

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-30T08:00:30.390
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4069741276896724096
 2Mass ID (if available) : 18095602-2219149

Saturn 2047-05-30T08:00:30 K9.82 G11.05 PgtRgt

ICRS Star Coord at Epoch: 18h 09m 56.02219s -22:19:15.06391s

RUWE (>1.4 is poor) : 0.65
 K magnitude : 9.825
 G magnitude : 11.052
 RP magnitude : 10.586
 BP magnitude : 11.331
 DUPflag : 0
 Distance (au) : 9.112
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.59
 Sun-Target sep (deg) : 155.90
 Sun-Moon sep (deg) : 141.00
 B (ring opening deg) : 26.23
 PA of pole (deg) : 5.70

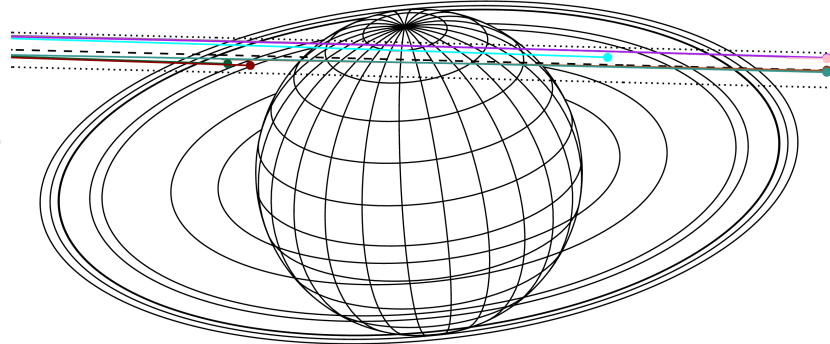
a(km) ring

- 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



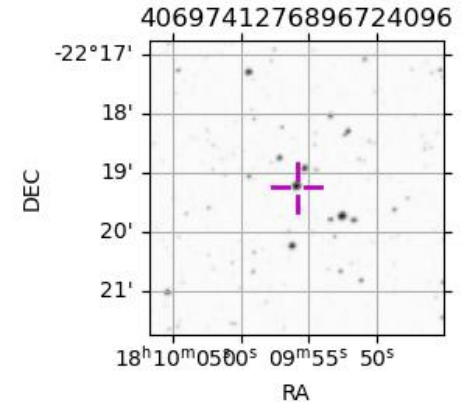
2047-05-30T08:00:30.3900 at: 18 09 56.0222 S: -22 19 15.064 C/A 6.285° PA 178.56 deg v_sky -17.59 km/s D 09.11 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 AAT
 MSO

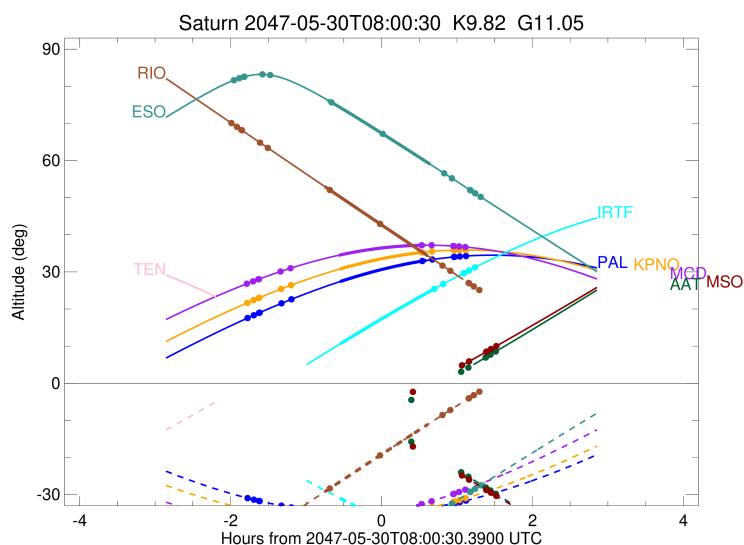
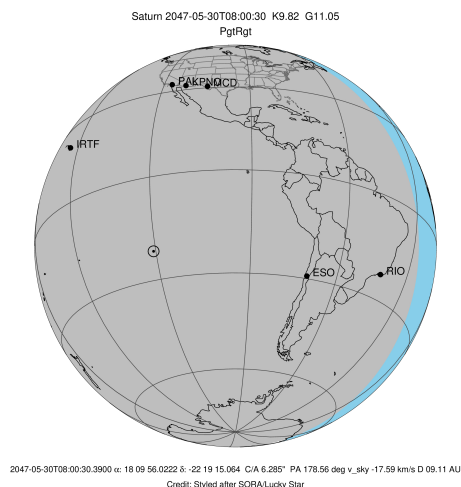


