984.69	10.01		
B (OER)	E	2030-10-18T12:48:27.240		11.95	-42.88	117571.16	11.15		
A (IER)	E	2030-10-18T12:55:06.558		13.07	-43.34	122050.38	11.28		
Encke (IEG)	E	2030-10-18T13:11:42.588		15.78	-44.25	133423.31	11.55		
Encke (OEG)	E	2030-10-18T13:12:10.431		15.85	-44.27	133744.89	11.55		
A (OER)	E	2030-10-18T13:16:31.976		16.54	-44.45	136774.40	11.61		
F ring	E	2030-10-18T13:21:48.500		17.37	-44.65	140461.00	11.68		