

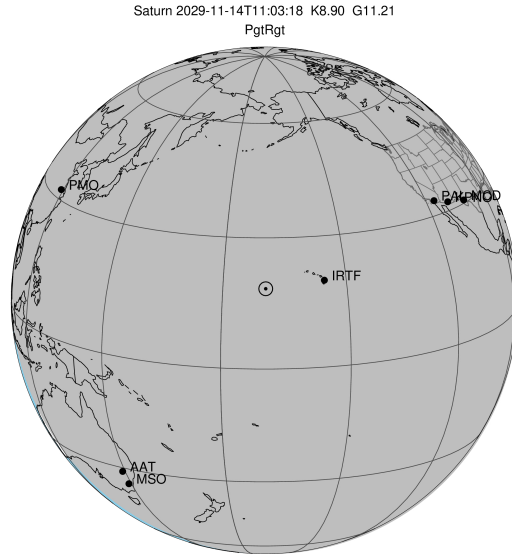
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2029-11-14T11:03:18.540
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 30397755592314752
 2Mass ID (if available) : 03170494+1537359

Saturn 2029-11-14T11:03:18 K8.90 G11.21 PgtRgt

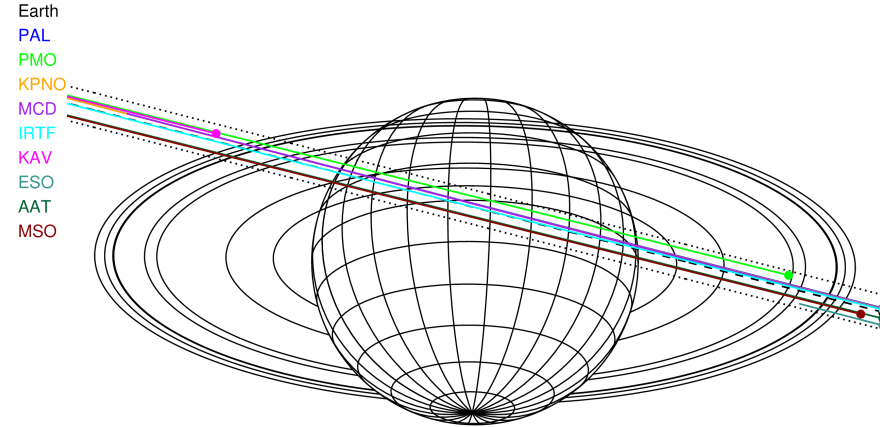
ICRS Star Coord at Epoch: 03h 17m 04.99427s +15:37:35.41042s

RUWE (>1.4 is poor) : 1.05
 K magnitude : 8.898
 G magnitude : 11.211
 RP magnitude : 10.484
 BP magnitude : 11.801
 DUPflag : 0
 Distance (au) : 8.145
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.04
 Sun-Target sep (deg) : 177.36
 Sun-Moon sep (deg) : 72.83
 B (ring opening deg) : -22.05
 PA of pole (deg) : -1.06

#	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

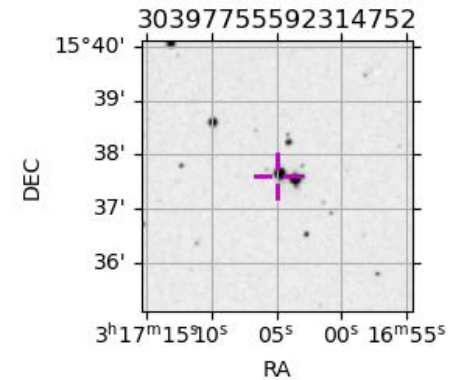


2029-11-14T11:03:18.5400 cc: 03 17 04.9943 s: +15 37 35.410 C/A 3.259° PA 165.62 deg v_sky -20.04 km/s D 08.14 AU
 Credit: Styled after SORA/Lucky Star



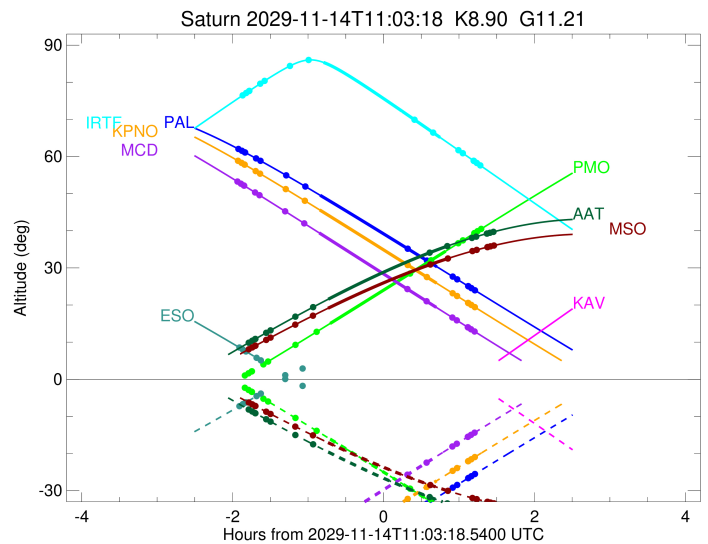
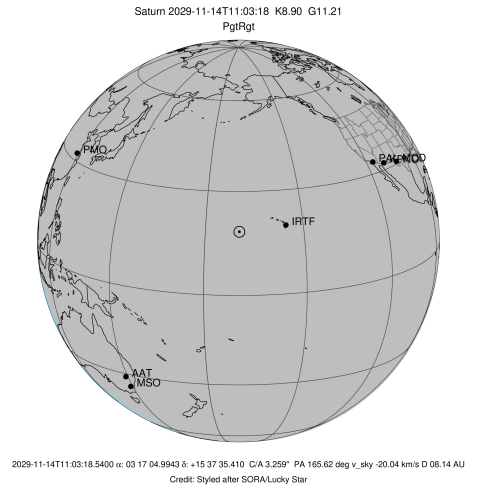
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+	+	+	NOV 14 09:07 - NOV 14 12:16	PieRie
PMO	Purple Mtn Obs	32.1	118.8		+	+	NOV 14 09:53 - NOV 14 12:21	PieRie
KPNO	Kitt Peak Natl	32.0	248.4	+	+	+	NOV 14 09:07 - NOV 14 12:16	PieRie
MCD	McDonald Obs.	30.7	256.0	+	+	+	NOV 14 09:07 - NOV 14 12:15	PieRie
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+	+	+	NOV 14 09:11 - NOV 14 12:20	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	+	+	+	NOV 14 09:08 - NOV 14 09:13	PnnRin
AAT	Siding Spring	-31.3	149.1	+	+	+	NOV 14 09:16 - NOV 14 12:30	PieRie
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0	+	+	+	NOV 14 09:16 - NOV 14 12:31	PieRie



