

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-02-10T13:36:30.570
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4069670663323395456
 2Mass ID (if available) : 18041581-2222317

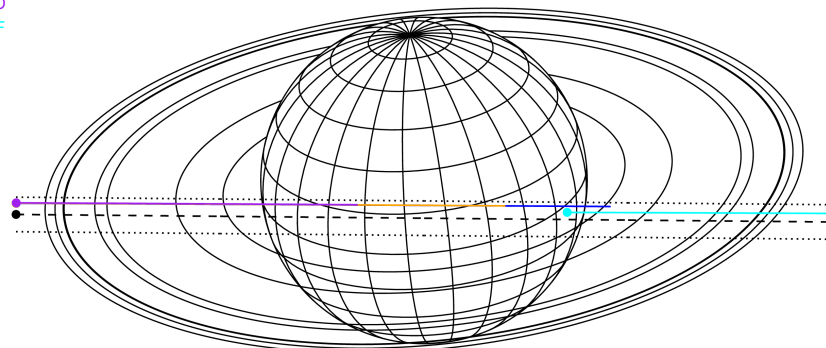
Saturn 2047-02-10T13:36:30 K6.95 G13.63 PgtRgt

ICRS Star Coord at Epoch: 18h 04m 15.80468s -22:22:31.87880s

RUWE (>1.4 is poor) : 1.12
 K magnitude : 6.951
 G magnitude : 13.626
 RP magnitude : 12.097
 BP magnitude : 17.003
 DUPflag : 0
 Distance (au) : 10.649
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 28.70
 Sun-Target sep (deg) : 50.09
 Sun-Moon sep (deg) : 130.53
 B (ring opening deg) : 26.41
 PA of pole (deg) : 5.60
 # a(km) ring



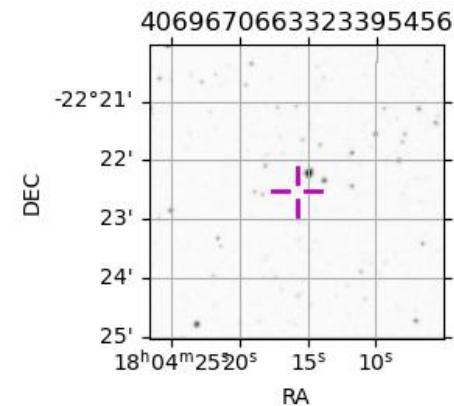
Earth
 PAL
 KPNO
 MCD
 IRTF



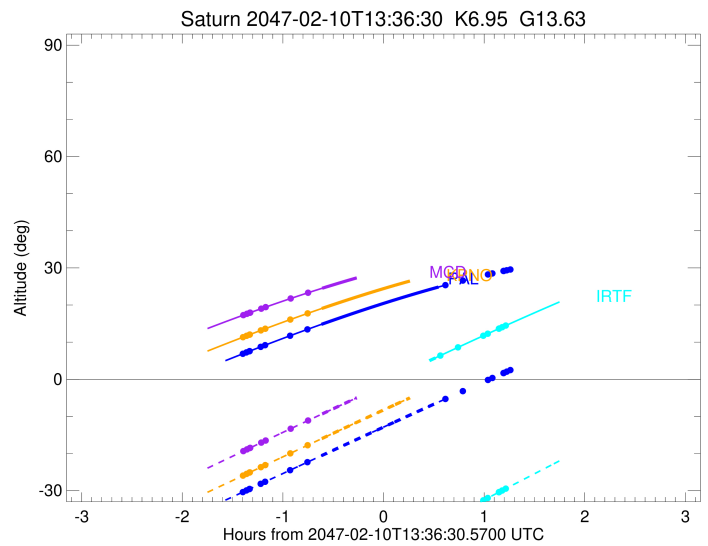
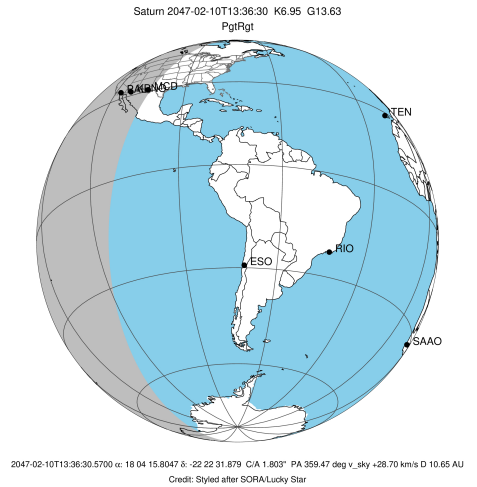
2047-02-10T13:36:30.5700 α: 18 04 15.8047 δ: -22 22 31.879 C/A 1.803° PA 359.47 deg v_sky +28.70 km/s D 10.65 AU
 Credit: Styled after SORA/Lucky Star