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+ + + + +	+ +	+ + + + +	MAY 30 06:13 - MAY 30 09:07	PieRie
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4	+ + + + +	+ +	+ + + + +	MAY 30 06:13 - MAY 30 09:07	PieRie
MCD	McDonald Obs.	30.7	256.0	+ + + + +	+ +	+ + + + +	MAY 30 06:13 - MAY 30 09:07	PieRie
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5		+ +	+ + + + +	MAY 30 07:27 - MAY 30 09:14	PieRne
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+ + + + +	+ +	+ +	MAY 30 06:01 - MAY 30 08:55	PieRie
ESO	European South	-29.3	289.3	+ + + + +	+ +	+ + + + +	MAY 30 06:03 - MAY 30 09:19	PieRie
AAT	Siding Spring	-31.3	149.1			+ + + + +	MAY 30 09:23 - MAY 30 09:31	PnnRne
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0			+ + + + +	MAY 30 09:10 - MAY 30 09:31	PnnRne



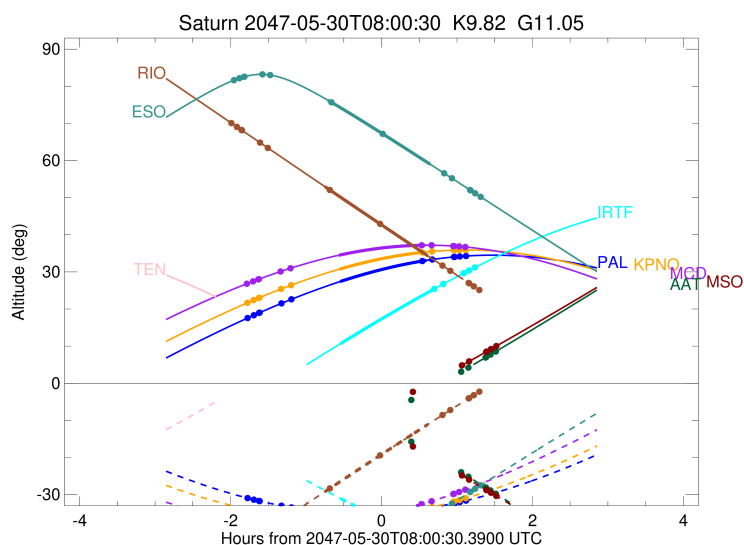
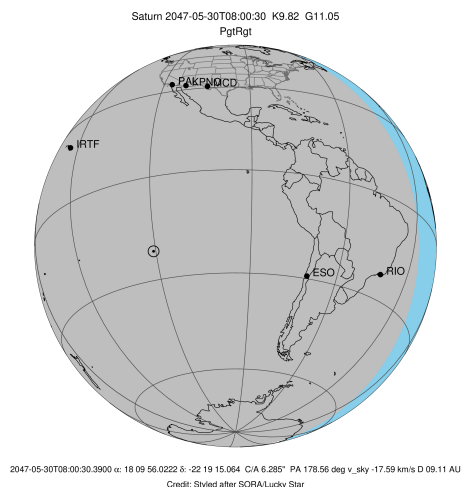
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-30T08:02:07.420
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4069741276896724096
 2Mass ID (if available) : 18095602-2219149
 ICRS Star Coord at Epoch: 18h 09m 56.02219s -22:19:15.06391s
 RUWE (>1.4 is poor) : 0.65
 K magnitude : 9.825
 G magnitude : 11.052
 RP magnitude : 10.586
 BP magnitude : 11.331
 DUPflag : 0
 Distance (au) : 9.112
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.59
 Sun-Target sep (deg) : 155.90
 Sun-Moon sep (deg) : 141.49
 B (ring opening deg) : 26.23
 PA of pole (deg) : 5.70
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.066
 C/A sky separation (km) : 46699.6
 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

