

target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2037-03-06T12:59:46.540  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 615385869108696960  
 2Mass ID (if available) : 10013584+1349341

ICRS Star Coord at Epoch: 10h 01m 35.84618s +13:49:33.76443s

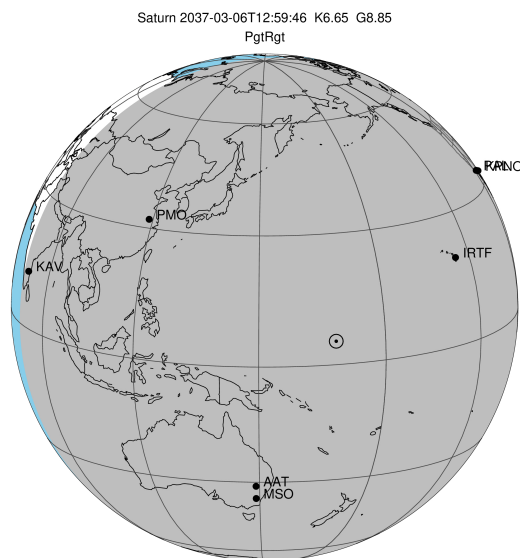
RUWE (>1.4 is poor) : 0.93  
 K magnitude : 6.648  
 G magnitude : 8.853  
 RP magnitude : 8.166  
 BP magnitude : 9.386  
 DUPflag : 0  
 Distance (au) : 8.292  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -18.69  
 Sun-Target sep (deg) : 161.78  
 Sun-Moon sep (deg) : 80.18  
 B (ring opening deg) : -11.55  
 PA of pole (deg) : -6.24

# 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

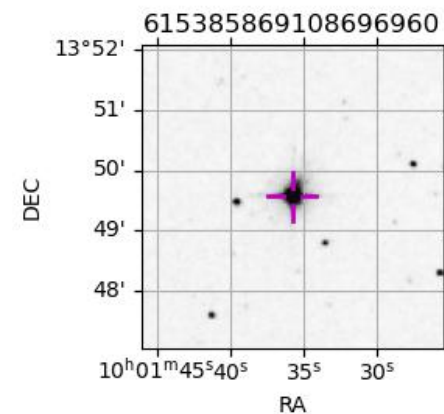
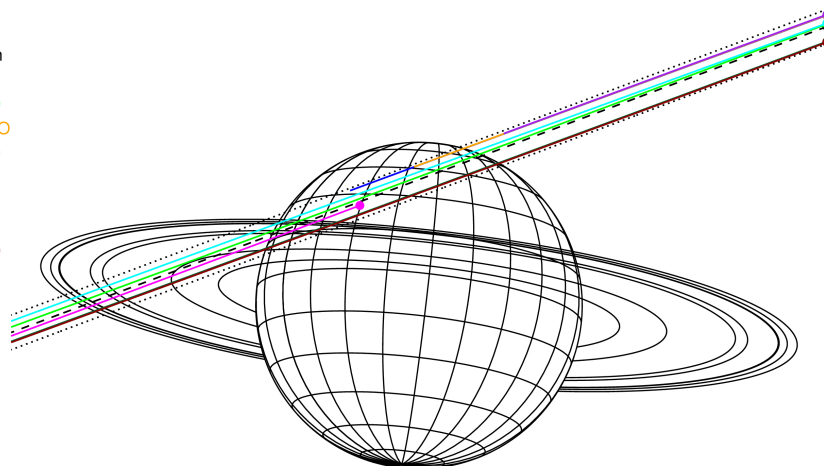
Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1		+		MAR 06 12:24 - MAR 06 12:24	PinRnn
PMO	Purple Mtn Obs	32.1	118.8	+	+	+	MAR 06 12:27 - MAR 06 14:45	PieRie
KPNO	Kitt Peak Natl	32.0	248.4		+		MAR 06 12:24 - MAR 06 12:24	PinRnn
MCD	McDonald Obs.	30.7	256.0					PnnRnn
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+	+	+	MAR 06 12:22 - MAR 06 14:41	PieRie
KAV	Kavalur Observ	12.6	78.8		+	+	MAR 06 13:42 - MAR 06 14:46	PneRie
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3					PnnRnn
AAT	Siding Spring	-31.3	149.1		+	+	MAR 06 12:18 - MAR 06 14:37	PieRie
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0		+	+	MAR 06 12:18 - MAR 06 14:36	PieRie