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	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1	+ + + + + + +	+ + +		FEB 10 12:12 - FEB 10 14:13	PieRie
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4	+ + + + + + +	+		FEB 10 12:12 - FEB 10 12:59	PinRin
MCD	McDonald Obs.	30.7	256.0	+ + + + + + +	+		FEB 10 12:12 - FEB 10 12:59	PinRin
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5		+ + + + + + +		FEB 10 14:07 - FEB 10 14:49	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					PnnRnn
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

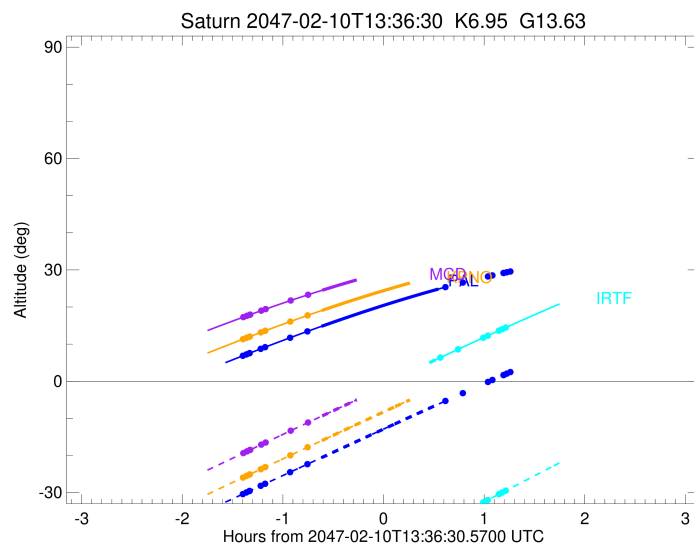
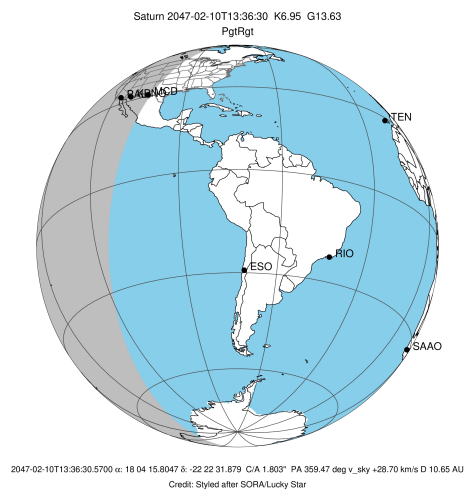


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-02-10T13:34:23.860
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4069670663323395456
 2Mass ID (if available) : 18041581-2222317
 ICRS Star Coord at Epoch: 18h 04m 15.80468s -22:22:31.87880s
 RUWE (>1.4 is poor) : 1.12
 K magnitude : 6.951
 G magnitude : 13.626
 RP magnitude : 12.097
 BP magnitude : 17.003
 DUPflag : 0
 Distance (au) : 10.649
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 28.70
 Sun-Target sep (deg) : 50.09
 Sun-Moon sep (deg) : 131.14
 B (ring opening deg) : 26.41
 PA of pole (deg) : 5.60
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.191
 C/A sky separation (km) : 9195.8
 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	2047-02-10T12:12:38.372		6.86	-30.39	140461.00	-28.85		
A (OER)	I	2047-02-10T12:14:46.194		7.24	-29.95	136774.40	-28.83		
Encke (OEG)	I	2047-02-10T12:16:31.305		7.55	-29.58	133744.89	-28.81		
Encke (IEG)	I	2047-02-10T12:16:42.466		7.58	-29.54	133423.31	-28.81		
A (IER)	I	2047-02-10T12:23:17.721		8.73	-28.16	122050.38	-28.73		
B (OER)	I	2047-02-10T12:25:53.708		9.18	-27.62	117571.16	-28.70		
B (IER)	I	2047-02-10T12:40:49.574		11.73	-24.49	91984.69	-28.39		
C (IER)	I	2047-02-10T12:51:09.738		13.44	-22.33	74490.58	-27.99		
Saturn	I	2047-02-10T12:59:30.398		14.80	-20.59	60265.06		-2.60	-3.19
Saturn	E	2047-02-10T14:09:18.550		24.85	-6.15	60193.97		-13.14	-15.99
C (IER)	E	2047-02-10T14:13:23.834		25.35	-5.31	74490.58	27.88		
B (IER)	E	2047-02-10T14:23:46.672		26.59	-3.21x	91984.69	28.26		
B (OER)	E	2047-02-10T14:38:47.305		28.23	-0.19x	117571.16	28.53		
A (IER)	E	2047-02-10T14:41:24.237		28.51	0.34x	122050.38	28.56		
Encke (IEG)	E	2047-02-10T14:48:02.038		29.17	1.66x	133423.31	28.62		
Encke (OEG)	E	2047-02-10T14:48:13.274		29.19	1.70x	133744.89	28.62		
A (OER)	E	2047-02-10T14:49:59.101		29.36	2.05x	136774.40	28.63		
F ring	E	2047-02-10T14:52:07.815		29.56	2.47x	140461.00	28.65		

