

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-03-03T05:04:18.380
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3412095914578812928
 2Mass ID (if available) : 04590697+2122430

Saturn 2032-03-03T05:04:18 K9.76 G12.25 PgtRgt

ICRS Star Coord at Epoch: 04h 59m 06.97572s +21:22:42.83765s

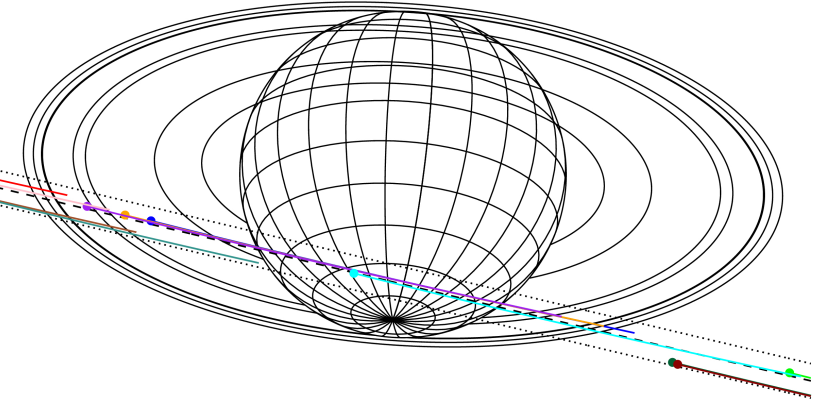
RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.760
 G magnitude : 12.255
 RP magnitude : 11.475
 BP magnitude : 12.900
 DUPflag : 0
 Distance (au) : 8.914
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 8.09
 Sun-Target sep (deg) : 93.11
 Sun-Moon sep (deg) : 154.00
 B (ring opening deg) : -26.71
 PA of pole (deg) : -4.08

#	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



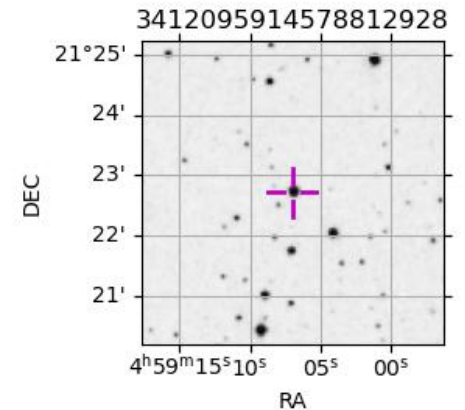
2032-03-03T05:04:18.3800 ra: 04 59 06.9757 s: +21 22 42.838 C/A 6.103° PA 346.63 deg v_sky + 8.09 km/s D 08.91 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PAL
 PMO
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 AAT
 MSO

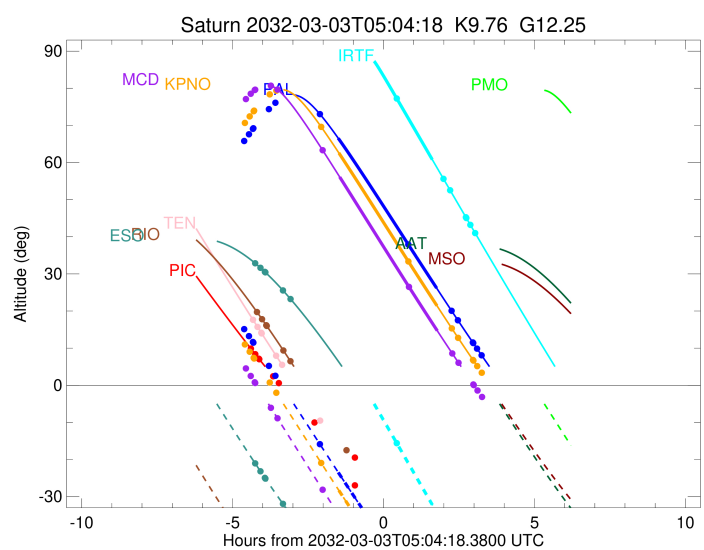
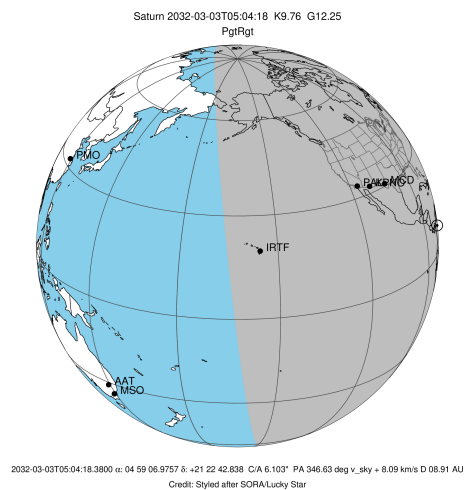