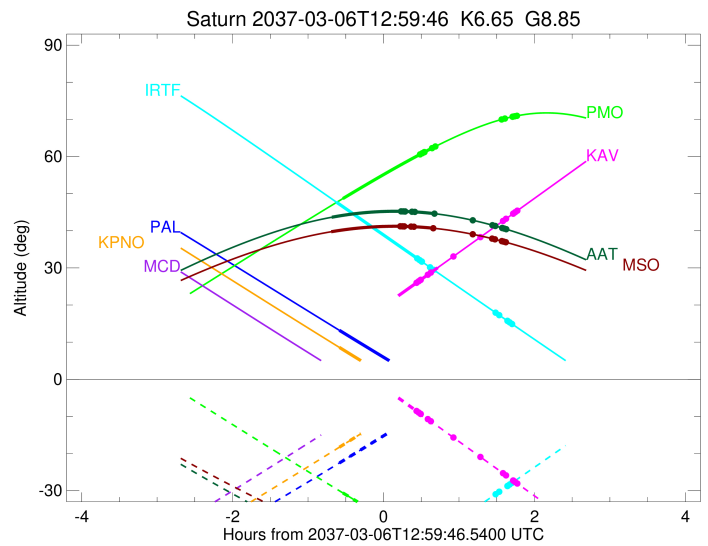
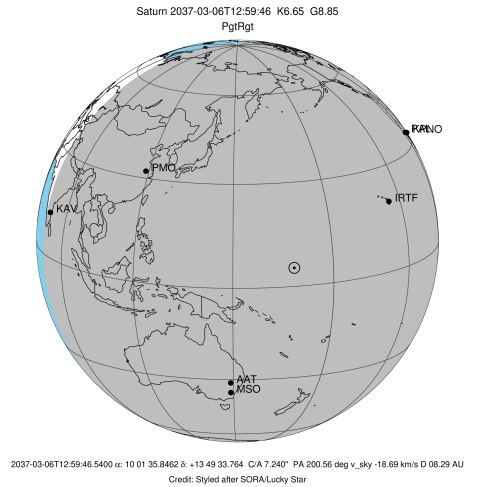
2037-03-06T12:59:46.5400 ra: 10 01 35.8462 s: +13 49 33.764 C/A 7.240° PA 200.56 deg v\_sky -18.69 km/s D 08.29 AU  
 Credit: Styled after SORA/Lucky Star

Saturn 2037-03-06T12:59:46 K6.65 G8.85 PgtRgt

Earth  
 PAL  
 PMO  
 KPNO  
 MCD  
 IRTF  
 KAV  
 AAT  
 MSO



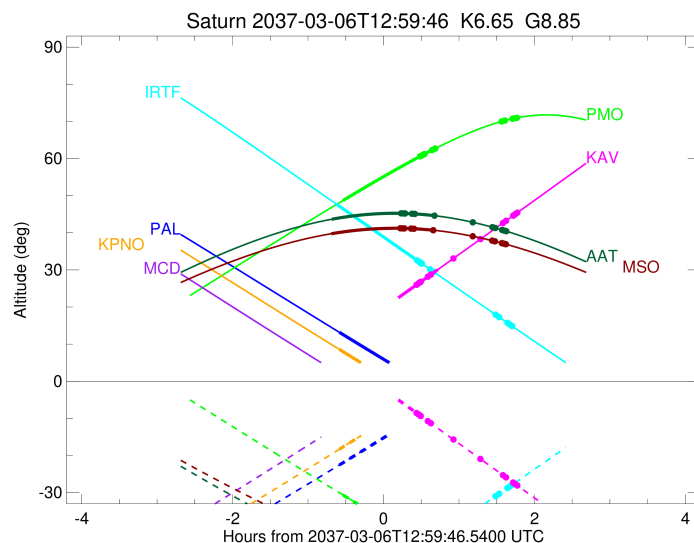
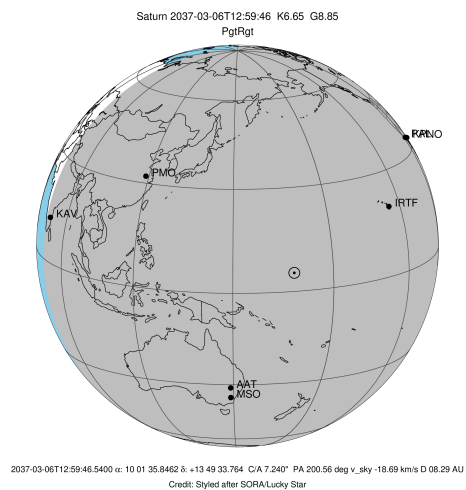
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2037-03-06T12:56:12.260  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PAL  
 Location : Palomar Mt (200")  
 Latitude (deg) : 33.35622  
 E. Longitude (deg) : 243.13601  
 Altitude (km) : 1.706  
 Gaia source ID : 615385869108696960  
 2Mass ID (if available) : 10013584+1349341  
 ICRS Star Coord at Epoch: 10h 01m 35.84618s +13:49:33.76443s  
 RUWE (>1.4 is poor) : 0.93  
 K magnitude : 6.648  
 G magnitude : 8.853  
 RP magnitude : 8.166  
 BP magnitude : 9.386  
 DUPflag : 0  
 Distance (au) : 8.292  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -18.69  
 Sun-Target sep (deg) : 161.78  
 Sun-Moon sep (deg) : 80.17  
 B (ring opening deg) : -11.55  
 PA of pole (deg) : -6.24  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 8.084  
 C/A sky separation (km) : 48614.3  
 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	2037-03-06T13:31:54.943	-0.58x	-8.51	140461.00	-31.22			
A (OER)	I	2037-03-06T13:33:54.770	-0.98x	-8.10	136774.40	-30.30			
Encke (OEG)	I	2037-03-06T13:35:36.151	-1.32x	-7.74	133744.89	-29.46			
Encke (IEG)	I	2037-03-06T13:35:47.085	-1.36x	-7.70	133423.31	-29.36			
A (IER)	I	2037-03-06T13:42:42.150	-2.74x	-6.26	122050.38	-25.26			
B (OER)	I	2037-03-06T13:45:47.445	-3.36x	-5.61	117571.16	-23.05			
Saturn	I	2037-03-06T12:24:44.461	13.18	-22.54	60048.28			75.10	77.58
Saturn	E	2037-03-06T13:28:01.301	0.20x	-9.33	60220.31			26.70	31.59
B (OER)	E	2037-03-06T14:30:50.210	-12.12x	3.77x	117571.16	23.01			
A (IER)	E	2037-03-06T14:33:55.847	-12.70x	4.41x	122050.38	25.21			
Encke (IEG)	E	2037-03-06T14:40:51.847	-14.00x	5.84x	133423.31	29.29			
Encke (OEG)	E	2037-03-06T14:41:02.809	-14.04x	5.88x	133744.89	29.38			
A (OER)	E	2037-03-06T14:42:44.457	-14.36x	6.23x	136774.40	30.22			
F ring	E	2037-03-06T14:44:44.618	-14.73x	6.64x	140461.00	31.13			