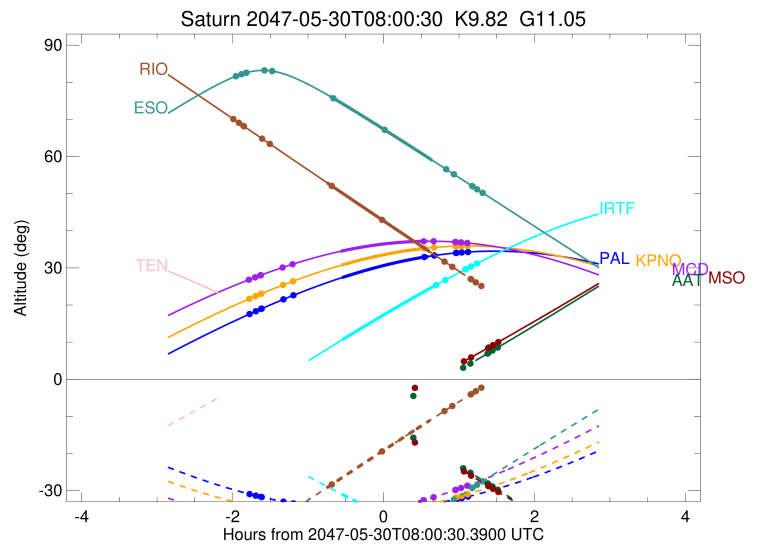
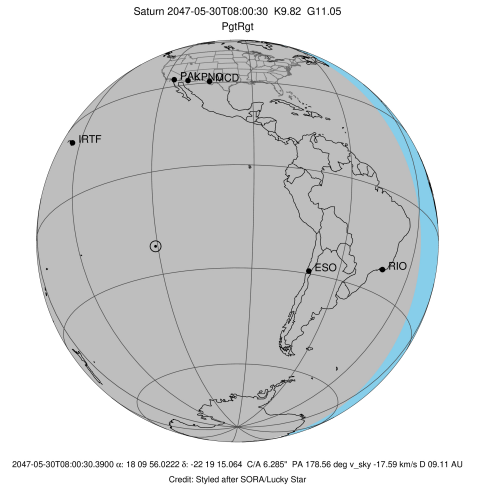
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-05-30T06:13:56.101		17.56	-30.93	140461.00	-12.60		
A (OER)	I	2047-05-30T06:18:53.262		18.31	-31.35	136774.40	-12.21		
Encke (OEG)	I	2047-05-30T06:23:05.089		18.94	-31.69	133744.89	-11.85		
Encke (IEG)	I	2047-05-30T06:23:32.275		19.01	-31.73	133423.31	-11.81		
A (IER)	I	2047-05-30T06:40:49.698		21.51	-32.97	122050.38	-10.04		
B (OER)	I	2047-05-30T06:48:38.166		22.58	-33.44	117571.16	-9.07		
Saturn	I	2047-05-30T07:27:30.605		27.39	-34.89	59723.93		38.68	44.28
Saturn	E	2047-05-30T08:36:16.743		33.11	-33.69	59450.23		50.25	55.58
B (OER)	E	2047-05-30T08:33:03.503	b	32.93	-33.86	117571.16	9.07		
A (IER)	E	2047-05-30T08:40:51.596		33.34	-33.45	122050.38	10.05		
Encke (IEG)	E	2047-05-30T08:58:06.524		34.03	-32.34	133423.31	11.85		
Encke (OEG)	E	2047-05-30T08:58:33.617		34.04	-32.30	133744.89	11.89		
A (OER)	E	2047-05-30T09:02:44.533		34.16	-31.99	136774.40	12.25		
F ring	E	2047-05-30T09:07:40.490		34.28	-31.60	140461.00	12.65		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-30T08:01:44.850
 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 : 4069741276896724096
 2Mass ID (if available) : 18095602-2219149
 ICRS Star Coord at Epoch: 18h 09m 56.02219s -22:19:15.06391s
 RUWE (>1.4 is poor) : 0.65
 K magnitude : 9.825
 G magnitude : 11.052
 RP magnitude : 10.586
 BP magnitude : 11.331
 DUPflag : 0
 Distance (au) : 9.112
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.59
 Sun-Target sep (deg) : 155.90
 Sun-Moon sep (deg) : 141.47
 B (ring opening deg) : 26.23
 PA of pole (deg) : 5.70
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.060
 C/A sky separation (km) : 46656.8
 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	2047-05-30T06:13:42.982		21.65	-33.87	140461.00	-12.62		
A (OER)	I	2047-05-30T06:18:39.582		22.37	-34.22	136774.40	-12.23		
Encke (OEG)	I	2047-05-30T06:22:50.921		22.97	-34.49	133744.89	-11.87		
Encke (IEG)	I	2047-05-30T06:23:18.053		23.03	-34.52	133423.31	-11.83		
A (IER)	I	2047-05-30T06:40:33.232		25.38	-35.45	122050.38	-10.06		
B (OER)	I	2047-05-30T06:48:20.484		26.38	-35.77	117571.16	-9.09		
Saturn	I	2047-05-30T07:27:07.161		30.75	-36.43	59724.48		38.66	44.26
Saturn	E	2047-05-30T08:35:55.753		35.36	-33.72	59452.07		50.18	55.51
B (OER)	E	2047-05-30T08:32:53.391	b	35.25	-33.94	117571.16	9.09		
A (IER)	E	2047-05-30T08:40:40.638		35.51	-33.36	122050.38	10.07		
Encke (IEG)	E	2047-05-30T08:57:54.331		35.85	-31.89	133423.31	11.86		
Encke (OEG)	E	2047-05-30T08:58:21.401		35.85	-31.85	133744.89	11.90		
A (OER)	E	2047-05-30T09:02:32.112		35.88	-31.46	136774.40	12.26		
F ring	E	2047-05-30T09:07:27.865		35.90	-30.97	140461.00	12.66		