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+ + + +			MAR 03 00:40 - MAR 03 00:57	PnnRin
PAL	Palomar Mt (20	33.4	243.1		+ +	+ + + + + +	MAR 03 02:57 - MAR 03 08:19	PieRie
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4		+ +	+ + + + +	MAR 03 03:00 - MAR 03 08:10	PieRie
MCD	McDonald Obs.	30.7	256.0		+ + +	+ +	MAR 03 01:20 - MAR 03 07:33	PieRie
TEN	Teide Obs./Ten	28.3	343.5	+ + + + + +			MAR 03 00:44 - MAR 03 01:42	PnnRin
IRTF	Mauna Kea/IRTF	19.8	204.5		+ +	+ + + + + +	MAR 03 06:41 - MAR 03 08:06	PneRne
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+ + + + + +			MAR 03 00:52 - MAR 03 01:59	PnnRin
ESO	European South	-29.3	289.3	+ + + + + +			MAR 03 00:49 - MAR 03 01:59	PnnRin
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



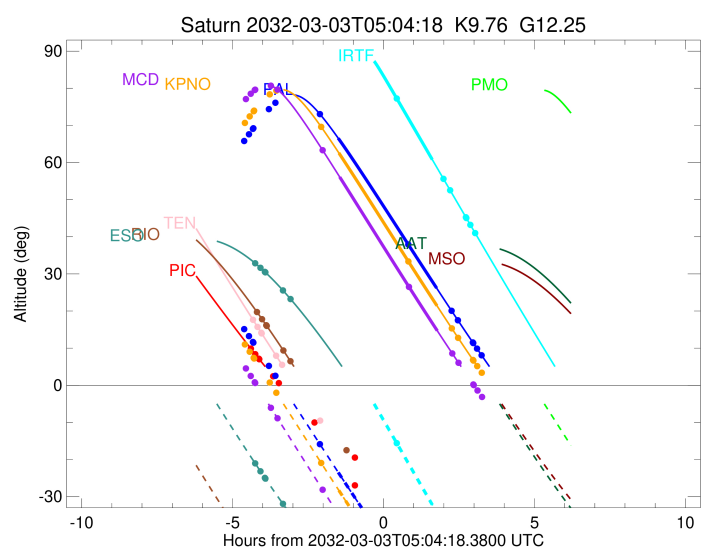
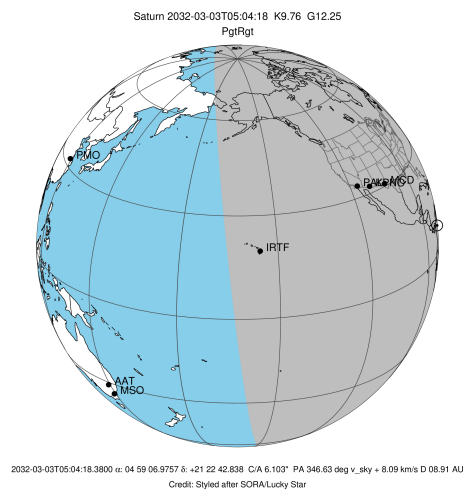
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-03-03T05:10:27.790
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 3412095914578812928
 2Mass ID (if available) : 04590697+2122430
 ICRS Star Coord at Epoch: 04h 59m 06.97572s +21:22:42.83765s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.760
 G magnitude : 12.255
 RP magnitude : 11.475
 BP magnitude : 12.900
 DUPflag : 0
 Distance (au) : 8.914
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 8.09
 Sun-Target sep (deg) : 93.11
 Sun-Moon sep (deg) : 154.07
 B (ring opening deg) : -26.71
 PA of pole (deg) : -4.08
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.295
 C/A sky separation (km) : 34236.0
 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	2032-03-03T00:40:47.888		9.85	-53.35	140461.00	-7.11		
A (OER)	I	2032-03-03T00:49:28.744		8.36	-52.96	136774.40	-7.05		
Encke (OEG)	I	2032-03-03T00:56:40.144		7.13	-52.57	133744.89	-7.00		
Encke (IEG)	I	2032-03-03T00:57:26.131		7.00	-52.52	133423.31	-6.99		
A (IER)	I	2032-03-03T01:25:01.636		2.40x	-50.43	122050.38	-6.74		
B (OER)	I	2032-03-03T01:36:13.012		0.59x	-49.35	117571.16	-6.61		
B (IER)	I	2032-03-03T02:47:16.494		-10.04x	-40.20	91984.69	-5.20		
C (IER)	I	2032-03-03T04:07:48.338	b	-19.51x	-26.91	74490.58	-1.62		
Saturn	I	2032-03-03T03:32:08.147		-15.73x	-33.04	60038.51		-23.32	-27.83
Saturn	E	2032-03-03T06:46:58.707		-25.38x	2.03x	59714.51		-38.12	-43.71
C (IER)	E	2032-03-03T05:00:31.204	b	-23.61x	-17.44	74490.58	1.63		
B (IER)	E	2032-03-03T06:19:39.485	b	-25.82x	-2.93x	91984.69	5.37		
B (OER)	E	2032-03-03T07:27:33.815		-23.62x	9.25x	117571.16	6.99		
A (IER)	E	2032-03-03T07:38:06.999		-22.96x	11.09x	122050.38	7.15		
Encke (IEG)	E	2032-03-03T08:03:59.711		-20.99x	15.49x	133423.31	7.48		
Encke (OEG)	E	2032-03-03T08:04:42.674		-20.93x	15.61x	133744.89	7.49		
A (OER)	E	2032-03-03T08:11:25.289		-20.34x	16.72x	136774.40	7.56		
F ring	E	2032-03-03T08:19:30.387		-19.60x	18.05x	140461.00	7.64		