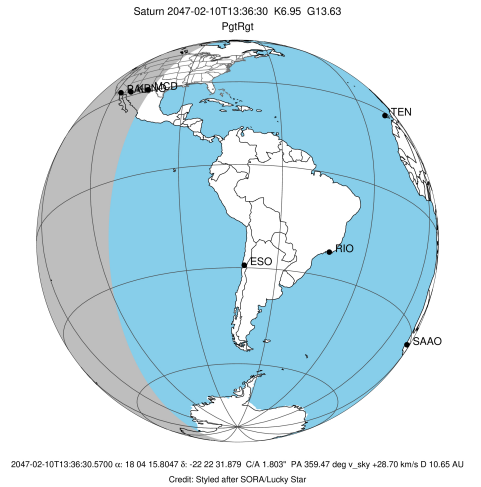
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-02-10T13:34:34.760
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 4069670663323395456
 2Mass ID (if available) : 18041581-2222317
 ICRS Star Coord at Epoch: 18h 04m 15.80468s -22:22:31.87880s
 RUWE (>1.4 is poor) : 1.12
 K magnitude : 6.951
 G magnitude : 13.626
 RP magnitude : 12.097
 BP magnitude : 17.003
 DUPflag : 0
 Distance (au) : 10.649
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 28.70
 Sun-Target sep (deg) : 50.09
 Sun-Moon sep (deg) : 131.15
 B (ring opening deg) : 26.41
 PA of pole (deg) : 5.60
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.187
 C/A sky separation (km) : 9170.2
 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