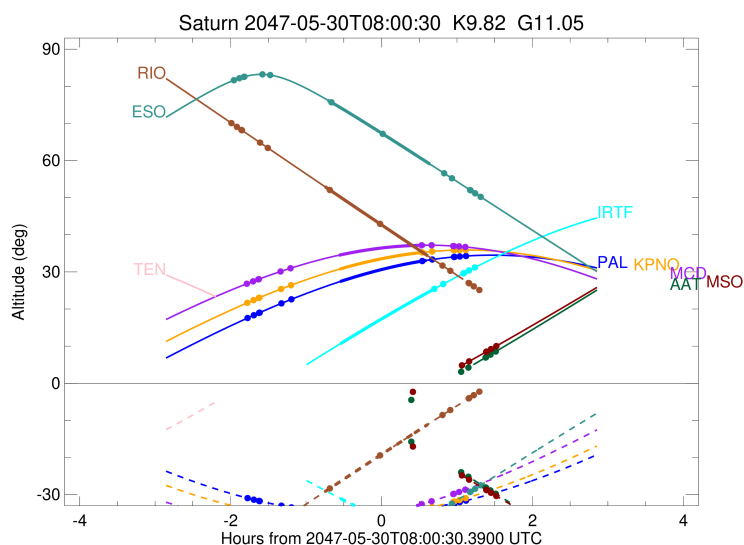
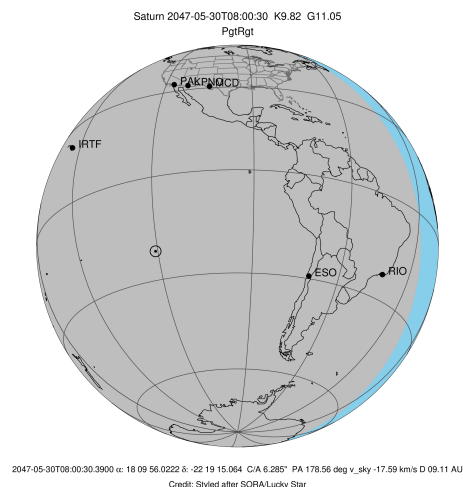
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-30T08:01:09.490
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 4069741276896724096
 2Mass ID (if available) : 18095602-2219149
 ICRS Star Coord at Epoch: 18h 09m 56.02219s -22:19:15.06391s
 RUWE (>1.4 is poor) : 0.65
 K magnitude : 9.825
 G magnitude : 11.052
 RP magnitude : 10.586
 BP magnitude : 11.331
 DUPflag : 0
 Distance (au) : 9.112
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.59
 Sun-Target sep (deg) : 155.90
 Sun-Moon sep (deg) : 141.41
 B (ring opening deg) : 26.23
 PA of pole (deg) : 5.70
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.053
 C/A sky separation (km) : 46610.4
 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	2047-05-30T06:13:21.115		26.80	-36.85	140461.00	-12.65		
A (OER)	I	2047-05-30T06:18:17.136		27.44	-37.05	136774.40	-12.25		
Encke (OEG)	I	2047-05-30T06:22:27.978		27.97	-37.20	133744.89	-11.90		
Encke (IEG)	I	2047-05-30T06:22:55.056		28.03	-37.22	133423.31	-11.86		
A (IER)	I	2047-05-30T06:40:08.057		30.09	-37.63	122050.38	-10.08		
B (OER)	I	2047-05-30T06:47:54.187		30.95	-37.71	117571.16	-9.12		
Saturn	I	2047-05-30T07:26:30.778		34.48	-37.13	59724.70		38.65	44.25
Saturn	E	2047-05-30T08:35:22.494		37.18	-32.29	59454.37		50.08	55.42
B (OER)	E	2047-05-30T08:32:33.520	b	37.17	-32.57	117571.16	9.10		
A (IER)	E	2047-05-30T08:40:20.211		37.18	-31.77	122050.38	10.08		
Encke (IEG)	E	2047-05-30T08:57:33.260		36.97	-29.84	133423.31	11.86		
Encke (OEG)	E	2047-05-30T08:58:00.322		36.96	-29.78	133744.89	11.90		
A (OER)	E	2047-05-30T09:02:10.970		36.86	-29.28	136774.40	12.27		
F ring	E	2047-05-30T09:07:06.683		36.71	-28.67	140461.00	12.66		