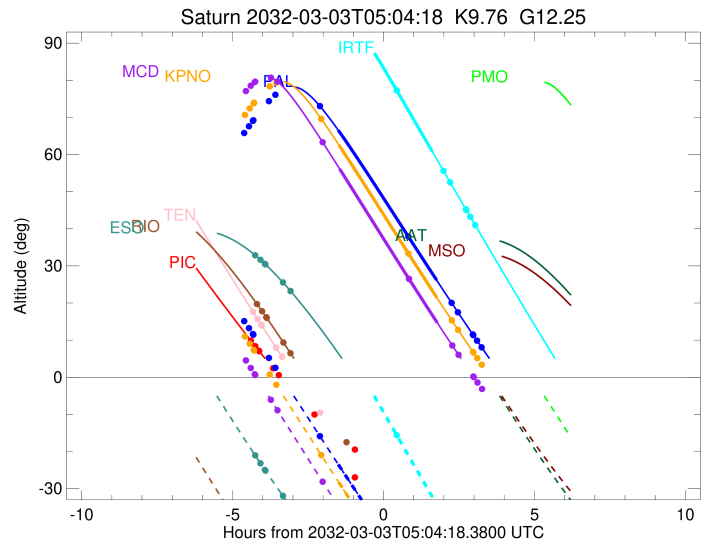
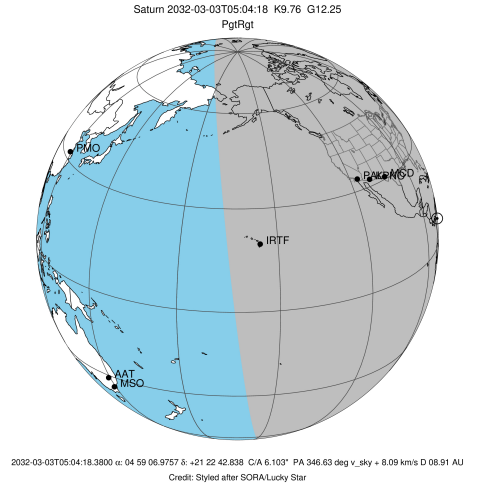
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-03-03T05:13:35.250
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3412095914578812928
 2Mass ID (if available) : 04590697+2122430
 ICRS Star Coord at Epoch: 04h 59m 06.97572s +21:22:42.83765s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.760
 G magnitude : 12.255
 RP magnitude : 11.475
 BP magnitude : 12.900
 DUPflag : 0
 Distance (au) : 8.914
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 8.09
 Sun-Target sep (deg) : 93.11
 Sun-Moon sep (deg) : 154.83
 B (ring opening deg) : -26.71
 PA of pole (deg) : -4.08
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.951
 C/A sky separation (km) : 38473.5
 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	2032-03-03T00:27:28.298		65.81	15.11x	140461.00	-6.53		
A (OER)	I	2032-03-03T00:36:57.269		67.62	13.22x	136774.40	-6.43		
Encke (OEG)	I	2032-03-03T00:44:51.703		69.09	11.64x	133744.89	-6.34		
Encke (IEG)	I	2032-03-03T00:45:42.456		69.25	11.47x	133423.31	-6.33		
A (IER)	I	2032-03-03T01:16:35.078		74.40	5.20x	122050.38	-5.93		
B (OER)	I	2032-03-03T01:29:22.808		76.10	2.57x	117571.16	-5.73		
B (IER)	I	2032-03-03T02:57:57.762		73.03	-15.89	91984.69	-3.65		
Saturn	I	2032-03-03T03:34:14.483		66.57	-23.44	59964.88		-27.09	-32.03
Saturn	E	2032-03-03T06:50:05.764		26.14	-58.93	59610.27		-42.36	-47.97
B (IER)	E	2032-03-03T05:53:33.510	b	37.93	-50.56	91984.69	3.70		
B (OER)	E	2032-03-03T07:20:02.439		19.98	-61.88	117571.16	5.93		
A (IER)	E	2032-03-03T07:32:24.204		17.46	-62.67	122050.38	6.15		
Encke (IEG)	E	2032-03-03T08:02:07.777		11.48	-63.37	133423.31	6.59		
Encke (OEG)	E	2032-03-03T08:02:56.520		11.32	-63.37	133744.89	6.60		
A (OER)	E	2032-03-03T08:10:31.888		9.81	-63.25	136774.40	6.70		
F ring	E	2032-03-03T08:19:37.339		8.02	-62.96	140461.00	6.81		

