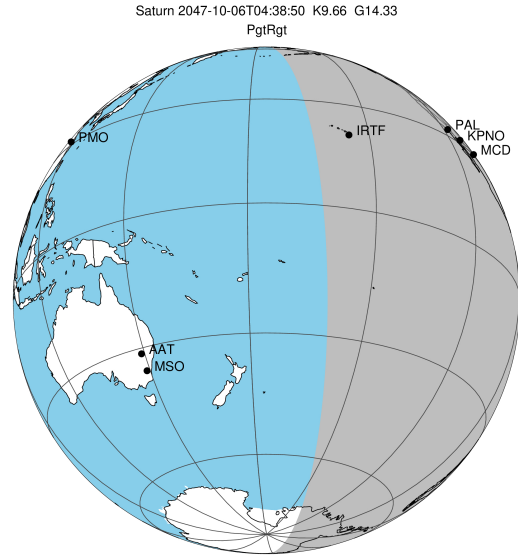


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-10-06T04:38:50.130
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4070223309734818560
 2Mass ID (if available) : 17523014-2236222

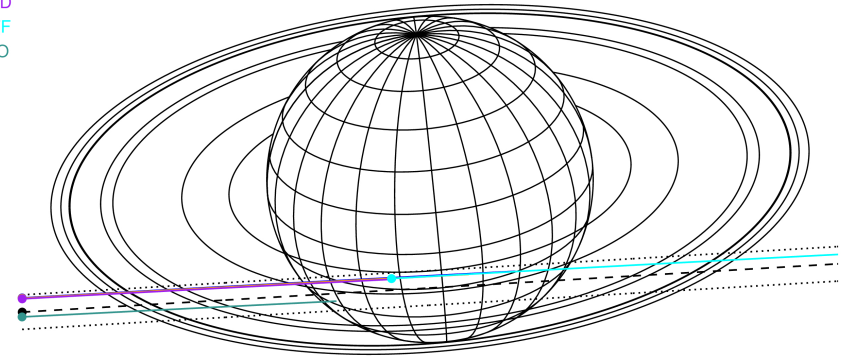
Saturn 2047-10-06T04:38:50 K9.66 G14.33 PgtRgt

ICRS Star Coord at Epoch: 17h 52m 30.15059s -22:36:22.15255s

RUWE (>1.4 is poor) : 0.93
 K magnitude : 9.657
 G magnitude : 14.331
 RP magnitude : 13.138
 BP magnitude : 15.889
 DUPflag : 0
 Distance (au) : 10.239
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 16.75
 Sun-Target sep (deg) : 76.07
 Sun-Moon sep (deg) : 128.05
 B (ring opening deg) : 26.90
 PA of pole (deg) : 5.38



Earth
 PAL
 KPNO
 MCD
 IRTF
 ESO

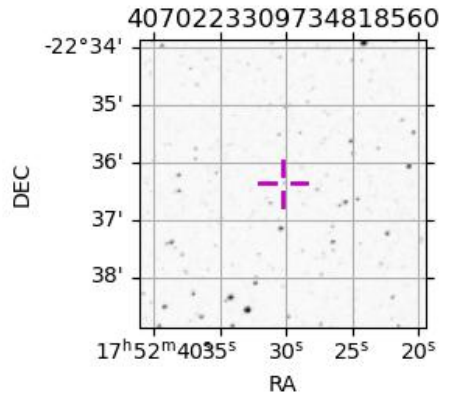


2047-10-06T04:38:50.1300 α: 17 52 30.1506 δ: -22 36 22.153 C/A 5.383° PA 3.39 deg v_sky +16.75 km/s D 10.24 AU
 Credit: Styled after SORA/Lucky Star