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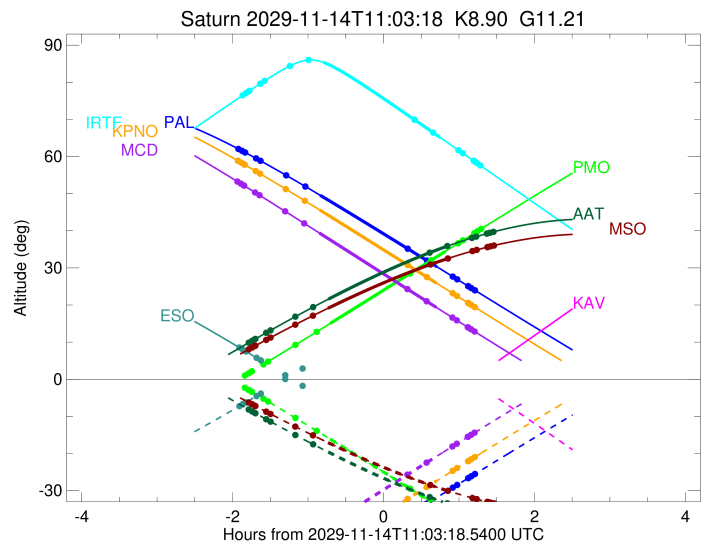
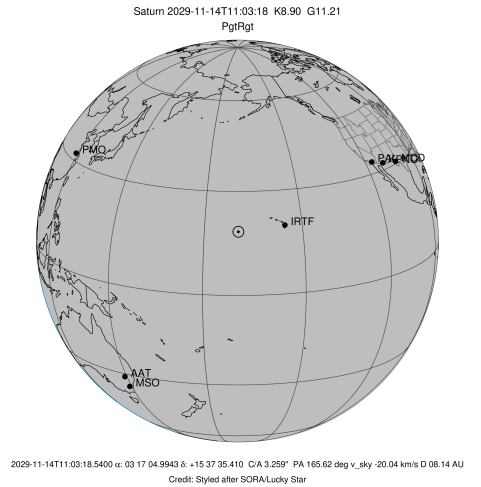
target                : Saturn
target radius (km)   : 60268.00
C/A epoch            : 2029-11-14T10:59:23.510
Event type           : PgtRgt
: Saturn occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : PAL
Location             : Palomar Mt (200")
Latitude (deg)       : 33.35622
E. Longitude (deg)   : 243.13601
Altitude (km)        : 1.706
Gaia source ID       : 30397755592314752
2Mass ID (if available) : 03170494+1537359
ICRS Star Coord at Epoch: 03h 17m 04.99427s +15:37:35.41042s
RUWE (>1.4 is poor) : 1.05
K magnitude          : 8.898
G magnitude          : 11.211
RP magnitude         : 10.484
BP magnitude         : 11.801
DUPflag             : 0
Distance (au)        : 8.145
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -20.04
Sun-Target sep (deg) : 177.36
Sun-Moon sep (deg)   : 73.58
B (ring opening deg) : -22.05
PA of pole (deg)     : -1.06
Pole direction: RA (deg): 40.60000
Dec (deg): 83.50000
C/A sky separation (") : 3.490
C/A sky separation (km) : 20615.2
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
  
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b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