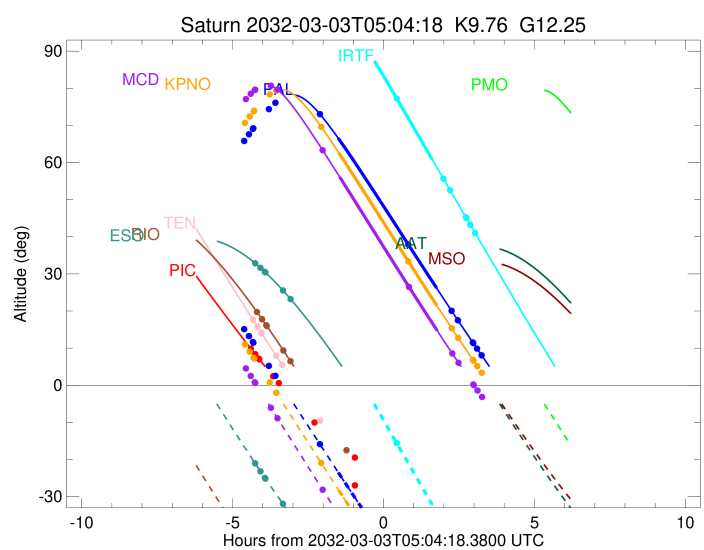
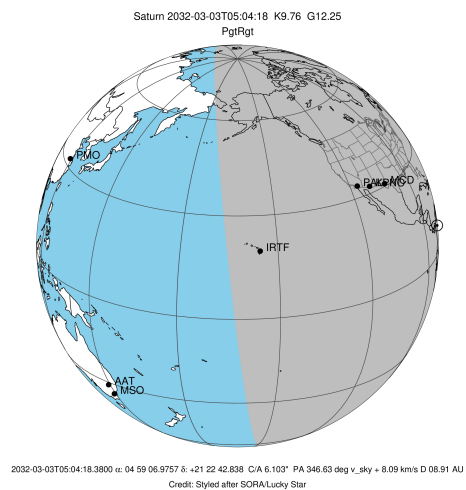
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-03-03T05:14:32.320
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 3412095914578812928
 2Mass ID (if available) : 04590697+2122430
 ICRS Star Coord at Epoch: 04h 59m 06.97572s +21:22:42.83765s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.760
 G magnitude : 12.255
 RP magnitude : 11.475
 BP magnitude : 12.900
 DUPflag : 0
 Distance (au) : 8.914
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 8.09
 Sun-Target sep (deg) : 93.11
 Sun-Moon sep (deg) : 154.86
 B (ring opening deg) : -26.71
 PA of pole (deg) : -4.08
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.964
 C/A sky separation (km) : 38558.4
 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	2032-03-03T00:28:50.893		70.68	10.98x	140461.00	-6.49		
A (OER)	I	2032-03-03T00:38:23.499		72.44	9.02x	136774.40	-6.39		
Encke (OEG)	I	2032-03-03T00:46:20.967		73.84	7.38x	133744.89	-6.30		
Encke (IEG)	I	2032-03-03T00:47:12.044		73.99	7.20x	133423.31	-6.29		
A (IER)	I	2032-03-03T01:18:16.632		78.37	0.71x	122050.38	-5.89		
B (OER)	I	2032-03-03T01:31:09.451		79.36	-2.00x	117571.16	-5.70		
B (IER)	I	2032-03-03T03:00:31.777		69.59	-20.95	91984.69	-3.60		
Saturn	I	2032-03-03T03:35:33.621		62.59	-28.32	59960.83		-27.29	-32.24
Saturn	E	2032-03-03T06:50:32.620		21.42	-62.44	59610.24		-42.36	-47.97
B (IER)	E	2032-03-03T05:53:44.794	b	33.35	-54.95	91984.69	3.66		
B (OER)	E	2032-03-03T07:20:28.635		15.24	-64.44	117571.16	5.94		
A (IER)	E	2032-03-03T07:32:49.374		12.73	-64.75	122050.38	6.16		
Encke (IEG)	E	2032-03-03T08:02:28.999		6.76	-64.14	133423.31	6.61		
Encke (OEG)	E	2032-03-03T08:03:17.610		6.60	-64.10	133744.89	6.62		
A (OER)	E	2032-03-03T08:10:51.694		5.10	-63.64	136774.40	6.72		
F ring	E	2032-03-03T08:19:55.493		3.32x	-62.95	140461.00	6.84		