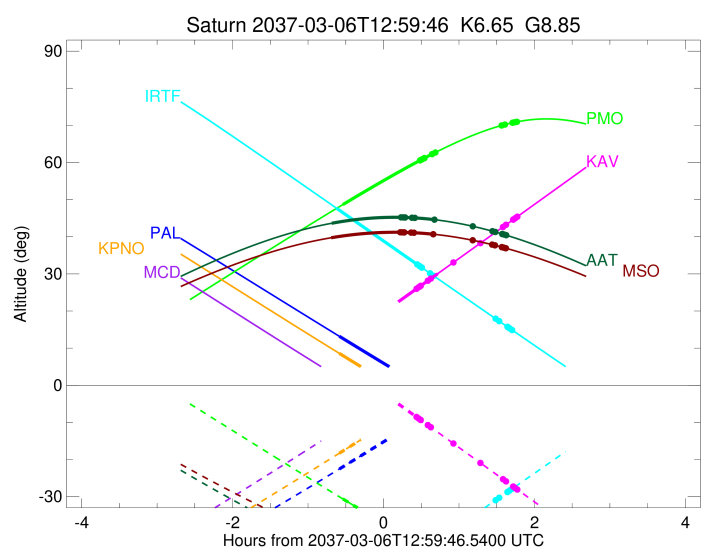
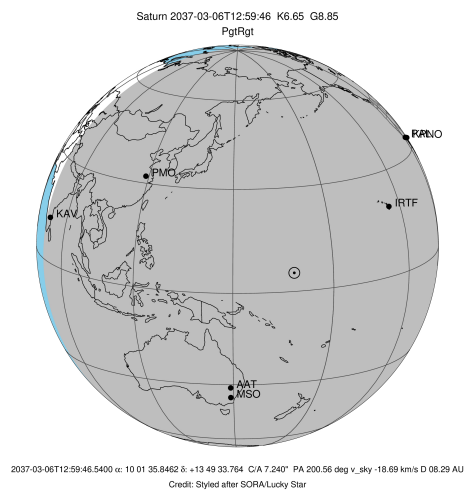
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2037-03-06T13:02:41.370  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PMO  
 Location : Purple Mtn Obs. Nanking  
 Latitude (deg) : 32.06667  
 E. Longitude (deg) : 118.82089  
 Altitude (km) : 0.364  
 Gaia source ID : 615385869108696960  
 2Mass ID (if available) : 10013584+1349341  
 ICRS Star Coord at Epoch: 10h 01m 35.84618s +13:49:33.76443s  
 RUWE (>1.4 is poor) : 0.93  
 K magnitude : 6.648  
 G magnitude : 8.853  
 RP magnitude : 8.166  
 BP magnitude : 9.386  
 DUPflag : 0  
 Distance (au) : 8.292  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -18.69  
 Sun-Target sep (deg) : 161.78  
 Sun-Moon sep (deg) : 81.05  
 B (ring opening deg) : -11.55  
 PA of pole (deg) : -6.24  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 7.413  
 C/A sky separation (km) : 44583.1  
 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	2037-03-06T13:28:54.614	b	60.59	-42.89	140461.00	-34.46		
A (OER)	I	2037-03-06T13:30:42.737	b	60.91	-43.24	136774.40	-33.72		
Encke (OEG)	I	2037-03-06T13:32:13.460	b	61.18	-43.53	133744.89	-33.06		
Encke (IEG)	I	2037-03-06T13:32:23.199	b	61.21	-43.56	133423.31	-32.98		
A (IER)	I	2037-03-06T13:38:24.606		62.26	-44.70	122050.38	-29.82		
B (OER)	I	2037-03-06T13:40:58.973		62.70	-45.18	117571.16	-28.19		
Saturn	I	2037-03-06T12:27:26.363		48.67	-30.61	60058.23		70.76	73.89
Saturn	E	2037-03-06T13:38:08.107		62.21	-44.65	60238.25		20.78	24.93
B (OER)	E	2037-03-06T14:33:39.526		69.99	-54.32	117571.16	28.10		
A (IER)	E	2037-03-06T14:36:14.378		70.22	-54.72	122050.38	29.72		
Encke (IEG)	E	2037-03-06T14:42:17.110		70.72	-55.64	133423.31	32.85		
Encke (OEG)	E	2037-03-06T14:42:26.888		70.73	-55.66	133744.89	32.92		
A (OER)	E	2037-03-06T14:43:57.987		70.84	-55.88	136774.40	33.58		
F ring	E	2037-03-06T14:45:46.579		70.96	-56.15	140461.00	34.31		