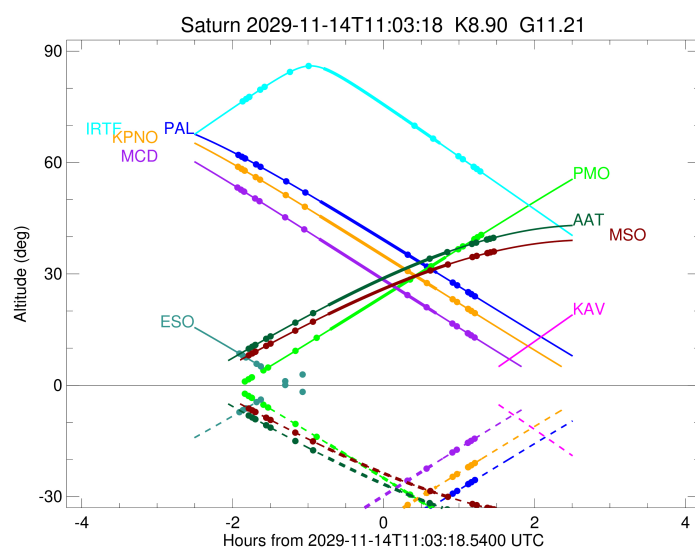
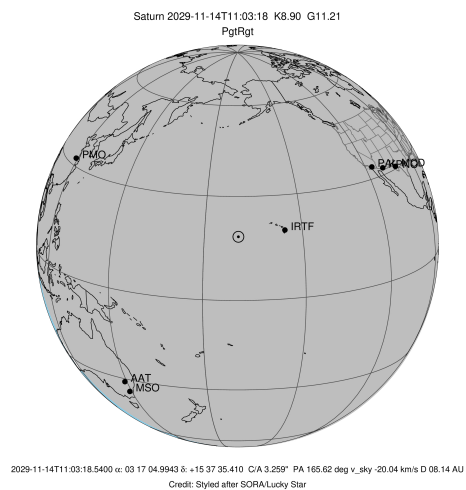
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2029-11-14T09:07:57.212		62.04	-63.88	140461.00	-22.04		
A (OER)	I	2029-11-14T09:10:44.740		61.55	-63.37	136774.40	-21.97		
Encke (OEG)	I	2029-11-14T09:13:02.876		61.13	-62.94	133744.89	-21.90		
Encke (IEG)	I	2029-11-14T09:13:17.565		61.09	-62.90	133423.31	-21.89		
A (IER)	I	2029-11-14T09:22:00.761		59.50	-61.25	122050.38	-21.57		
B (OER)	I	2029-11-14T09:25:29.118		58.85	-60.59	117571.16	-21.42		
B (IER)	I	2029-11-14T09:45:58.574		54.93	-56.58	91984.69	-20.03		
C (IER)	I	2029-11-14T10:01:13.690		51.92	-53.51	74490.58	-17.99		
Saturn	I	2029-11-14T10:12:58.193		49.56	-51.12	60257.11		6.17	7.57
Saturn	E	2029-11-14T11:45:44.377		30.31	-31.84	60022.58		30.79	36.05
C (IER)	E	2029-11-14T11:22:33.988	b	35.17	-36.68	74490.58	17.85		
B (IER)	E	2029-11-14T11:37:54.427	b	31.95	-33.47	91984.69	19.94		
B (OER)	E	2029-11-14T11:58:29.515		27.63	-29.17	117571.16	21.32		
A (IER)	E	2029-11-14T12:01:58.845		26.90	-28.45	122050.38	21.47		
Encke (IEG)	E	2029-11-14T12:10:44.577		25.07	-26.62	133423.31	21.78		
Encke (OEG)	E	2029-11-14T12:10:59.339		25.01	-26.57	133744.89	21.79		
A (OER)	E	2029-11-14T12:13:18.171		24.53	-26.09	136774.40	21.85		
F ring	E	2029-11-14T12:16:06.560		23.94	-25.50	140461.00	21.93		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2029-11-14T11:06:58.620
 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 : 30397755592314752
 2Mass ID (if available) : 03170494+1537359
 ICRS Star Coord at Epoch: 03h 17m 04.99427s +15:37:35.41042s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 8.898
 G magnitude : 11.211
 RP magnitude : 10.484
 BP magnitude : 11.801
 DUPflag : 0
 Distance (au) : 8.145
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.04
 Sun-Target sep (deg) : 177.36
 Sun-Moon sep (deg) : 72.99
 B (ring opening deg) : -22.05
 PA of pole (deg) : -1.06
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.923
 C/A sky separation (km) : 23172.9
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2029-11-14T09:13:05.750		1.02x	-2.29x	140461.00	-21.08		
A (OER)	I	2029-11-14T09:16:01.002		1.61x	-2.87x	136774.40	-20.99		
Encke (OEG)	I	2029-11-14T09:18:25.648		2.10x	-3.35x	133744.89	-20.90		
Encke (IEG)	I	2029-11-14T09:18:41.037		2.15x	-3.40x	133423.31	-20.89		
A (IER)	I	2029-11-14T09:27:50.344		4.02x	-5.24	122050.38	-20.50		
B (OER)	I	2029-11-14T09:31:29.854		4.77x	-5.98	117571.16	-20.31		
B (IER)	I	2029-11-14T09:53:19.976		9.27	-10.42	91984.69	-18.53		
C (IER)	I	2029-11-14T10:10:11.301		12.78	-13.89	74490.58	-15.77		
Saturn	I	2029-11-14T10:20:53.125		15.03	-16.11	60245.26		8.94	10.94
Saturn	E	2029-11-14T11:52:40.460		34.49	-35.45	59994.57		32.72	38.10
C (IER)	E	2029-11-14T11:24:24.525	b	28.48	-29.45	74490.58	15.75		
B (IER)	E	2029-11-14T11:41:14.026	b	32.06	-33.02	91984.69	18.62		
B (OER)	E	2029-11-14T12:02:54.436		36.67	-37.62	117571.17	20.50		
A (IER)	E	2029-11-14T12:06:31.791		37.44	-38.39	122050.38	20.71		
Encke (IEG)	E	2029-11-14T12:15:35.160		39.36	-40.31	133423.31	21.13		
Encke (OEG)	E	2029-11-14T12:15:50.373		39.41	-40.36	133744.89	21.14		
A (OER)	E	2029-11-14T12:18:13.326		39.92	-40.87	136774.40	21.24		
F ring	E	2029-11-14T12:21:06.463		40.53	-41.48	140461.00	21.35		