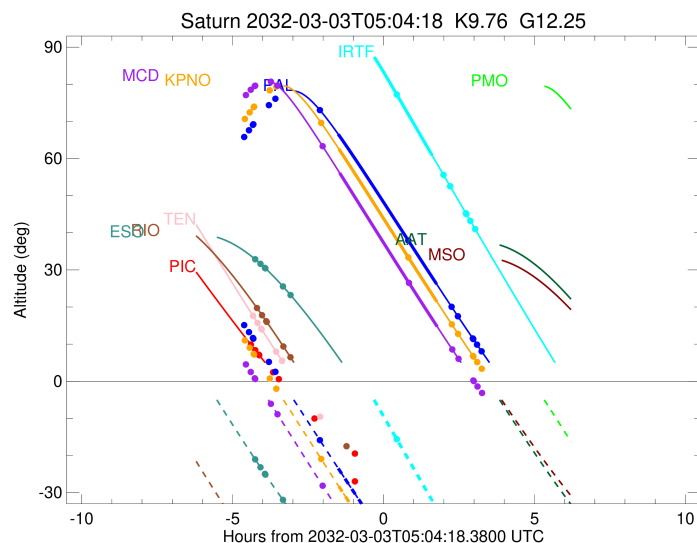
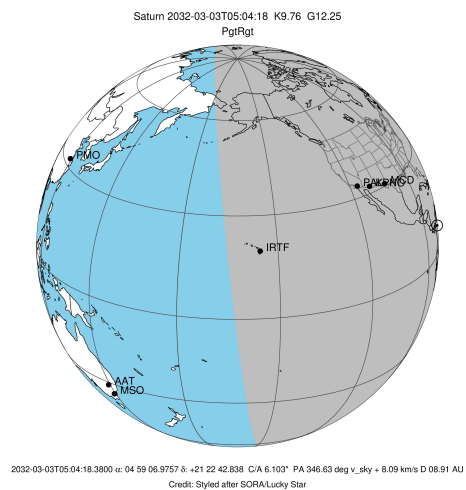
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-03-03T05:15:44.660
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 3412095914578812928
 2Mass ID (if available) : 04590697+2122430
 ICRS Star Coord at Epoch: 04h 59m 06.97572s +21:22:42.83765s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.760
 G magnitude : 12.255
 RP magnitude : 11.475
 BP magnitude : 12.900
 DUPflag : 0
 Distance (au) : 8.914
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 8.09
 Sun-Target sep (deg) : 93.11
 Sun-Moon sep (deg) : 154.89
 B (ring opening deg) : -26.71
 PA of pole (deg) : -4.08
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.965
 C/A sky separation (km) : 38567.0
 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	2032-03-03T00:30:52.485		77.11	4.52x	140461.00	-6.45		
A (OER)	I	2032-03-03T00:40:28.755		78.54	2.48x	136774.40	-6.35		
Encke (OEG)	I	2032-03-03T00:48:29.194		79.54	0.78x	133744.89	-6.26		
Encke (IEG)	I	2032-03-03T00:49:20.585		79.63	0.60x	133423.31	-6.25		
A (IER)	I	2032-03-03T01:20:36.031		80.70	-6.09	122050.38	-5.86		
B (OER)	I	2032-03-03T01:33:33.042		79.66	-8.88	117571.16	-5.67		
B (IER)	I	2032-03-03T03:03:24.703		63.30	-28.16	91984.69	-3.57		
Saturn	I	2032-03-03T03:37:11.910		56.11	-35.27	59957.58		-27.45	-32.42
Saturn	E	2032-03-03T06:51:09.701		14.69	-65.75	59612.78		-42.26	-47.87
B (IER)	E	2032-03-03T05:54:54.505	b	26.51	-60.59	91984.69	3.66		
B (OER)	E	2032-03-03T07:21:23.597		8.49	-65.86	117571.16	5.97		
A (IER)	E	2032-03-03T07:33:40.210		6.01	-65.31	122050.38	6.19		
Encke (IEG)	E	2032-03-03T08:03:08.988		0.16x	-62.77	133423.31	6.65		
Encke (OEG)	E	2032-03-03T08:03:57.288		0.00x	-62.68	133744.89	6.66		
A (OER)	E	2032-03-03T08:11:28.437		-1.46x	-61.79	136774.40	6.77		
F ring	E	2032-03-03T08:20:28.656		-3.20x	-60.62	140461.00	6.88		