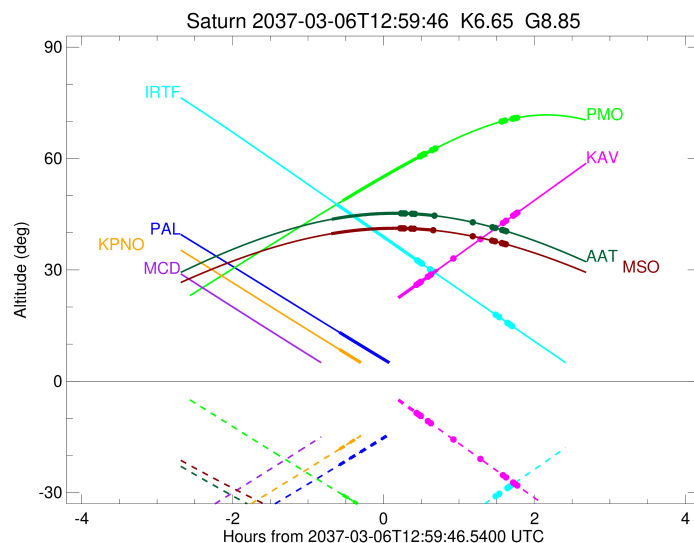
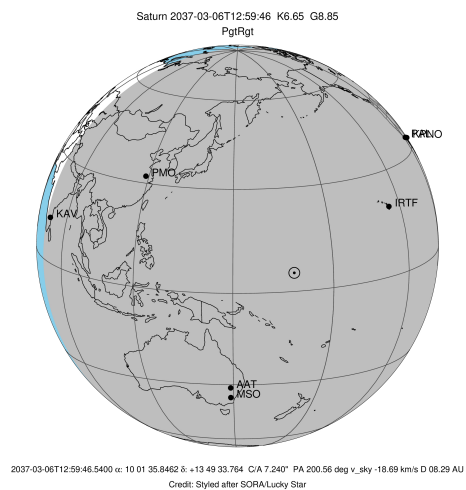
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2037-03-06T12:56:11.080  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : KPNO  
 Location : Kitt Peak Natl Obs  
 Latitude (deg) : 31.96333  
 E. Longitude (deg) : 248.40000  
 Altitude (km) : 2.120  
 Gaia source ID : 615385869108696960  
 2Mass ID (if available) : 10013584+1349341  
 ICRS Star Coord at Epoch: 10h 01m 35.84618s +13:49:33.76443s  
 RUWE (>1.4 is poor) : 0.93  
 K magnitude : 6.648  
 G magnitude : 8.853  
 RP magnitude : 8.166  
 BP magnitude : 9.386  
 DUPflag : 0  
 Distance (au) : 8.292  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -18.69  
 Sun-Target sep (deg) : 161.78  
 Sun-Moon sep (deg) : 80.09  
 B (ring opening deg) : -11.55  
 PA of pole (deg) : -6.24  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 8.085  
 C/A sky separation (km) : 48624.6  
 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