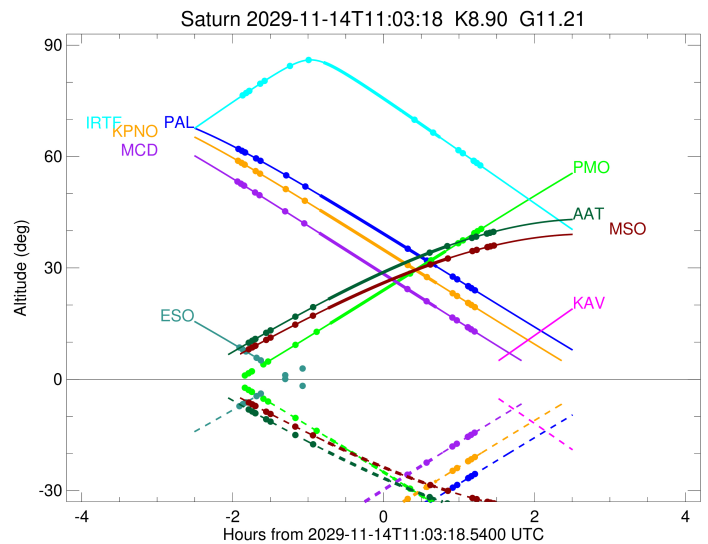
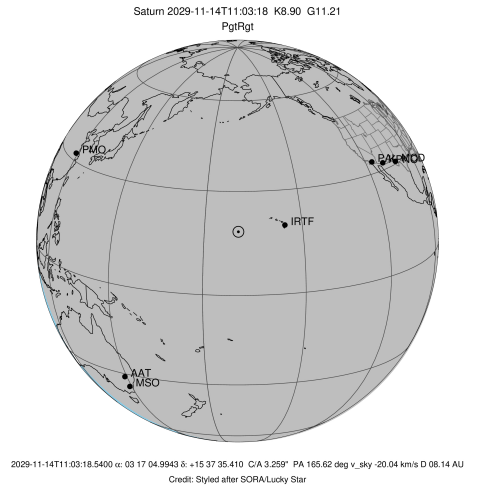
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2029-11-14T10:59:06.320
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 30397755592314752
 2Mass ID (if available) : 03170494+1537359
 ICRS Star Coord at Epoch: 03h 17m 04.99427s +15:37:35.41042s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 8.898
 G magnitude : 11.211
 RP magnitude : 10.484
 BP magnitude : 11.801
 DUPflag : 0
 Distance (au) : 8.145
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.04
 Sun-Target sep (deg) : 177.36
 Sun-Moon sep (deg) : 73.54
 B (ring opening deg) : -22.05
 PA of pole (deg) : -1.06
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.470
 C/A sky separation (km) : 20500.0
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



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

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2029-11-14T09:07:38.490		58.85	-60.47	140461.00	-22.07		
A (OER)	I	2029-11-14T09:10:25.842		58.31	-59.91	136774.40	-21.99		
Encke (OEG)	I	2029-11-14T09:12:43.829		57.86	-59.45	133744.89	-21.92		
Encke (IEG)	I	2029-11-14T09:12:58.502		57.81	-59.40	133423.31	-21.91		
A (IER)	I	2029-11-14T09:21:41.086		56.08	-57.64	122050.38	-21.60		
B (OER)	I	2029-11-14T09:25:09.173		55.39	-56.93	117571.16	-21.45		
B (IER)	I	2029-11-14T09:45:36.514		51.23	-52.71	91984.69	-20.08		
C (IER)	I	2029-11-14T10:00:48.815		48.08	-49.53	74490.58	-18.06		
Saturn	I	2029-11-14T10:12:36.170		45.61	-47.05	60257.61		6.03	7.39
Saturn	E	2029-11-14T11:45:32.843		25.88	-27.35	60023.63		30.72	35.97
C (IER)	E	2029-11-14T11:22:32.140	b	30.78	-32.23	74490.58	17.92		
B (IER)	E	2029-11-14T11:37:50.254	b	27.52	-28.98	91984.69	19.97		
B (OER)	E	2029-11-14T11:58:24.201		23.15	-24.64	117571.16	21.33		
A (IER)	E	2029-11-14T12:01:53.458		22.41	-23.91	122050.38	21.48		
Encke (IEG)	E	2029-11-14T12:10:39.108		20.55	-22.06	133423.31	21.78		
Encke (OEG)	E	2029-11-14T12:10:53.870		20.50	-22.01	133744.89	21.79		
A (OER)	E	2029-11-14T12:13:12.703		20.01	-21.53	136774.40	21.85		
F ring	E	2029-11-14T12:16:01.102		19.41	-20.94	140461.00	21.93		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2029-11-14T10:58:45.070
 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 : 30397755592314752
 2Mass ID (if available) : 03170494+1537359
 ICRS Star Coord at Epoch: 03h 17m 04.99427s +15:37:35.41042s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 8.898
 G magnitude : 11.211
 RP magnitude : 10.484
 BP magnitude : 11.801
 DUPflag : 0
 Distance (au) : 8.145
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.04
 Sun-Target sep (deg) : 177.36
 Sun-Moon sep (deg) : 73.47
 B (ring opening deg) : -22.05
 PA of pole (deg) : -1.06
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.460
 C/A sky separation (km) : 20439.4
 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