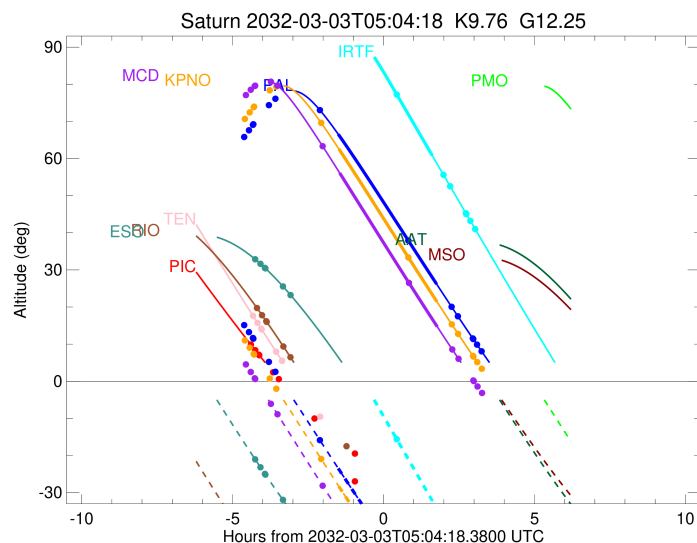
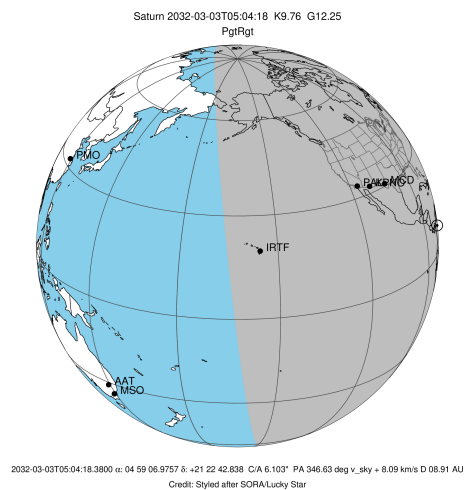
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-03-03T05:13:45.180
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 3412095914578812928
 2Mass ID (if available) : 04590697+2122430
 ICRS Star Coord at Epoch: 04h 59m 06.97572s +21:22:42.83765s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.760
 G magnitude : 12.255
 RP magnitude : 11.475
 BP magnitude : 12.900
 DUPflag : 0
 Distance (au) : 8.914
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 8.09
 Sun-Target sep (deg) : 93.11
 Sun-Moon sep (deg) : 154.25
 B (ring opening deg) : -26.71
 PA of pole (deg) : -4.08
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.524
 C/A sky separation (km) : 35715.8
 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