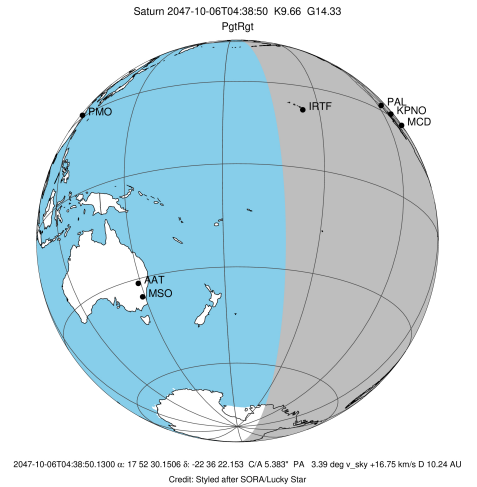
#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring

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

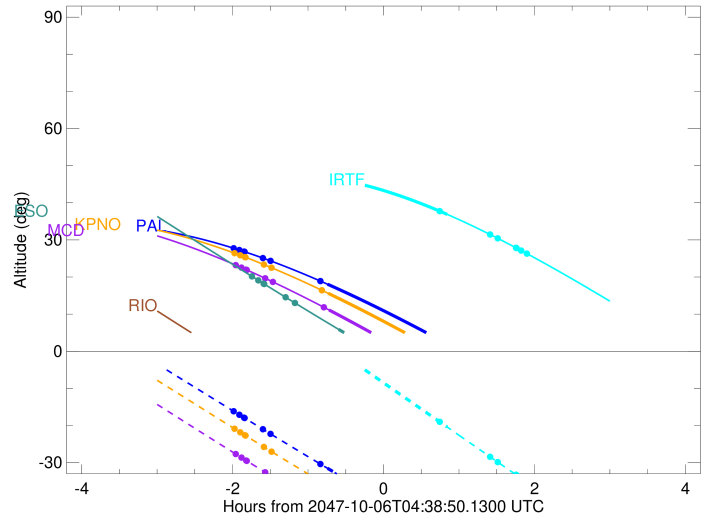
Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEncode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1	+ + + + + + +	+		OCT 06 02:39 - OCT 06 03:54	PinRin
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4	+ + + + + + +	+		OCT 06 02:40 - OCT 06 03:54	PinRin
MCD	McDonald Obs.	30.7	256.0	+ + + + + + +	+		OCT 06 02:41 - OCT 06 03:55	PinRin
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5		+	+ + + + + + +	OCT 06 05:29 - OCT 06 06:32	PneRne
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3	+ + + + + + +	+		OCT 06 02:54 - OCT 06 04:03	PinRin
AAT	Siding Spring	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0					PnnRnn



target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-10-06T04:42:56.150
 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 : 4070223309734818560
 2Mass ID (if available) : 17523014-2236222
 ICRS Star Coord at Epoch: 17h 52m 30.15059s -22:36:22.15255s
 RUWE (>1.4 is poor) : 0.93
 K magnitude : 9.657
 G magnitude : 14.331
 RP magnitude : 13.138
 BP magnitude : 15.889
 DUPflag : 0
 Distance (au) : 10.239
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 16.75
 Sun-Target sep (deg) : 76.07
 Sun-Moon sep (deg) : 128.62
 B (ring opening deg) : 26.90
 PA of pole (deg) : 5.38
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.779
 C/A sky separation (km) : 35489.0
 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