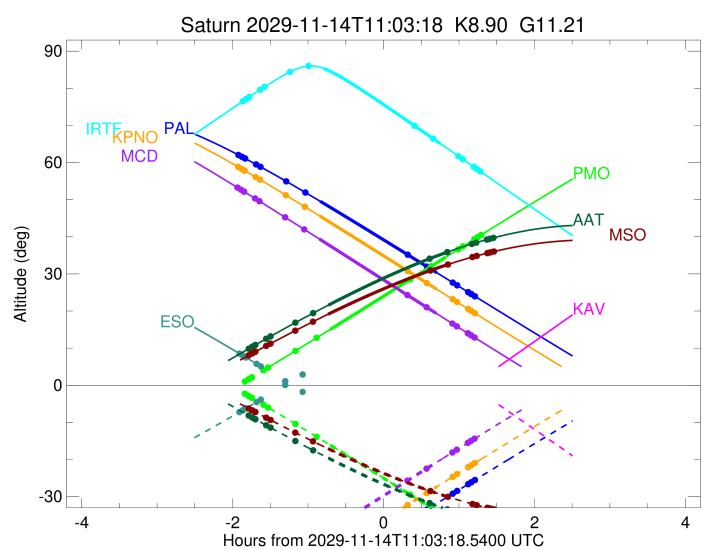
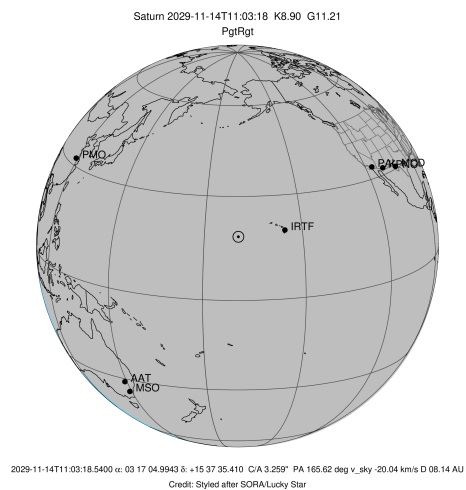


b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2029-11-14T09:07:11.025		53.26	-54.67	140461.00	-22.08		
A (OER)	I	2029-11-14T09:09:58.302		52.68	-54.08	136774.40	-22.00		
Encke (OEG)	I	2029-11-14T09:12:16.226		52.20	-53.59	133744.89	-21.93		
Encke (IEG)	I	2029-11-14T09:12:30.892		52.15	-53.54	133423.31	-21.92		
A (IER)	I	2029-11-14T09:21:13.223		50.32	-51.69	122050.38	-21.61		
B (OER)	I	2029-11-14T09:24:41.201		49.59	-50.95	117571.17	-21.46		
B (IER)	I	2029-11-14T09:45:07.650		45.24	-46.58	91984.69	-20.10		
C (IER)	I	2029-11-14T10:00:18.615		41.99	-43.32	74490.58	-18.10		
Saturn	I	2029-11-14T10:12:08.863		39.44	-40.78	60257.96		5.92	7.27
Saturn	E	2029-11-14T11:45:18.578		19.36	-20.81	60023.76		30.71	35.96
C (IER)	E	2029-11-14T11:22:19.304	b	24.30	-25.70	74490.58	17.95		
B (IER)	E	2029-11-14T11:37:36.800	b	21.01	-22.44	91984.69	19.97		
B (OER)	E	2029-11-14T11:58:11.205		16.60	-18.08	117571.17	21.32		
A (IER)	E	2029-11-14T12:01:40.622		15.86	-17.34	122050.38	21.46		
Encke (IEG)	E	2029-11-14T12:10:26.749		13.99	-15.50	133423.31	21.76		
Encke (OEG)	E	2029-11-14T12:10:41.526		13.94	-15.44	133744.89	21.77		
A (OER)	E	2029-11-14T12:13:00.501		13.44	-14.96	136774.40	21.83		
F ring	E	2029-11-14T12:15:49.081		12.85	-14.37	140461.00	21.90		