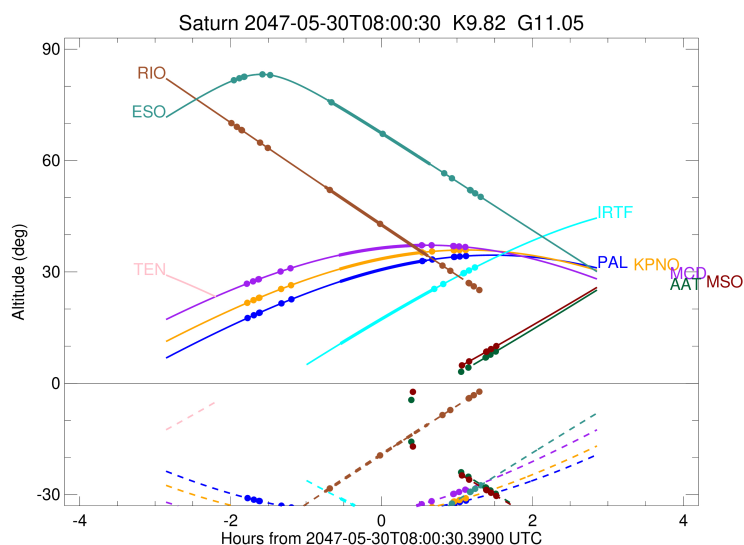
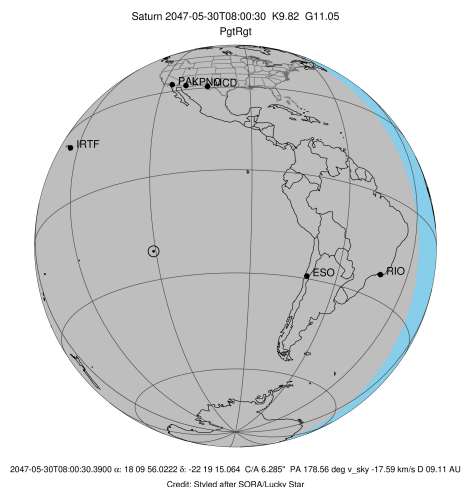
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-30T08:04:59.880
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 4069741276896724096
 2Mass ID (if available) : 18095602-2219149
 ICRS Star Coord at Epoch: 18h 09m 56.02219s -22:19:15.06391s
 RUWE (>1.4 is poor) : 0.65
 K magnitude : 9.825
 G magnitude : 11.052
 RP magnitude : 10.586
 BP magnitude : 11.331
 DUPflag : 0
 Distance (au) : 9.112
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.59
 Sun-Target sep (deg) : 155.90
 Sun-Moon sep (deg) : 141.76
 B (ring opening deg) : 26.23
 PA of pole (deg) : 5.70
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.784
 C/A sky separation (km) : 44833.4
 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	2047-05-30T06:12:08.916	-5.53x	-16.75	140461.00	-13.05			
A (OER)	I	2047-05-30T06:16:55.073	-4.48x	-17.70	136774.40	-12.71			
Encke (OEG)	I	2047-05-30T06:20:56.253	-3.61x	-18.50	133744.89	-12.41			
Encke (IEG)	I	2047-05-30T06:21:22.209	-3.51x	-18.59	133423.31	-12.37			
A (IER)	I	2047-05-30T06:37:37.419	0.02x	-21.78	122050.38	-10.88			
B (OER)	I	2047-05-30T06:44:44.176	1.55x	-23.15	117571.16	-10.09			
Saturn	I	2047-05-30T07:27:54.978		10.68	-31.05	59784.45		36.07	41.61
Saturn	E	2047-05-30T08:41:32.131		25.24	-42.12	59494.30		48.37	53.80
B (OER)	E	2047-05-30T08:42:32.338		25.43	-42.24	117571.16	10.17		
A (IER)	E	2047-05-30T08:49:35.531		26.73	-43.07	122050.38	10.98		
Encke (IEG)	E	2047-05-30T09:05:40.071		29.62	-44.77	133423.31	12.53		
Encke (OEG)	E	2047-05-30T09:06:05.699		29.69	-44.81	133744.89	12.57		
A (OER)	E	2047-05-30T09:10:03.726		30.38	-45.19	136774.40	12.89		
F ring	E	2047-05-30T09:14:45.909		31.19	-45.61	140461.00	13.24		