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	2037-03-06T13:31:53.808	-5.23x	-4.02x	140461.00	-31.23			
A (OER)	I	2037-03-06T13:33:53.589	-5.63x	-3.60x	136774.40	-30.31			
Encke (OEG)	I	2037-03-06T13:35:34.917	-5.97x	-3.24x	133744.89	-29.47			
Encke (IEG)	I	2037-03-06T13:35:45.845	-6.01x	-3.20x	133423.31	-29.38			
A (IER)	I	2037-03-06T13:42:40.513	-7.38x	-1.74x	122050.38	-25.29			
B (OER)	I	2037-03-06T13:45:45.495	-8.00x	-1.09x	117571.16	-23.10			
Saturn	I	2037-03-06T12:24:40.497	8.59	-18.31	60048.20			75.13	77.60
Saturn	E	2037-03-06T13:28:02.980	-4.46x	-4.84x	60220.38			26.68	31.57
B (OER)	E	2037-03-06T14:30:56.836	-16.72x	8.41x	117571.16	23.06			
A (IER)	E	2037-03-06T14:34:02.119	-17.30x	9.05x	122050.38	25.25			
Encke (IEG)	E	2037-03-06T14:40:57.613	-18.59x	10.49x	133423.31	29.32			
Encke (OEG)	E	2037-03-06T14:41:08.565	-18.62x	10.53x	133744.89	29.41			
A (OER)	E	2037-03-06T14:42:50.129	-18.93x	10.88x	136774.40	30.24			
F ring	E	2037-03-06T14:44:50.205	-19.30x	11.29x	140461.00	31.15			

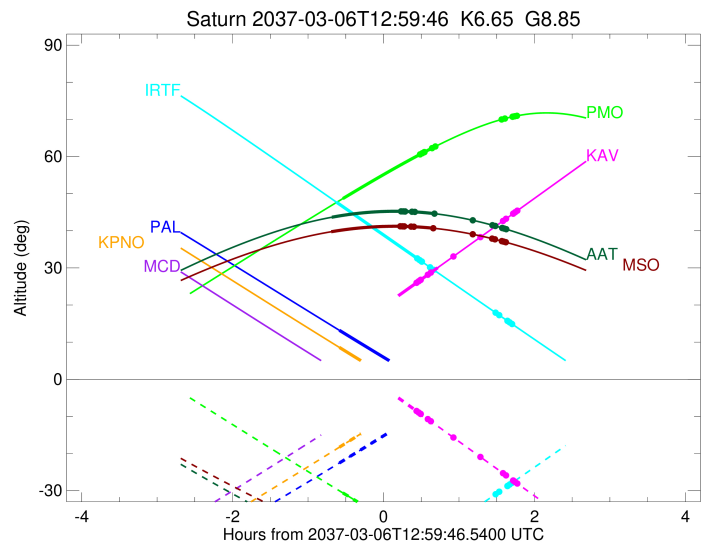
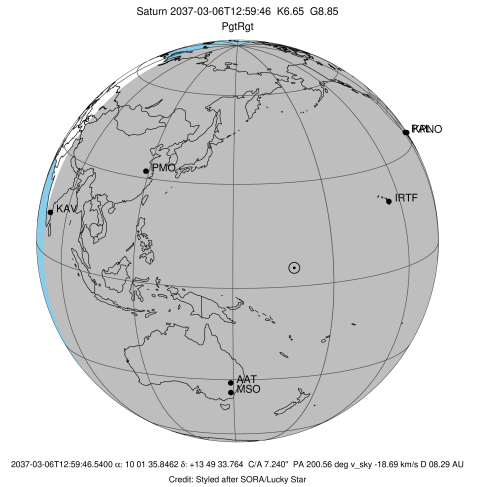
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2037-03-06T12:55:49.630  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : IRTF  
 Location : Mauna Kea/IRTF  
 Latitude (deg) : 19.82622  
 E. Longitude (deg) : 204.52800  
 Altitude (km) : 4.168  
 Gaia source ID : 615385869108696960  
 2Mass ID (if available) : 10013584+1349341  
 ICRS Star Coord at Epoch: 10h 01m 35.84618s +13:49:33.76443s  
 RUWE (>1.4 is poor) : 0.93  
 K magnitude : 6.648  
 G magnitude : 8.853  
 RP magnitude : 8.166  
 BP magnitude : 9.386  
 DUPflag : 0  
 Distance (au) : 8.292  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -18.69  
 Sun-Target sep (deg) : 161.78  
 Sun-Moon sep (deg) : 80.68  
 B (ring opening deg) : -11.55  
 PA of pole (deg) : -6.24  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 7.709  
 C/A sky separation (km) : 46361.5  
 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	2037-03-06T13:26:37.403	b	32.55	-45.44	140461.00	-32.64		
A (OER)	I	2037-03-06T13:28:31.794	b	32.10	-45.01	136774.40	-31.81		
Encke (OEG)	I	2037-03-06T13:30:08.161		31.72	-44.64	133744.89	-31.06		
Encke (IEG)	I	2037-03-06T13:30:18.529		31.68	-44.60	133423.31	-30.97		
A (IER)	I	2037-03-06T13:36:47.360		30.16	-43.10	122050.38	-27.36		
B (OER)	I	2037-03-06T13:39:36.790		29.49	-42.45	117571.17	-25.47		
Saturn	I	2037-03-06T12:22:14.264		47.74	-59.83	60053.96		72.50	75.37
Saturn	E	2037-03-06T13:29:45.674		31.81	-44.72	60230.26		23.55	28.09
B (OER)	E	2037-03-06T14:28:52.913		17.94	-30.97	117571.17	25.38		
A (IER)	E	2037-03-06T14:31:43.006		17.28	-30.31	122050.38	27.25		
Encke (IEG)	E	2037-03-06T14:38:13.643		15.76	-28.78	133423.31	30.82		
Encke (OEG)	E	2037-03-06T14:38:24.065		15.72	-28.74	133744.89	30.90		
A (OER)	E	2037-03-06T14:40:00.944		15.35	-28.36	136774.40	31.64		
F ring	E	2037-03-06T14:41:55.974		14.90	-27.91	140461.00	32.45		