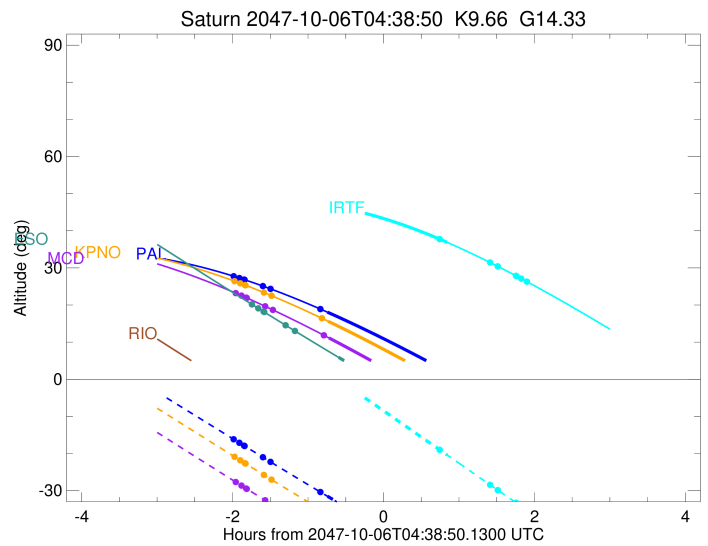
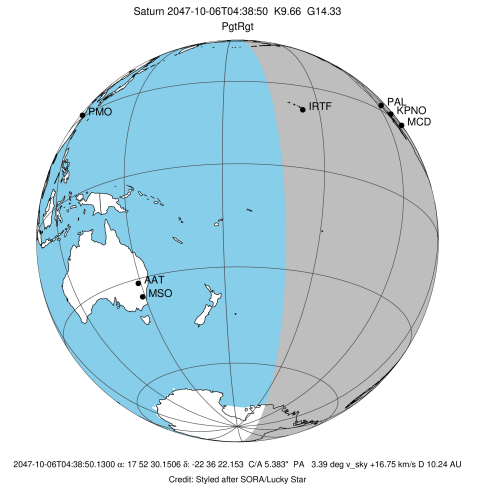
Saturn 2047-10-06T04:38:50 K9.66 G14.33



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-10-06T02:39:37.346		27.76	-16.15	140461.00	-13.67		
A (OER)	I	2047-10-06T02:44:08.608		27.28	-17.09	136774.40	-13.51		
Encke (OEG)	I	2047-10-06T02:47:54.120		26.86	-17.87	133744.89	-13.36		
Encke (IEG)	I	2047-10-06T02:48:18.206		26.82	-17.96	133423.31	-13.34		
A (IER)	I	2047-10-06T03:02:52.030		25.11	-20.99	122050.38	-12.66		
B (OER)	I	2047-10-06T03:08:50.709		24.37	-22.23	117571.16	-12.31		
B (IER)	I	2047-10-06T03:48:35.331		18.92	-30.37	91984.69	-8.69		
Saturn	I	2047-10-06T03:54:14.539		18.08	-31.51	59898.36		-29.92	-35.11
Saturn	E	2047-10-06T05:31:15.720		1.66x	-49.70	59804.98		-33.98	-39.43
B (IER)	E	2047-10-06T05:25:29.743	b	2.72x	-48.73	91984.69	8.76		
B (OER)	E	2047-10-06T06:04:43.256		-4.63x	-54.86	117571.16	12.53		
A (IER)	E	2047-10-06T06:10:35.515		-5.75x	-55.66	122050.38	12.89		
Encke (IEG)	E	2047-10-06T06:24:51.979		-8.52x	-57.46	133423.31	13.63		
Encke (OEG)	E	2047-10-06T06:25:15.553		-8.60x	-57.51	133744.89	13.65		
A (OER)	E	2047-10-06T06:28:56.183		-9.32x	-57.93	136774.40	13.81		
F ring	E	2047-10-06T06:33:21.368		-10.19x	-58.42	140461.00	13.99		