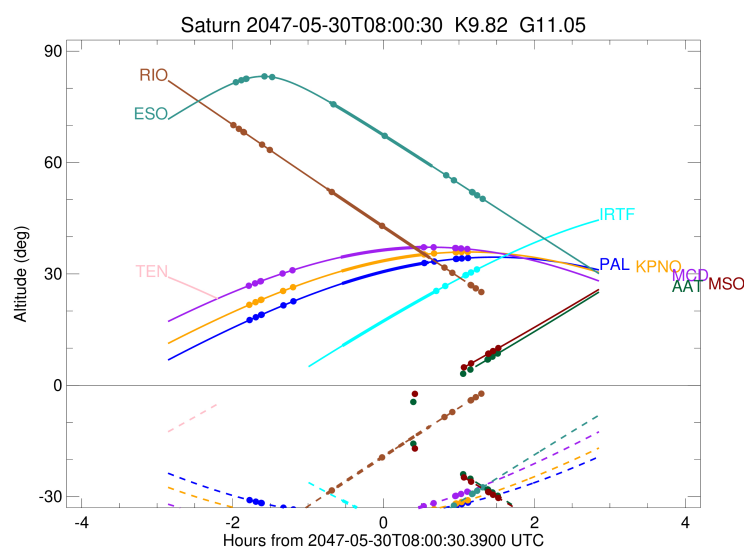
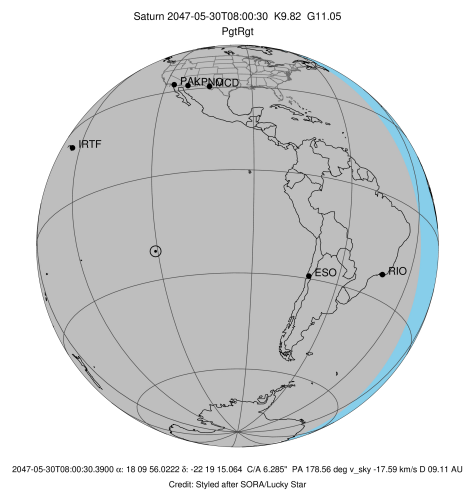
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-30T07:56:31.370
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 4069741276896724096
 2Mass ID (if available) : 18095602-2219149
 ICRS Star Coord at Epoch: 18h 09m 56.02219s -22:19:15.06391s
 RUWE (>1.4 is poor) : 0.65
 K magnitude : 9.825
 G magnitude : 11.052
 RP magnitude : 10.586
 BP magnitude : 11.331
 DUPflag : 0
 Distance (au) : 9.112
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.59
 Sun-Target sep (deg) : 155.90
 Sun-Moon sep (deg) : 140.88
 B (ring opening deg) : 26.23
 PA of pole (deg) : 5.70
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.134
 C/A sky separation (km) : 40537.3
 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	2047-05-30T06:01:05.571		70.10	-46.06	140461.00	-14.24		
A (OER)	I	2047-05-30T06:05:26.825		69.09	-45.06	136774.40	-13.97		
Encke (OEG)	I	2047-05-30T06:09:05.478		68.25	-44.23	133744.89	-13.73		
Encke (IEG)	I	2047-05-30T06:09:28.917		68.16	-44.15	133423.31	-13.71		
A (IER)	I	2047-05-30T06:23:53.014		64.84	-40.87	122050.38	-12.57		
B (OER)	I	2047-05-30T06:29:57.680		63.44	-39.49	117571.16	-11.99		
B (IER)	I	2047-05-30T07:19:15.269	b	52.11	-28.37	91984.69	-4.40		
Saturn	I	2047-05-30T07:15:25.979		52.98	-29.22	59881.01		31.74	37.06
Saturn	E	2047-05-30T08:37:24.213		34.31	-11.07	59621.59		43.01	48.61
B (IER)	E	2047-05-30T07:59:15.059	b	42.97	-19.45	91984.69	4.36		
B (OER)	E	2047-05-30T08:49:02.512		31.68	-8.55	117571.16	11.85		
A (IER)	E	2047-05-30T08:55:11.422		30.30	-7.22	122050.38	12.42		
Encke (IEG)	E	2047-05-30T09:09:46.455		27.03	-4.08x	133423.31	13.52		
Encke (OEG)	E	2047-05-30T09:10:10.210		26.94	-4.00x	133744.89	13.55		
A (OER)	E	2047-05-30T09:13:51.858		26.11	-3.21x	136774.40	13.78		
F ring	E	2047-05-30T09:18:16.811		25.12	-2.27x	140461.00	14.04		