target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2037-03-06T13:05:03.090  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : KAV  
 Location : Kavalur Observatory  
 Latitude (deg) : 12.57556  
 E. Longitude (deg) : 78.83167  
 Altitude (km) : 0.722  
 Gaia source ID : 615385869108696960  
 2Mass ID (if available) : 10013584+1349341  
 ICRS Star Coord at Epoch: 10h 01m 35.84618s +13:49:33.76443s  
 RUWE (>1.4 is poor) : 0.93  
 K magnitude : 6.648  
 G magnitude : 8.853  
 RP magnitude : 8.166  
 BP magnitude : 9.386  
 DUPflag : 0  
 Distance (au) : 8.292  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -18.69  
 Sun-Target sep (deg) : 161.78  
 Sun-Moon sep (deg) : 80.65  
 B (ring opening deg) : -11.55  
 PA of pole (deg) : -6.24  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 7.029  
 C/A sky separation (km) : 42273.9  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 Saturn\_ring\_plane.tf  
 sat378.bsp  
 sat286.bsp  
 vgr1.sat286.bsp  
 vgr2.sat286.bsp  
 HST1081HSPephemUTC.bsp  
 pfb10000r.bsp  
 cassini.bsp  
 earthstns\_itrf93\_040916.bsp  
 earth\_200101\_990628\_predict.bpc  
 earth\_720101\_070426.bpc  
 cpck28Mar2008.tpc  
 pck.sat440.tpc  
 IAU\_SATURN\_for\_RINGFIT.tpc  
 naif0012.tls  
 earth\_flat\_IAU.spk

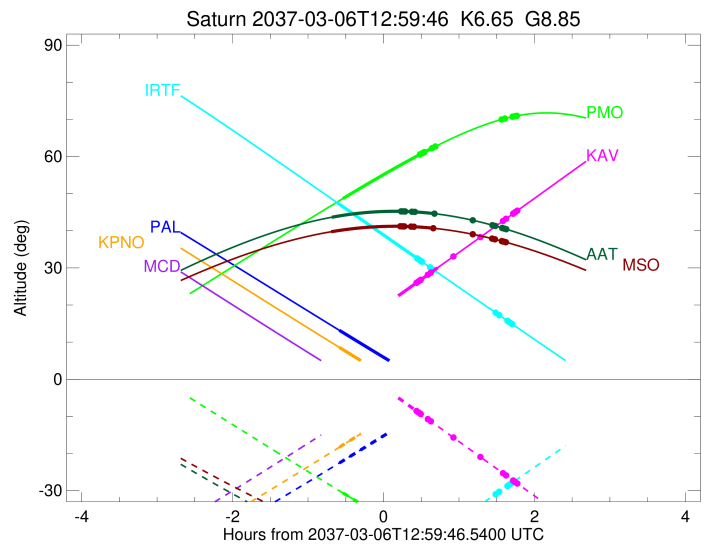
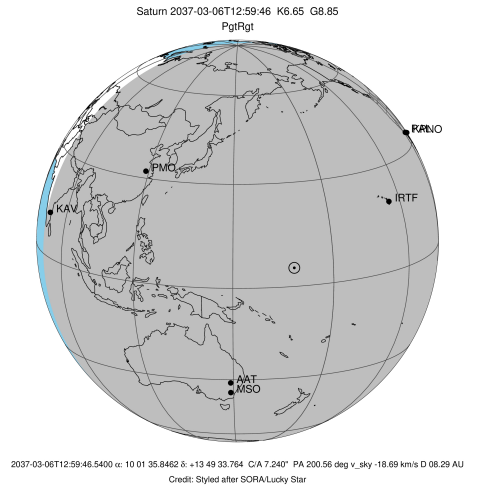