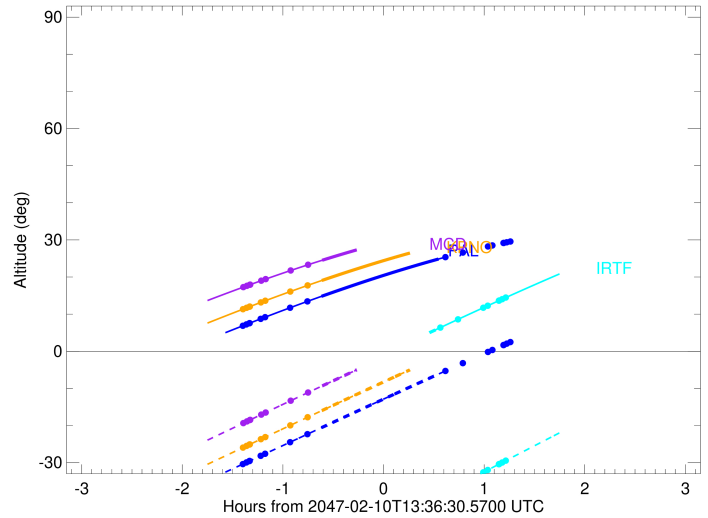
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-02-10T12:12:44.013		11.34	-25.95	140461.00	-28.82		
A (OER)	I	2047-02-10T12:14:51.973		11.71	-25.49	136774.40	-28.80		
Encke (OEG)	I	2047-02-10T12:16:37.194		12.01	-25.12	133744.89	-28.78		
Encke (IEG)	I	2047-02-10T12:16:48.367		12.04	-25.08	133423.31	-28.78		
A (IER)	I	2047-02-10T12:23:24.033		13.17	-23.68	122050.38	-28.70		
B (OER)	I	2047-02-10T12:26:00.179		13.61	-23.13	117571.16	-28.67		
B (IER)	I	2047-02-10T12:40:56.908		16.09	-19.96	91984.69	-28.36		
C (IER)	I	2047-02-10T12:51:17.601		17.75	-17.77	74490.58	-27.96		
Saturn	I	2047-02-10T12:59:38.934		19.06	-16.00	60265.14		-2.56	-3.14
Saturn	E	2047-02-10T14:09:31.566		28.53	-1.46x	60194.02		-13.14	-15.98
C (IER)	E	2047-02-10T14:13:37.113		28.98	-0.62x	74490.58	27.86		
B (IER)	E	2047-02-10T14:24:00.249		30.09	1.49x	91984.69	28.24		
B (OER)	E	2047-02-10T14:39:01.321		31.54	4.51x	117571.17	28.49		
A (IER)	E	2047-02-10T14:41:38.327		31.77	5.03x	122050.38	28.54		
Encke (IEG)	E	2047-02-10T14:48:16.311		32.34	6.35x	133423.31	28.61		
Encke (OEG)	E	2047-02-10T14:48:27.552		32.35	6.39x	133744.89	28.61		
A (OER)	E	2047-02-10T14:50:13.425		32.50	6.74x	136774.40	28.62		
F ring	E	2047-02-10T14:52:22.195		32.67	7.17x	140461.00	28.64		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-02-10T13:34:53.830
 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 : 4069670663323395456
 2Mass ID (if available) : 18041581-2222317
 ICRS Star Coord at Epoch: 18h 04m 15.80468s -22:22:31.87880s
 RUWE (>1.4 is poor) : 1.12
 K magnitude : 6.951
 G magnitude : 13.626
 RP magnitude : 12.097
 BP magnitude : 17.003
 DUPflag : 0
 Distance (au) : 10.649
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 28.70
 Sun-Target sep (deg) : 50.09
 Sun-Moon sep (deg) : 131.15
 B (ring opening deg) : 26.41
 PA of pole (deg) : 5.60
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.179
 C/A sky separation (km) : 9108.0
 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

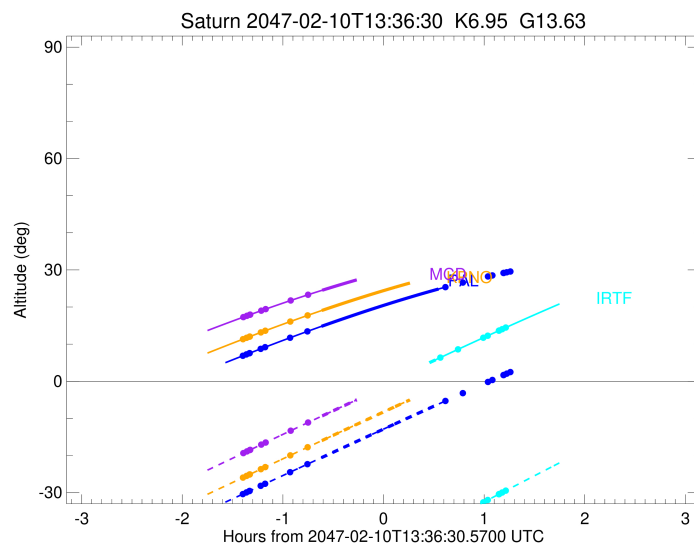
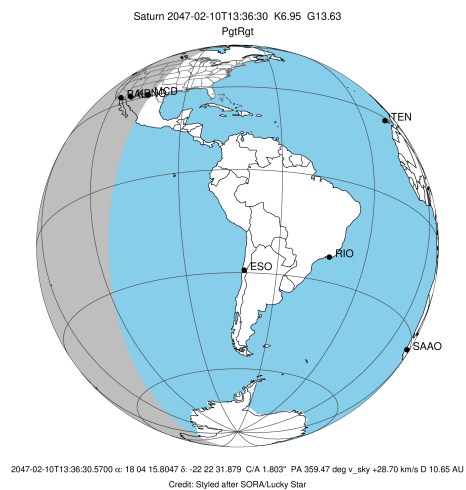