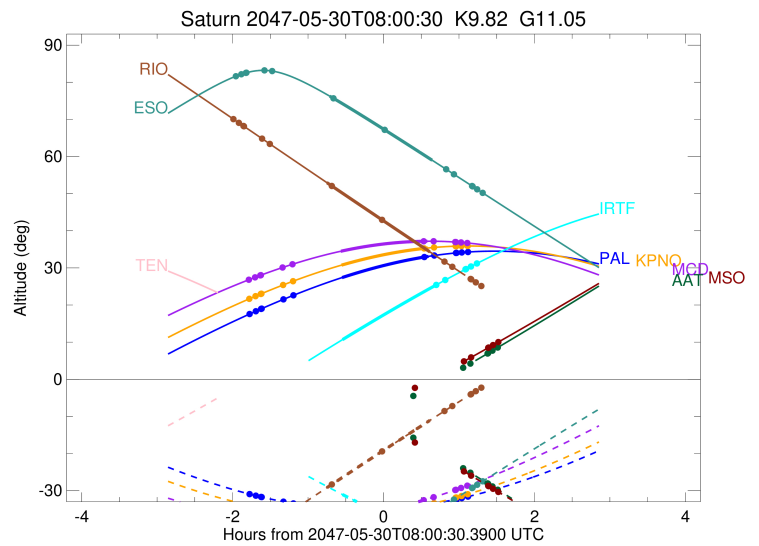
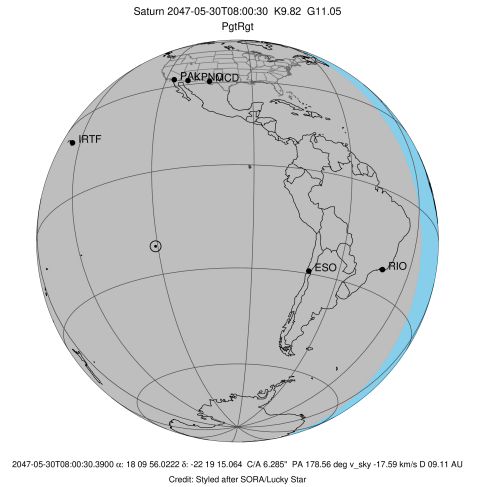
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-30T07:58:35.050
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4069741276896724096
 2Mass ID (if available) : 18095602-2219149
 ICRS Star Coord at Epoch: 18h 09m 56.02219s -22:19:15.06391s
 RUWE (>1.4 is poor) : 0.65
 K magnitude : 9.825
 G magnitude : 11.052
 RP magnitude : 10.586
 BP magnitude : 11.331
 DUPflag : 0
 Distance (au) : 9.112
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.59
 Sun-Target sep (deg) : 155.90
 Sun-Moon sep (deg) : 141.29
 B (ring opening deg) : 26.23
 PA of pole (deg) : 5.70
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.134
 C/A sky separation (km) : 40539.2
 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	2047-05-30T06:03:04.353		81.62	-69.98	140461.00	-14.29		
A (OER)	I	2047-05-30T06:07:24.755		82.16	-69.07	136774.40	-14.02		
Encke (OEG)	I	2047-05-30T06:11:02.637		82.53	-68.31	133744.89	-13.78		
Encke (IEG)	I	2047-05-30T06:11:25.990		82.57	-68.23	133423.31	-13.76		
A (IER)	I	2047-05-30T06:25:46.438		83.21	-65.17	122050.38	-12.63		
B (OER)	I	2047-05-30T06:31:49.248		83.03	-63.87	117571.16	-12.05		
B (IER)	I	2047-05-30T07:20:32.613	b	75.71	-53.29	91984.69	-4.53		
Saturn	I	2047-05-30T07:17:40.858		76.28	-53.92	59884.86		31.56	36.87
Saturn	E	2047-05-30T08:39:12.133		59.00	-36.15	59617.99		43.16	48.76
B (IER)	E	2047-05-30T08:01:19.551	b	67.21	-44.39	91984.69	4.50		
B (OER)	E	2047-05-30T08:50:23.422		56.56	-33.73	117571.16	11.97		
A (IER)	E	2047-05-30T08:56:28.645		55.22	-32.41	122050.38	12.54		
Encke (IEG)	E	2047-05-30T09:10:55.097		52.06	-29.30	133423.31	13.66		
Encke (OEG)	E	2047-05-30T09:11:18.621		51.98	-29.22	133744.89	13.68		
A (OER)	E	2047-05-30T09:14:58.112		51.17	-28.43	136774.40	13.92		
F ring	E	2047-05-30T09:19:20.489		50.22	-27.49	140461.00	14.18		