b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2037-03-06T13:26:06.814	b	26.01	-8.56	140461.00	-36.10		
A (OER)	I	2037-03-06T13:27:49.803	b	26.42	-8.98	136774.40	-35.48		
Encke (OEG)	I	2037-03-06T13:29:15.857	b	26.77	-9.33	133744.89	-34.92		
Encke (IEG)	I	2037-03-06T13:29:25.074	b	26.80	-9.36	133423.31	-34.86		
A (IER)	I	2037-03-06T13:35:03.509	b	28.17	-10.74	122050.38	-32.23		
B (OER)	I	2037-03-06T13:37:25.339	b	28.74	-11.31	117571.16	-30.91		
B (IER)	I	2037-03-06T13:55:18.511		33.07	-15.67	91984.69	-14.82		
Saturn	I	2037-03-06T12:27:19.627		11.85	5.73x	60064.42		68.44	71.90
Saturn	E	2037-03-06T13:42:52.890		30.06	-12.64	60246.99		17.35	20.96
B (IER)	E	2037-03-06T14:16:49.731		38.29	-20.92	91984.69	14.82		
B (OER)	E	2037-03-06T14:34:43.889		42.63	-25.29	117571.16	30.86		
A (IER)	E	2037-03-06T14:37:05.929		43.21	-25.87	122050.38	32.18		
Encke (IEG)	E	2037-03-06T14:42:44.938		44.58	-27.25	133423.31	34.80		
Encke (OEG)	E	2037-03-06T14:42:54.172		44.62	-27.29	133744.89	34.86		
A (OER)	E	2037-03-06T14:44:20.387		44.97	-27.64	136774.40	35.41		
F ring	E	2037-03-06T14:46:03.575		45.38	-28.06	140461.00	36.03		



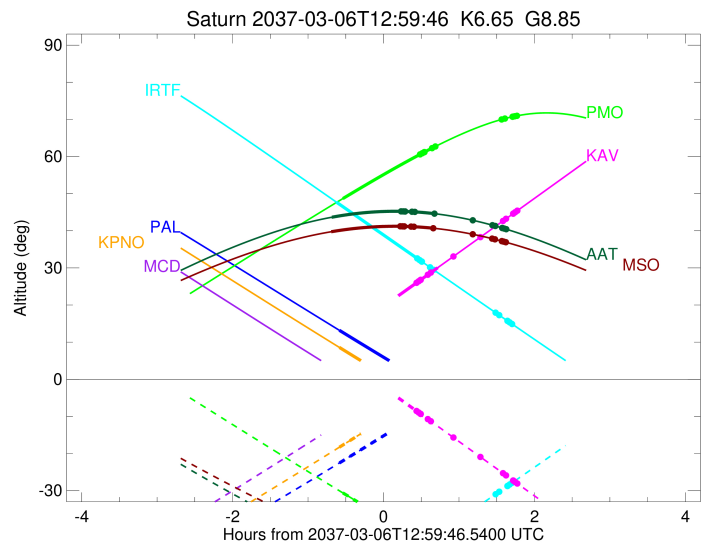
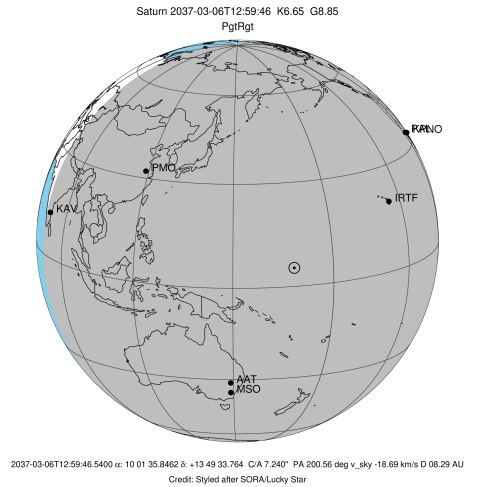
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2037-03-06T12:58:19.440  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : AAT  
 Location : Siding Spring (AAT)  
 Latitude (deg) : -31.27703  
 E. Longitude (deg) : 149.06608  
 Altitude (km) : 1.164  
 Gaia source ID : 615385869108696960  
 2Mass ID (if available) : 10013584+1349341  
 ICRS Star Coord at Epoch: 10h 01m 35.84618s +13:49:33.76443s  
 RUWE (>1.4 is poor) : 0.93  
 K magnitude : 6.648  
 G magnitude : 8.853  
 RP magnitude : 8.166  
 BP magnitude : 9.386  
 DUPflag : 0  
 Distance (au) : 8.292  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -18.69  
 Sun-Target sep (deg) : 161.78  
 Sun-Moon sep (deg) : 80.84  
 B (ring opening deg) : -11.55  
 PA of pole (deg) : -6.24  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 6.528  
 C/A sky separation (km) : 39257.0  
 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	2037-03-06T13:13:51.514	b	45.23	-50.70	140461.00	-37.13		
A (OER)	I	2037-03-06T13:15:31.508	b	45.22	-50.84	136774.40	-36.60		
Encke (OEG)	I	2037-03-06T13:16:54.821	b	45.21	-50.96	133744.89	-36.12		
Encke (IEG)	I	2037-03-06T13:17:03.730	b	45.20	-50.97	133423.31	-36.07		
A (IER)	I	2037-03-06T13:22:28.596	b	45.13	-51.41	122050.38	-33.85		
B (OER)	I	2037-03-06T13:24:43.088	b	45.08	-51.58	117571.16	-32.74		
B (IER)	I	2037-03-06T13:40:16.071		44.61	-52.58	91984.69	-20.65		
Saturn	I	2037-03-06T12:18:35.820		43.64	-44.14	60076.00		64.56	68.53
Saturn	E	2037-03-06T13:38:16.429		44.69	-52.47	60254.11		14.03	17.05
B (IER)	E	2037-03-06T14:10:43.529		42.83	-53.49	91984.69	20.60		
B (OER)	E	2037-03-06T14:26:20.060		41.51	-53.41	117571.17	32.57		
A (IER)	E	2037-03-06T14:28:35.274		41.30	-53.36	122050.38	33.66		
Encke (IEG)	E	2037-03-06T14:34:02.084		40.77	-53.23	133423.31	35.84		
Encke (OEG)	E	2037-03-06T14:34:11.050		40.75	-53.22	133744.89	35.89		
A (OER)	E	2037-03-06T14:35:34.903		40.61	-53.18	136774.40	36.36		
F ring	E	2037-03-06T14:37:15.563		40.44	-53.12	140461.00	36.88		