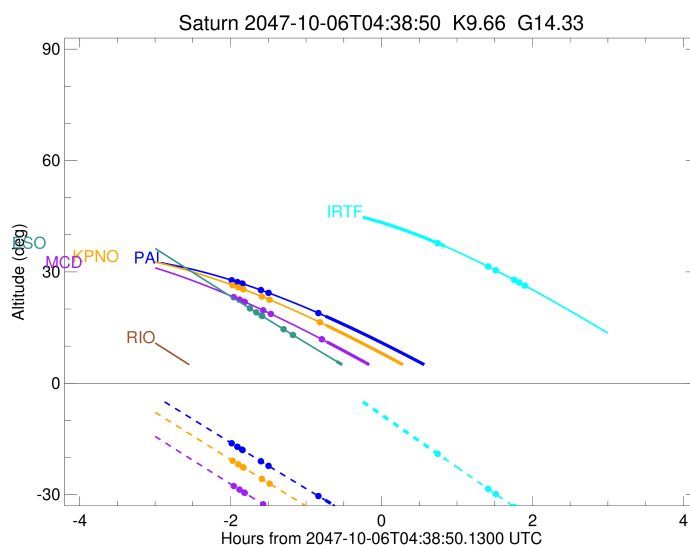
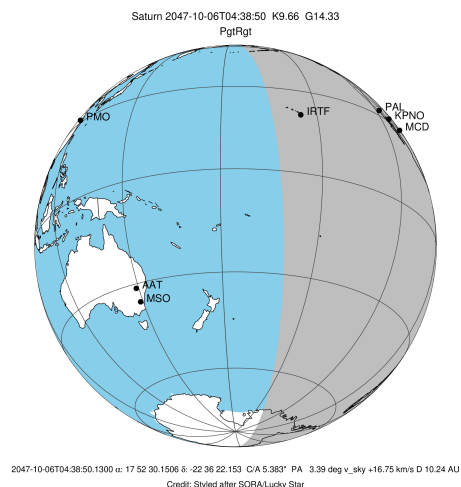
```

target                : Saturn
target radius (km)   : 60268.00
C/A epoch            : 2047-10-06T04:43:13.850
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       : 4070223309734818560
2Mass ID (if available) : 17523014-2236222
ICRS Star Coord at Epoch: 17h 52m 30.15059s -22:36:22.15255s
RUWE (>1.4 is poor) : 0.93
K magnitude          : 9.657
G magnitude           : 14.331
RP magnitude         : 13.138
BP magnitude         : 15.889
DUPflag             : 0
Distance (au)        : 10.239
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : 16.75
Sun-Target sep (deg) : 76.07
Sun-Moon sep (deg)   : 128.61
B (ring opening deg) : 26.90
PA of pole (deg)     : 5.38
Pole direction: RA (deg): 40.60000
Dec (deg): 83.50000
C/A sky separation (") : 4.814
C/A sky separation (km) : 35748.1
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
    
```



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-10-06T02:40:19.820		26.43	-20.86	140461.00	-13.64		
A (OER)	I	2047-10-06T02:44:51.767		25.86	-21.81	136774.40	-13.47		
Encke (OEG)	I	2047-10-06T02:48:37.898		25.38	-22.60	133744.89	-13.32		
Encke (IEG)	I	2047-10-06T02:49:02.053		25.33	-22.69	133423.31	-13.30		
A (IER)	I	2047-10-06T03:03:38.858		23.37	-25.75	122050.38	-12.61		
B (OER)	I	2047-10-06T03:09:39.097		22.53	-27.01	117571.16	-12.26		
B (IER)	I	2047-10-06T03:49:46.037		16.44	-35.26	91984.69	-8.54		
Saturn	I	2047-10-06T03:54:48.828		15.62	-36.27	59893.17		-30.15	-35.36
Saturn	E	2047-10-06T05:31:16.078		-1.65x	-54.00	59798.14		-34.27	-39.74
B (IER)	E	2047-10-06T05:24:40.311	b	-0.39x	-52.94	91984.69	8.61		
B (OER)	E	2047-10-06T06:04:14.781		-8.09x	-58.65	117571.16	12.48		
A (IER)	E	2047-10-06T06:10:08.310		-9.26x	-59.36	122050.38	12.85		
Encke (IEG)	E	2047-10-06T06:24:26.970		-12.12x	-60.86	133423.31	13.61		
Encke (OEG)	E	2047-10-06T06:24:50.590		-12.20x	-60.90	133744.89	13.62		
A (OER)	E	2047-10-06T06:28:31.618		-12.94x	-61.23	136774.40	13.79		
F ring	E	2047-10-06T06:32:57.213		-13.84x	-61.60	140461.00	13.97		