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	2032-03-03T00:44:59.106		17.62	-67.18	140461.00	-6.86		
A (OER)	I	2032-03-03T00:53:58.915		15.70	-67.81	136774.40	-6.80		
Encke (OEG)	I	2032-03-03T01:01:26.471		14.12	-68.19	133744.89	-6.74		
Encke (IEG)	I	2032-03-03T01:02:14.207		13.96	-68.22	133423.31	-6.73		
A (IER)	I	2032-03-03T01:30:56.870		7.94	-68.31	122050.38	-6.45		
B (OER)	I	2032-03-03T01:42:38.433		5.52	-67.74	117571.16	-6.31		
B (IER)	I	2032-03-03T02:58:26.612		-9.54x	-57.93	91984.69	-4.71		
Saturn	I	2032-03-03T03:37:26.804		-16.73x	-50.61	60004.56		-25.11	-29.83
Saturn	E	2032-03-03T06:47:42.549		-39.81x	-9.72	59686.10		-39.29	-44.90
B (IER)	E	2032-03-03T06:13:46.798	b	-37.88x	-17.20	91984.69	4.92		
B (OER)	E	2032-03-03T07:25:08.174		-40.43x	-1.49x	117571.16	6.82		
A (IER)	E	2032-03-03T07:35:56.185		-40.30x	0.88x	122050.38	7.00		
Encke (IEG)	E	2032-03-03T08:02:15.142		-39.42x	6.60x	133423.31	7.38		
Encke (OEG)	E	2032-03-03T08:02:58.660		-39.39x	6.76x	133744.89	7.39		
A (OER)	E	2032-03-03T08:09:46.087		-39.03x	8.23x	136774.40	7.48		
F ring	E	2032-03-03T08:17:56.108		-38.53x	9.99x	140461.00	7.57		

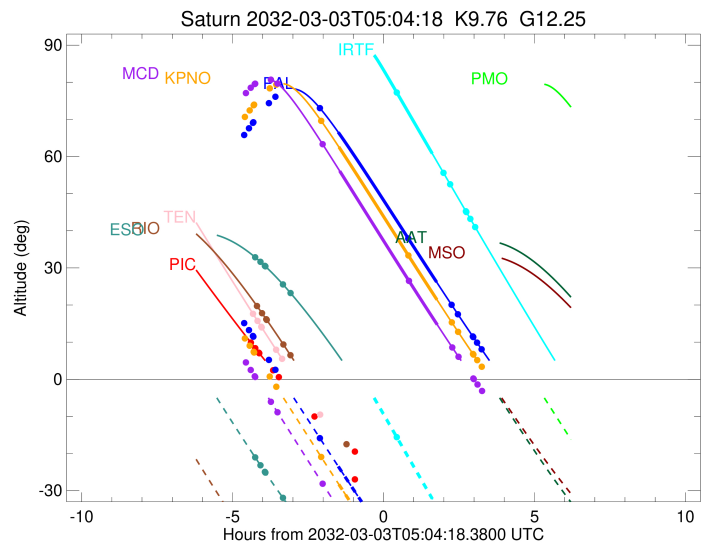
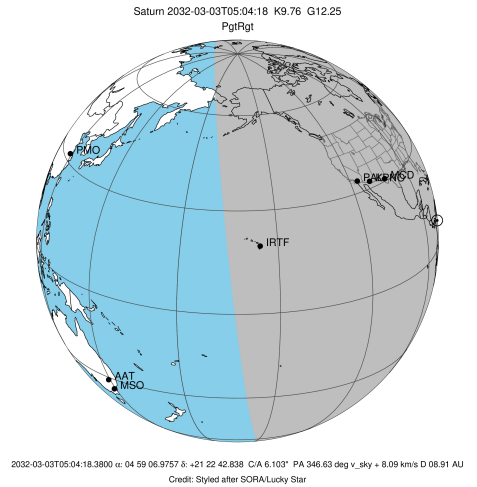
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-03-03T05:04:50.310
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 3412095914578812928
 2Mass ID (if available) : 04590697+2122430
 ICRS Star Coord at Epoch: 04h 59m 06.97572s +21:22:42.83765s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.760
 G magnitude : 12.255
 RP magnitude : 11.475
 BP magnitude : 12.900
 DUPflag : 0
 Distance (au) : 8.914
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 8.09
 Sun-Target sep (deg) : 93.11
 Sun-Moon sep (deg) : 154.50
 B (ring opening deg) : -26.71
 PA of pole (deg) : -4.08
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.156
 C/A sky separation (km) : 39798.9
 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	2032-03-03T00:20:05.201		30.16	52.84x	140461.00	-6.68		
A (OER)	I	2032-03-03T00:29:21.610		32.28	51.21x	136774.40	-6.57		
Encke (OEG)	I	2032-03-03T00:37:06.465		34.06	49.79x	133744.89	-6.47		
Encke (IEG)	I	2032-03-03T00:37:56.244		34.26	49.63x	133423.31	-6.45		
A (IER)	I	2032-03-03T01:08:21.280		41.27	43.72x	122050.38	-5.99		
B (OER)	I	2032-03-03T01:21:03.011		44.20	41.12x	117571.16	-5.77		
B (IER)	I	2032-03-03T02:52:05.806		65.39	21.24x	91984.69	-3.34		
Saturn	I	2032-03-03T03:26:47.413		73.48	13.32x	59950.98		-27.76	-32.77
Saturn	E	2032-03-03T06:41:17.146		60.79	-32.19	59559.63		-44.41	-49.98
B (IER)	E	2032-03-03T05:30:38.885	b	77.26	-15.59	91984.69	3.28		
B (OER)	E	2032-03-03T07:03:56.611		55.51	-37.50	117571.16	5.60		
A (IER)	E	2032-03-03T07:17:00.862		52.47	-40.55	122050.38	5.82		
Encke (IEG)	E	2032-03-03T07:48:22.624		45.19	-47.80	133423.31	6.25		
Encke (OEG)	E	2032-03-03T07:49:13.996		44.99	-48.00	133744.89	6.27		
A (OER)	E	2032-03-03T07:57:13.831		43.14	-49.83	136774.40	6.36		
F ring	E	2032-03-03T08:06:48.379		40.93	-52.02	140461.00	6.47		