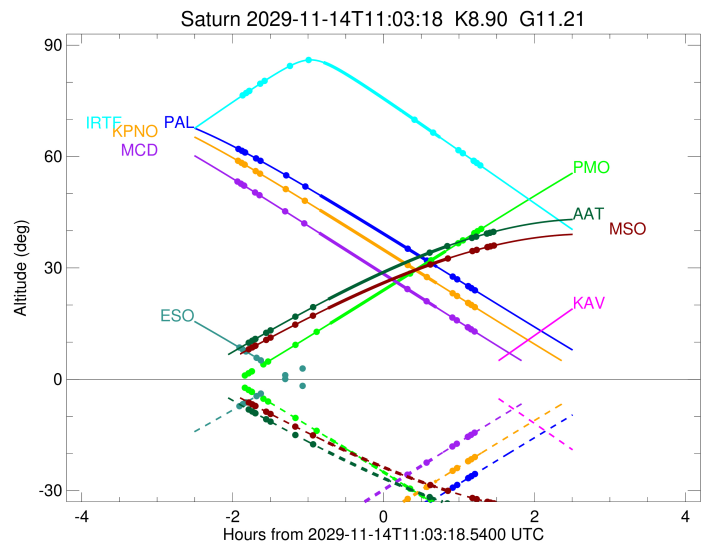
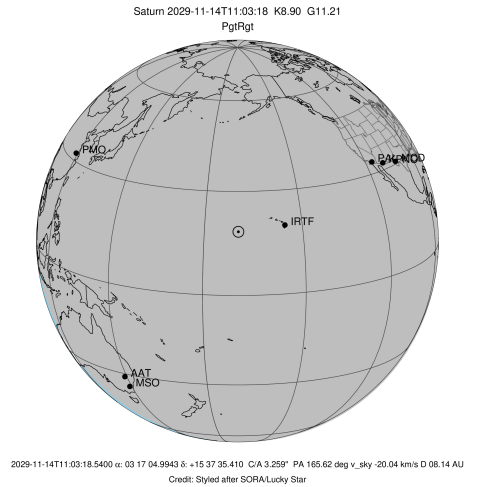
```

target                : Saturn
target radius (km)   : 60268.00
C/A epoch            : 2029-11-14T11:02:04.890
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      : 30397755592314752
2Mass ID (if available) : 03170494+1537359
ICRS Star Coord at Epoch: 03h 17m 04.99427s +15:37:35.41042s
RUWE (>1.4 is poor) : 1.05
K magnitude          : 8.898
G magnitude          : 11.211
RP magnitude         : 10.484
BP magnitude         : 11.801
DUPflag             : 0
Distance (au)       : 8.145
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -20.04
Sun-Target sep (deg) : 177.36
Sun-Moon sep (deg)  : 73.75
B (ring opening deg) : -22.05
PA of pole (deg)    : -1.06
Pole direction: RA (deg): 40.60000
Dec (deg): 83.50000
C/A sky separation (") : 3.279
C/A sky separation (km) : 19371.8
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
    
```



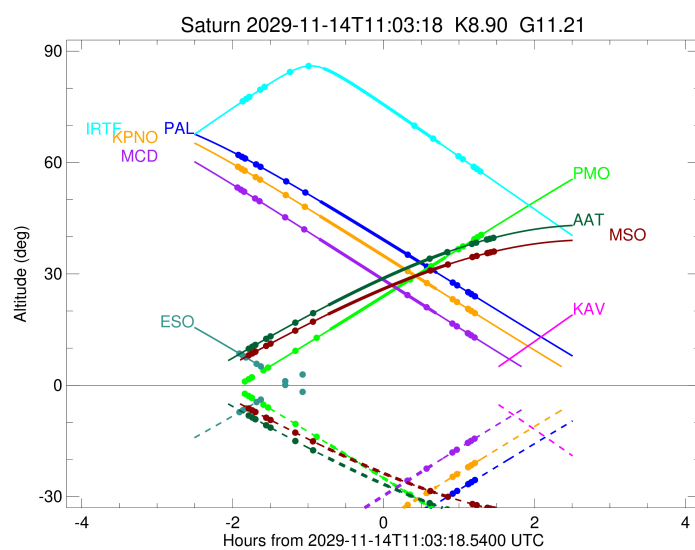
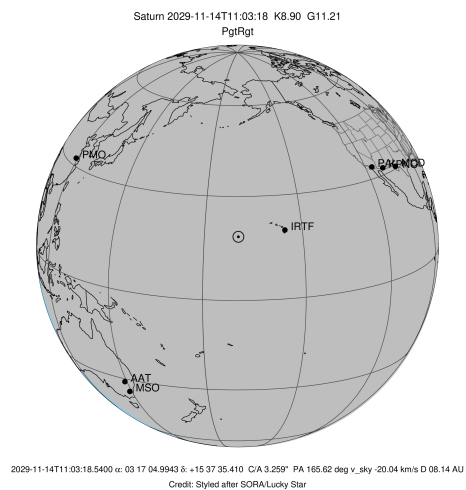
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2029-11-14T09:11:19.784		76.48	-76.93	140461.00	-22.15		
A (OER)	I	2029-11-14T09:14:06.441		77.11	-77.58	136774.40	-22.09		
Encke (OEG)	I	2029-11-14T09:16:23.786		77.63	-78.12	133744.89	-22.03		
Encke (IEG)	I	2029-11-14T09:16:38.387		77.69	-78.18	133423.31	-22.02		
A (IER)	I	2029-11-14T09:25:17.880		79.62	-80.20	122050.38	-21.75		
B (OER)	I	2029-11-14T09:28:44.418		80.38	-81.01	117571.17	-21.62		
B (IER)	I	2029-11-14T09:48:57.281		84.41	-85.67	91984.69	-20.42		
C (IER)	I	2029-11-14T10:03:48.280		86.01	-88.52	74490.58	-18.66		
Saturn	I	2029-11-14T10:15:37.710		85.35	-87.42	60260.07		5.26	6.46
Saturn	E	2029-11-14T11:48:22.917		65.13	-65.88	60042.15		29.40	34.55
C (IER)	E	2029-11-14T11:27:58.209	b	69.91	-70.68	74490.58	18.61		
B (IER)	E	2029-11-14T11:42:49.894	b	66.43	-67.18	91984.69	20.44		
B (OER)	E	2029-11-14T12:03:00.750		61.68	-62.44	117571.16	21.67		
A (IER)	E	2029-11-14T12:06:26.766		60.87	-61.63	122050.38	21.81		
Encke (IEG)	E	2029-11-14T12:15:04.775		58.84	-59.60	133423.31	22.09		
Encke (OEG)	E	2029-11-14T12:15:19.331		58.78	-59.54	133744.89	22.10		
A (OER)	E	2029-11-14T12:17:36.245		58.24	-59.01	136774.40	22.16		
F ring	E	2029-11-14T12:20:22.358		57.59	-58.36	140461.00	22.23		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2029-11-14T10:59:21.360
 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 : 30397755592314752
 2Mass ID (if available) : 03170494+1537359
 ICRS Star Coord at Epoch: 03h 17m 04.99427s +15:37:35.41042s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 8.898
 G magnitude : 11.211
 RP magnitude : 10.484
 BP magnitude : 11.801
 DUPflag : 0
 Distance (au) : 8.145
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.04
 Sun-Target sep (deg) : 177.36
 Sun-Moon sep (deg) : 72.81
 B (ring opening deg) : -22.05
 PA of pole (deg) : -1.06
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.577
 C/A sky separation (km) : 15219.7
 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