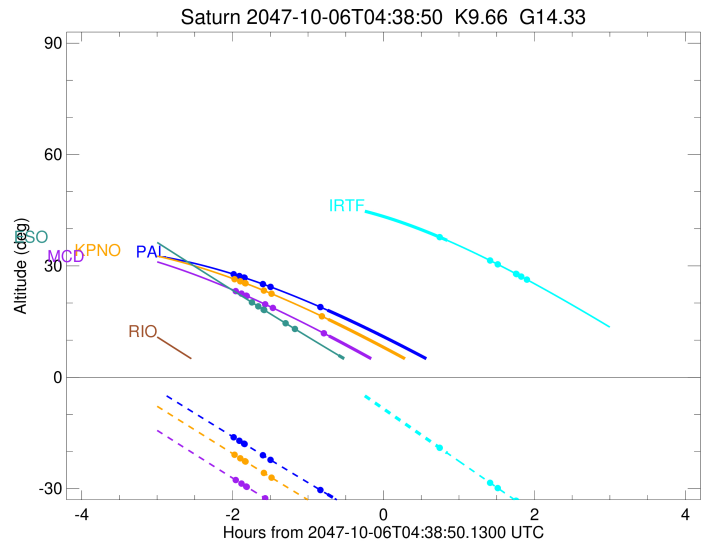
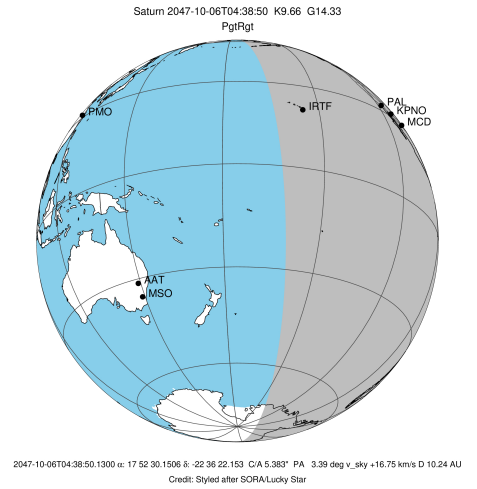
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-10-06T04:43:33.080
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 4070223309734818560
 2Mass ID (if available) : 17523014-2236222
 ICRS Star Coord at Epoch: 17h 52m 30.15059s -22:36:22.15255s
 RUWE (>1.4 is poor) : 0.93
 K magnitude : 9.657
 G magnitude : 14.331
 RP magnitude : 13.138
 BP magnitude : 15.889
 DUPflag : 0
 Distance (au) : 10.239
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 16.75
 Sun-Target sep (deg) : 76.07
 Sun-Moon sep (deg) : 128.58
 B (ring opening deg) : 26.90
 PA of pole (deg) : 5.38
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.860
 C/A sky separation (km) : 36094.3
 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	2047-10-06T02:41:16.748		23.22	-27.66	140461.00	-13.60		
A (OER)	I	2047-10-06T02:45:49.491		22.55	-28.62	136774.40	-13.43		
Encke (OEG)	I	2047-10-06T02:49:36.353		21.99	-29.42	133744.89	-13.28		
Encke (IEG)	I	2047-10-06T02:50:00.591		21.93	-29.51	133423.31	-13.26		
A (IER)	I	2047-10-06T03:04:41.038		19.67	-32.58	122050.38	-12.54		
B (OER)	I	2047-10-06T03:10:43.245		18.71	-33.84	117571.16	-12.18		
B (IER)	I	2047-10-06T03:51:20.511		11.87	-42.09	91984.69	-8.33		
Saturn	I	2047-10-06T03:55:31.842		11.13	-42.92	59886.05		-30.47	-35.71
Saturn	E	2047-10-06T05:31:10.778		-7.04x	-59.33	59789.09		-34.65	-40.13
B (IER)	E	2047-10-06T05:23:27.617	b	-5.50x	-58.28	91984.69	8.40		
B (OER)	E	2047-10-06T06:03:31.114		-13.59x	-62.86	117571.16	12.42		
A (IER)	E	2047-10-06T06:09:26.326		-14.81x	-63.32	122050.38	12.80		
Encke (IEG)	E	2047-10-06T06:23:47.849		-17.77x	-64.16	133423.31	13.57		
Encke (OEG)	E	2047-10-06T06:24:11.528		-17.85x	-64.18	133744.89	13.59		
A (OER)	E	2047-10-06T06:27:53.067		-18.62x	-64.32	136774.40	13.76		
F ring	E	2047-10-06T06:32:19.184		-19.54x	-64.46	140461.00	13.95		