Saturn 2047-02-10T13:36:30 K6.95 G13.63



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-02-10T12:12:56.492		17.28	-19.35	140461.00	-28.78		
A (OER)	I	2047-02-10T12:15:04.620		17.63	-18.89	136774.40	-28.76		
Encke (OEG)	I	2047-02-10T12:16:49.978		17.92	-18.52	133744.89	-28.75		
Encke (IEG)	I	2047-02-10T12:17:01.166		17.95	-18.48	133423.31	-28.74		
A (IER)	I	2047-02-10T12:23:37.330		19.02	-17.06	122050.38	-28.67		
B (OER)	I	2047-02-10T12:26:13.664		19.43	-16.51	117571.16	-28.63		
B (IER)	I	2047-02-10T12:41:11.372		21.76	-13.31	91984.69	-28.34		
C (IER)	I	2047-02-10T12:51:32.596		23.31	-11.11	74490.58	-27.94		
Saturn	I	2047-02-10T12:59:54.868		24.51	-9.34	60265.31		-2.48	-3.05
Saturn	E	2047-02-10T14:09:53.328		32.80	5.18x	60194.28		-13.11	-15.95
C (IER)	E	2047-02-10T14:13:59.780		33.17	6.01x	74490.58	27.86		
B (IER)	E	2047-02-10T14:24:23.054		34.04	8.10x	91984.69	28.24		
B (OER)	E	2047-02-10T14:39:24.389		35.12	11.08x	117571.17	28.51		
A (IER)	E	2047-02-10T14:42:01.441		35.28	11.60x	122050.38	28.54		
Encke (IEG)	E	2047-02-10T14:48:39.536		35.67	12.90x	133423.31	28.60		
Encke (OEG)	E	2047-02-10T14:48:50.781		35.68	12.93x	133744.89	28.60		
A (OER)	E	2047-02-10T14:50:36.682		35.78	13.28x	136774.40	28.61		
F ring	E	2047-02-10T14:52:45.485		35.89	13.69x	140461.00	28.63		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-02-10T13:33:06.150
 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 : 4069670663323395456
 2Mass ID (if available) : 18041581-2222317
 ICRS Star Coord at Epoch: 18h 04m 15.80468s -22:22:31.87880s
 RUWE (>1.4 is poor) : 1.12
 K magnitude : 6.951
 G magnitude : 13.626
 RP magnitude : 12.097
 BP magnitude : 17.003
 DUPflag : 0
 Distance (au) : 10.649
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 28.70
 Sun-Target sep (deg) : 50.09
 Sun-Moon sep (deg) : 131.11
 B (ring opening deg) : 26.41
 PA of pole (deg) : 5.60
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.500
 C/A sky separation (km) : 11586.1
 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	2047-02-10T12:11:59.175	-19.56x	-66.42	140461.00	-28.92			
A (OER)	I	2047-02-10T12:14:06.710	-19.08x	-65.93	136774.40	-28.89			
Encke (OEG)	I	2047-02-10T12:15:51.622	-18.69x	-65.52	133744.89	-28.86			
Encke (IEG)	I	2047-02-10T12:16:02.764	-18.64x	-65.48	133423.31	-28.86			
A (IER)	I	2047-02-10T12:22:37.646	-17.17x	-63.95	122050.38	-28.74			
B (OER)	I	2047-02-10T12:25:13.667	-16.58x	-63.34	117571.16	-28.68			
B (IER)	I	2047-02-10T12:40:12.599	-13.24x	-59.84	91984.69	-28.19			
C (IER)	I	2047-02-10T12:50:39.687	-10.92x	-57.39	74490.58	-27.54			
Saturn	I	2047-02-10T12:58:44.817	-9.13x	-55.49	60258.09			-4.77	-5.85
Saturn	E	2047-02-10T14:07:29.769	5.76	-39.31	60171.21			-15.07	-18.28
C (IER)	E	2047-02-10T14:10:22.600	6.37	-38.63	74490.58	27.37			
B (IER)	E	2047-02-10T14:20:54.010	8.58	-36.16	91984.69	27.98			
B (OER)	E	2047-02-10T14:36:00.677	11.72	-32.61	117571.16	28.41			
A (IER)	E	2047-02-10T14:38:38.231	12.26	-31.99	122050.38	28.45			
Encke (IEG)	E	2047-02-10T14:45:17.251	13.62	-30.43	133423.31	28.55			
Encke (OEG)	E	2047-02-10T14:45:28.515	13.66	-30.39	133744.89	28.55			
A (OER)	E	2047-02-10T14:47:14.591	14.02	-29.98	136774.40	28.57			
F ring	E	2047-02-10T14:49:23.574	14.46	-29.47	140461.00	28.59			