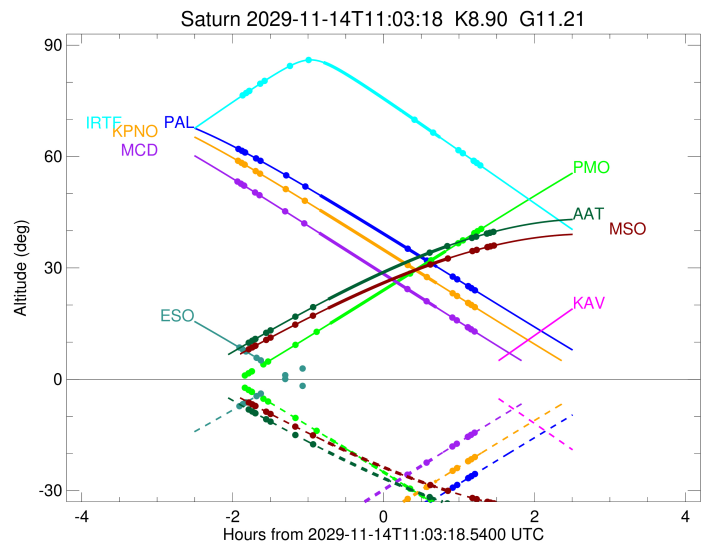
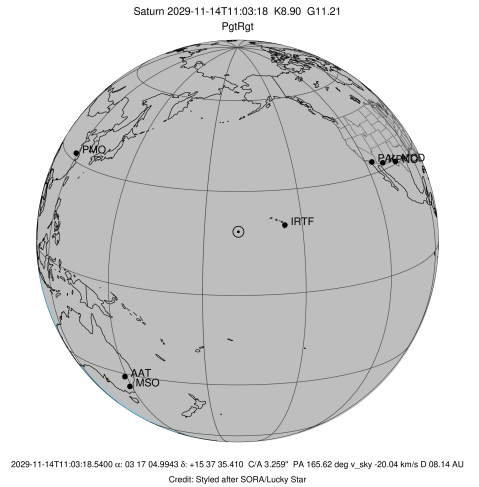
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2029-11-14T09:08:44.808		8.55	-7.24	140461.00	-22.60		
A (OER)	I	2029-11-14T09:11:28.101		8.00	-6.71	136774.40	-22.55		
Encke (OEG)	I	2029-11-14T09:13:42.537		7.55	-6.26	133744.89	-22.52		
Encke (IEG)	I	2029-11-14T09:13:56.821		7.50	-6.22	133423.31	-22.51		
A (IER)	I	2029-11-14T09:22:23.911		5.78	-4.54x	122050.38	-22.34		
B (OER)	I	2029-11-14T09:25:44.801		5.10	-3.87x	117571.16	-22.26		
B (IER)	I	2029-11-14T09:45:11.225		1.10x	0.07x	91984.69	-21.53		
C (IER)	I	2029-11-14T09:59:01.034		-1.79x	2.90x	74490.58	-20.53		
Saturn	I	2029-11-14T10:10:54.300		-4.29x	5.36x	60267.76		0.92	1.12
Saturn	E	2029-11-14T11:47:51.219		-25.17x	26.00x	60086.02		26.13	30.97
C (IER)	E	2029-11-14T11:33:23.002	b	-22.01x	22.87x	74490.58	20.35		
B (IER)	E	2029-11-14T11:47:20.126	b	-25.05x	25.89x	91984.69	21.34		
B (OER)	E	2029-11-14T12:06:58.342		-29.35x	30.15x	117571.17	22.01		
A (IER)	E	2029-11-14T12:10:21.511		-30.09x	30.89x	122050.38	22.08		
Encke (IEG)	E	2029-11-14T12:18:54.709		-31.96x	32.75x	133423.31	22.23		
Encke (OEG)	E	2029-11-14T12:19:09.173		-32.01x	32.80x	133744.89	22.24		
A (OER)	E	2029-11-14T12:21:25.318		-32.51x	33.30x	136774.40	22.27		
F ring	E	2029-11-14T12:24:10.734		-33.11x	33.90x	140461.00	22.30		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2029-11-14T11:07:06.580
 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 : 30397755592314752
 2Mass ID (if available) : 03170494+1537359
 ICRS Star Coord at Epoch: 03h 17m 04.99427s +15:37:35.41042s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 8.898
 G magnitude : 11.211
 RP magnitude : 10.484
 BP magnitude : 11.801
 DUPflag : 0
 Distance (au) : 8.145
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.04
 Sun-Target sep (deg) : 177.36
 Sun-Moon sep (deg) : 73.08
 B (ring opening deg) : -22.05
 PA of pole (deg) : -1.06
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.700
 C/A sky separation (km) : 15950.8
 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	2029-11-14T09:16:09.531		9.84	-8.15	140461.00	-22.22		
A (OER)	I	2029-11-14T09:18:55.634		10.38	-8.68	136774.40	-22.17		
Encke (OEG)	I	2029-11-14T09:21:12.375		10.82	-9.11	133744.89	-22.14		
Encke (IEG)	I	2029-11-14T09:21:26.904		10.87	-9.16	133423.31	-22.13		
A (IER)	I	2029-11-14T09:30:02.652		12.52	-10.77	122050.38	-21.96		
B (OER)	I	2029-11-14T09:33:26.979		13.16	-11.40	117571.16	-21.88		
B (IER)	I	2029-11-14T09:53:14.348		16.87	-15.02	91984.69	-21.12		
C (IER)	I	2029-11-14T10:07:22.287		19.44	-17.52	74490.58	-20.02		