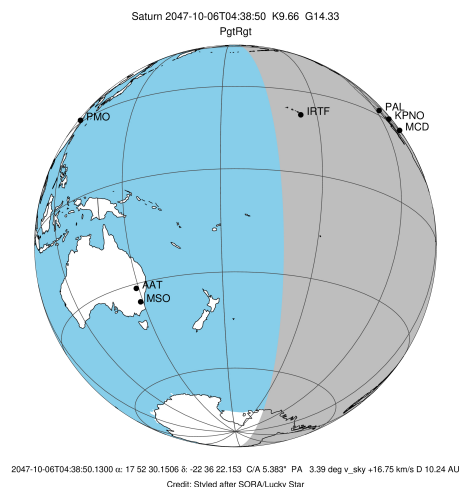
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-10-06T04:40:38.150
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 4070223309734818560
 2Mass ID (if available) : 17523014-2236222
 ICRS Star Coord at Epoch: 17h 52m 30.15059s -22:36:22.15255s
 RUWE (>1.4 is poor) : 0.93
 K magnitude : 9.657
 G magnitude : 14.331
 RP magnitude : 13.138
 BP magnitude : 15.889
 DUPflag : 0
 Distance (au) : 10.239
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 16.75
 Sun-Target sep (deg) : 76.07
 Sun-Moon sep (deg) : 128.75
 B (ring opening deg) : 26.90
 PA of pole (deg) : 5.38
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.811
 C/A sky separation (km) : 35726.5
 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