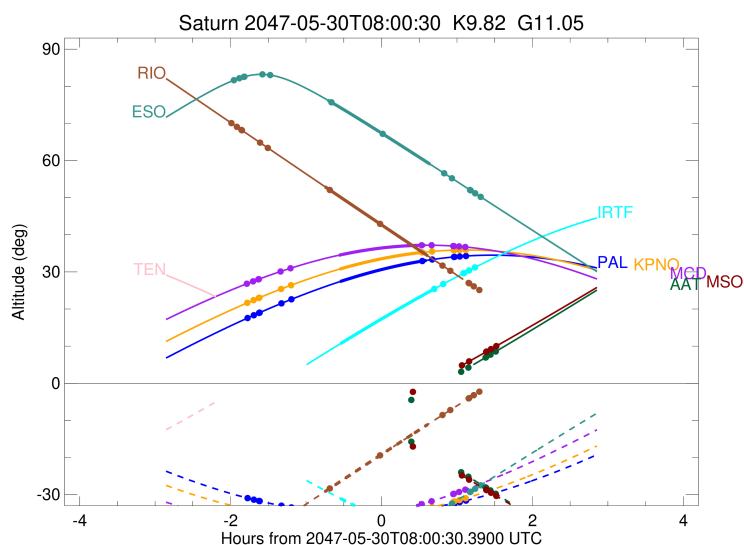
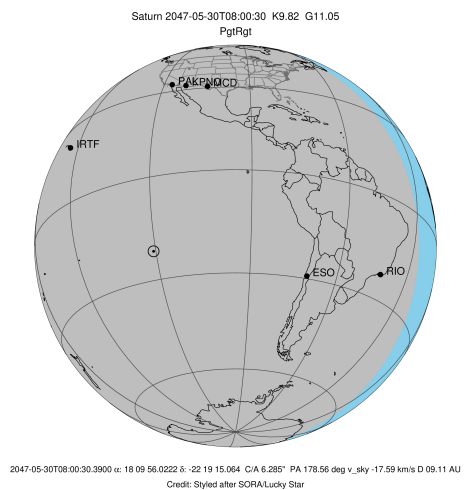
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-30T08:05:00.470
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 4069741276896724096
 2Mass ID (if available) : 18095602-2219149
 ICRS Star Coord at Epoch: 18h 09m 56.02219s -22:19:15.06391s
 RUWE (>1.4 is poor) : 0.65
 K magnitude : 9.825
 G magnitude : 11.052
 RP magnitude : 10.586
 BP magnitude : 11.331
 DUPflag : 0
 Distance (au) : 9.112
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.59
 Sun-Target sep (deg) : 155.90
 Sun-Moon sep (deg) : 141.50
 B (ring opening deg) : 26.23
 PA of pole (deg) : 5.70
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.714
 C/A sky separation (km) : 37761.9
 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	2047-05-30T06:01:18.205		-27.47x	11.87x	140461.00	-14.46		
A (OER)	I	2047-05-30T06:05:34.947		-26.93x	11.11x	136774.40	-14.26		
Encke (OEG)	I	2047-05-30T06:09:08.838		-26.47x	10.48x	133744.89	-14.07		
Encke (IEG)	I	2047-05-30T06:09:31.709		-26.42x	10.41x	133423.31	-14.05		
A (IER)	I	2047-05-30T06:23:25.621		-24.55x	7.90x	122050.38	-13.19		
B (OER)	I	2047-05-30T06:29:10.862		-23.75x	6.84x	117571.16	-12.75		
B (IER)	I	2047-05-30T07:09:16.163		-17.64x	-0.74x	91984.69	-7.92		
Saturn	I	2047-05-30T07:20:22.957		-15.81x	-2.91x	59960.46		27.94	32.95
Saturn	E	2047-05-30T08:49:05.223		0.23x	-20.89	59672.12		40.88	46.50
B (IER)	E	2047-05-30T08:24:07.665	b	-4.50x	-15.73	91984.69	7.93		
B (OER)	E	2047-05-30T09:03:53.652		3.11x	-23.98	117571.16	12.92		
A (IER)	E	2047-05-30T09:09:34.099		4.22x	-25.17	122050.38	13.38		
Encke (IEG)	E	2047-05-30T09:23:14.769		6.93	-28.05	133423.31	14.30		
Encke (OEG)	E	2047-05-30T09:23:37.246		7.01	-28.13	133744.89	14.32		
A (OER)	E	2047-05-30T09:27:07.368		7.71	-28.87	136774.40	14.52		
F ring	E	2047-05-30T09:31:19.403		8.55	-29.76	140461.00	14.74		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-30T08:04:49.030
 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 : 4069741276896724096
 2Mass ID (if available) : 18095602-2219149
 ICRS Star Coord at Epoch: 18h 09m 56.02219s -22:19:15.06391s
 RUWE (>1.4 is poor) : 0.65
 K magnitude : 9.825
 G magnitude : 11.052
 RP magnitude : 10.586
 BP magnitude : 11.331
 DUPflag : 0
 Distance (au) : 9.112
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.59
 Sun-Target sep (deg) : 155.90
 Sun-Moon sep (deg) : 141.50
 B (ring opening deg) : 26.23
 PA of pole (deg) : 5.70
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.666
 C/A sky separation (km) : 37444.9
 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	2047-05-30T06:00:54.266		-24.24x	9.66x	140461.00	-14.53		
A (OER)	I	2047-05-30T06:05:09.715		-23.74x	8.95x	136774.40	-14.33		
Encke (OEG)	I	2047-05-30T06:08:42.457		-23.32x	8.35x	133744.89	-14.15		
Encke (IEG)	I	2047-05-30T06:09:05.201		-23.28x	8.29x	133423.31	-14.13		
A (IER)	I	2047-05-30T06:22:53.793		-21.55x	5.92x	122050.38	-13.28		
B (OER)	I	2047-05-30T06:28:36.341		-20.80x	4.92x	117571.16	-12.86		
B (IER)	I	2047-05-30T07:08:02.349		-15.19x	-2.19x	91984.69	-8.18		
Saturn	I	2047-05-30T07:19:57.594		-13.35x	-4.40x	59966.93		27.61	32.60
Saturn	E	2047-05-30T08:49:08.323		1.98x	-21.74	59680.19		40.54	46.16
B (IER)	E	2047-05-30T08:25:23.026	b	-2.33x	-17.02	91984.69	8.20		
B (OER)	E	2047-05-30T09:04:30.448		4.83x	-24.83	117571.16	13.03		
A (IER)	E	2047-05-30T09:10:08.402		5.89	-25.96	122050.38	13.47		
Encke (IEG)	E	2047-05-30T09:23:44.309		8.47	-28.71	133423.31	14.37		
Encke (OEG)	E	2047-05-30T09:24:06.675		8.54	-28.79	133744.89	14.39		
A (OER)	E	2047-05-30T09:27:35.807		9.21	-29.50	136774.40	14.58		
F ring	E	2047-05-30T09:31:46.746		10.01	-30.34	140461.00	14.80		