Saturn	I	2029-11-14T10:19:22.762		21.57	-19.60	60266.55		2.25	2.76
Saturn	E	2029-11-14T11:54:33.344		35.93	-33.50	60086.46		26.10	30.93
C (IER)	E	2029-11-14T11:40:01.755	b	34.10	-31.74	74490.58	20.09		
B (IER)	E	2029-11-14T11:54:05.231	b	35.88	-33.44	91984.69	21.26		
B (OER)	E	2029-11-14T12:13:42.699		38.08	-35.57	117571.16	22.10		
A (IER)	E	2029-11-14T12:17:04.982		38.43	-35.90	122050.38	22.19		
Encke (IEG)	E	2029-11-14T12:25:35.166		39.25	-36.69	133423.31	22.39		
Encke (OEG)	E	2029-11-14T12:25:49.529		39.27	-36.71	133744.89	22.39		
A (OER)	E	2029-11-14T12:28:04.696		39.48	-36.91	136774.40	22.43		
F ring	E	2029-11-14T12:30:48.835		39.72	-37.14	140461.00	22.48		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2029-11-14T11:07:02.590
 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 : 30397755592314752
 2Mass ID (if available) : 03170494+1537359
 ICRS Star Coord at Epoch: 03h 17m 04.99427s +15:37:35.41042s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 8.898
 G magnitude : 11.211
 RP magnitude : 10.484
 BP magnitude : 11.801
 DUPflag : 0
 Distance (au) : 8.145
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.04
 Sun-Target sep (deg) : 177.36
 Sun-Moon sep (deg) : 73.05
 B (ring opening deg) : -22.05
 PA of pole (deg) : -1.06
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.643
 C/A sky separation (km) : 15614.4
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2029-11-14T09:16:11.321		8.07	-6.26	140461.00	-22.25		
A (OER)	I	2029-11-14T09:18:57.148		8.58	-6.76	136774.40	-22.21		
Encke (OEG)	I	2029-11-14T09:21:13.650		9.00	-7.16	133744.89	-22.18		
Encke (IEG)	I	2029-11-14T09:21:28.153		9.04	-7.21	133423.31	-22.17		
A (IER)	I	2029-11-14T09:30:02.892		10.60	-8.74	122050.38	-22.01		
B (OER)	I	2029-11-14T09:33:26.763		11.22	-9.34	117571.17	-21.93		
B (IER)	I	2029-11-14T09:53:10.518		14.71	-12.76	91984.69	-21.21		
C (IER)	I	2029-11-14T10:07:14.019		17.13	-15.11	74490.58	-20.16		
Saturn	I	2029-11-14T10:19:12.597		19.13	-17.06	60266.94		1.93	2.37
Saturn	E	2029-11-14T11:54:36.016		32.54	-30.06	60090.15		25.81	30.61
C (IER)	E	2029-11-14T11:40:34.151	b	30.92	-28.50	74490.58	20.23		
B (IER)	E	2029-11-14T11:54:33.384	b	32.54	-30.06	91984.69	21.34		
B (OER)	E	2029-11-14T12:14:07.697		34.55	-32.00	117571.16	22.14		
A (IER)	E	2029-11-14T12:17:29.619		34.86	-32.30	122050.38	22.23		
Encke (IEG)	E	2029-11-14T12:25:59.051		35.61	-33.02	133423.31	22.41		
Encke (OEG)	E	2029-11-14T12:26:13.396		35.63	-33.04	133744.89	22.42		
A (OER)	E	2029-11-14T12:28:28.398		35.81	-33.22	136774.40	22.46		
F ring	E	2029-11-14T12:31:12.352		36.03	-33.44	140461.00	22.51		