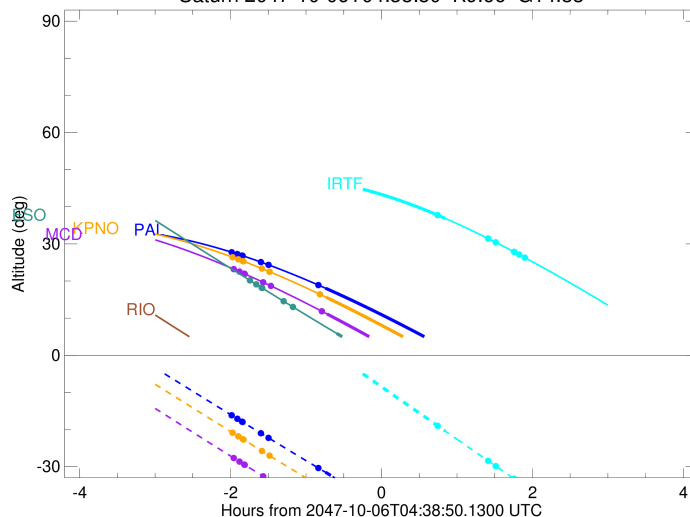
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-10-06T02:37:17.617		46.51	19.84x	140461.00	-13.56		
A (OER)	I	2047-10-06T02:41:51.269		46.76	18.80x	136774.40	-13.39		
Encke (OEG)	I	2047-10-06T02:45:38.889		46.94	17.93x	133744.89	-13.23		
Encke (IEG)	I	2047-10-06T02:46:03.207		46.96	17.83x	133423.31	-13.22		
A (IER)	I	2047-10-06T03:00:46.409		47.47	14.44x	122050.38	-12.51		
B (OER)	I	2047-10-06T03:06:49.552		47.59	13.04x	117571.16	-12.16		
B (IER)	I	2047-10-06T03:47:20.076		47.09	3.60x	91984.69	-8.44		
Saturn	I	2047-10-06T03:51:35.137		46.90	2.61x	59887.00		-30.43	-35.66
Saturn	E	2047-10-06T05:29:26.349		36.89	-20.40	59804.30		-34.01	-39.46
B (IER)	E	2047-10-06T05:23:24.931	b	37.76	-18.98	91984.69	8.48		
B (OER)	E	2047-10-06T06:03:37.140		31.45	-28.44	117571.16	12.28		
A (IER)	E	2047-10-06T06:09:36.409		30.43	-29.84	122050.38	12.65		
Encke (IEG)	E	2047-10-06T06:24:09.110		27.88	-33.24	133423.31	13.39		
Encke (OEG)	E	2047-10-06T06:24:33.118		27.80	-33.34	133744.89	13.40		
A (OER)	E	2047-10-06T06:28:17.779		27.13	-34.21	136774.40	13.56		
F ring	E	2047-10-06T06:32:47.748		26.31	-35.26	140461.00	13.74		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-10-06T04:43:56.320
 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 : 4070223309734818560
 2Mass ID (if available) : 17523014-2236222
 ICRS Star Coord at Epoch: 17h 52m 30.15059s -22:36:22.15255s
 RUWE (>1.4 is poor) : 0.93
 K magnitude : 9.657
 G magnitude : 14.331
 RP magnitude : 13.138
 BP magnitude : 15.889
 DUPflag : 0
 Distance (au) : 10.239
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 16.75
 Sun-Target sep (deg) : 76.07
 Sun-Moon sep (deg) : 128.48
 B (ring opening deg) : 26.90
 PA of pole (deg) : 5.38
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.810
 C/A sky separation (km) : 43149.6
 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



Saturn 2047-10-06T04:38:50 K9.66 G14.33



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-10-06T02:54:05.858		20.20	-48.66	140461.00	-12.29		
A (OER)	I	2047-10-06T02:59:09.121		19.13	-49.33	136774.40	-12.01		
Encke (OEG)	I	2047-10-06T03:03:23.951		18.24	-49.88	133744.89	-11.76		
Encke (IEG)	I	2047-10-06T03:03:51.330		18.14	-49.93	133423.31	-11.73		
A (IER)	I	2047-10-06T03:20:51.706		14.58	-51.91	122050.38	-10.50		
B (OER)	I	2047-10-06T03:28:11.342		13.06	-52.65	117571.16	-9.86		
Saturn	I	2047-10-06T04:03:02.156		5.92	-55.18	59704.79		-38.11	-43.71
Saturn	E	2047-10-06T05:24:29.823		-9.87x	-53.48	59602.55		-42.20	-47.82
B (OER)	E	2047-10-06T05:44:40.221		-13.52x	-51.50	117571.16	10.00		
A (IER)	E	2047-10-06T05:51:53.328		-14.79x	-50.67	122050.38	10.67		
Encke (IEG)	E	2047-10-06T06:08:35.772		-17.66x	-48.54	133423.31	11.96		
Encke (OEG)	E	2047-10-06T06:09:02.618		-17.73x	-48.48	133744.89	11.99		
A (OER)	E	2047-10-06T06:13:12.366		-18.43x	-47.90	136774.40	12.26		
F ring	E	2047-10-06T06:18:09.291		-19.25x	-47.19	140461.00	12.56		