target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2037-03-06T12:58:14.250  
 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 : 615385869108696960  
 2Mass ID (if available) : 10013584+1349341  
 ICRS Star Coord at Epoch: 10h 01m 35.84618s +13:49:33.76443s  
 RUWE (>1.4 is poor) : 0.93  
 K magnitude : 6.648  
 G magnitude : 8.853  
 RP magnitude : 8.166  
 BP magnitude : 9.386  
 DUPflag : 0  
 Distance (au) : 8.292  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -18.69  
 Sun-Target sep (deg) : 161.78  
 Sun-Moon sep (deg) : 80.79  
 B (ring opening deg) : -11.55  
 PA of pole (deg) : -6.24  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 6.480  
 C/A sky separation (km) : 38972.2  
 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



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	2037-03-06T13:13:11.694	b	41.21	-46.93	140461.00	-37.27		
A (OER)	I	2037-03-06T13:14:51.298	b	41.20	-47.06	136774.40	-36.75		
Encke (OEG)	I	2037-03-06T13:16:14.257	b	41.19	-47.16	133744.89	-36.28		
Encke (IEG)	I	2037-03-06T13:16:23.127	b	41.19	-47.18	133423.31	-36.23		
A (IER)	I	2037-03-06T13:21:46.294	b	41.12	-47.57	122050.38	-34.06		
B (OER)	I	2037-03-06T13:23:59.899	b	41.09	-47.72	117571.17	-32.97		
B (IER)	I	2037-03-06T13:39:19.472		40.69	-48.60	91984.69	-21.26		
Saturn	I	2037-03-06T12:18:15.582		39.74	-41.02	60076.96		64.26	68.27
Saturn	E	2037-03-06T13:38:26.187		40.72	-48.56	60254.81		13.66	16.61
B (IER)	E	2037-03-06T14:10:41.808		39.06	-49.46	91984.69	21.21		
B (OER)	E	2037-03-06T14:26:04.864		37.89	-49.40	117571.17	32.81		
A (IER)	E	2037-03-06T14:28:19.178		37.70	-49.36	122050.38	33.87		
Encke (IEG)	E	2037-03-06T14:33:44.249		37.22	-49.24	133423.31	36.00		
Encke (OEG)	E	2037-03-06T14:33:53.174		37.21	-49.24	133744.89	36.06		
A (OER)	E	2037-03-06T14:35:16.661		37.08	-49.20	136774.40	36.51		
F ring	E	2037-03-06T14:36:56.915		36.93	-49.16	140461.00	37.02		