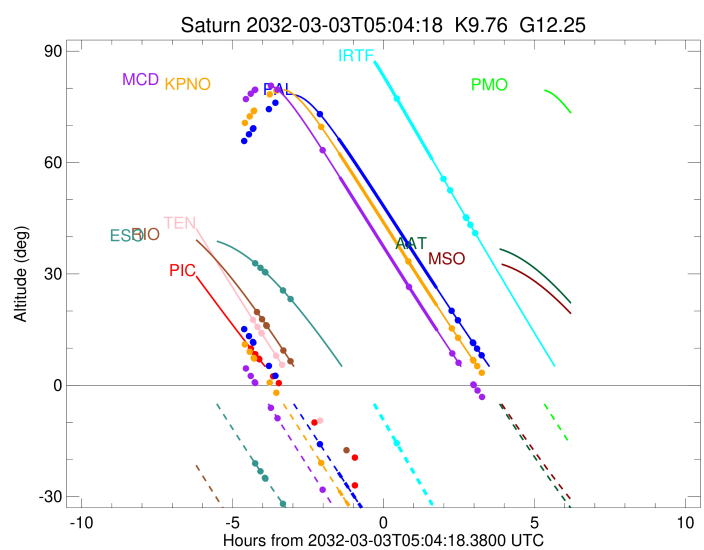
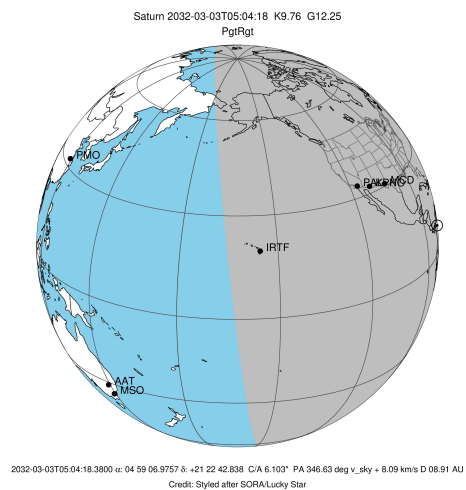
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-03-03T05:15:39.090
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 3412095914578812928
 2Mass ID (if available) : 04590697+2122430
 ICRS Star Coord at Epoch: 04h 59m 06.97572s +21:22:42.83765s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.760
 G magnitude : 12.255
 RP magnitude : 11.475
 BP magnitude : 12.900
 DUPflag : 0
 Distance (au) : 8.914
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 8.09
 Sun-Target sep (deg) : 93.11
 Sun-Moon sep (deg) : 154.44
 B (ring opening deg) : -26.71
 PA of pole (deg) : -4.08
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.455
 C/A sky separation (km) : 41734.3
 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	2032-03-03T00:52:52.852		19.72	-46.34	140461.00	-6.14		
A (OER)	I	2032-03-03T01:02:57.804		17.79	-48.13	136774.40	-6.04		
Encke (OEG)	I	2032-03-03T01:11:23.039		16.15	-49.57	133744.89	-5.95		
Encke (IEG)	I	2032-03-03T01:12:17.141		15.97	-49.72	133423.31	-5.94		
A (IER)	I	2032-03-03T01:45:23.513		9.35	-54.76	122050.38	-5.49		
B (OER)	I	2032-03-03T01:59:17.011		6.50	-56.51	117571.16	-5.25		
B (IER)	I	2032-03-03T03:50:51.365	b	-17.52x	-58.53	91984.69	-1.91		
Saturn	I	2032-03-03T03:48:17.691		-16.95x	-58.75	59863.74		-31.78	-37.10
Saturn	E	2032-03-03T06:40:14.914		-55.95x	-29.71	59539.72		-45.21	-50.76
B (IER)	E	2032-03-03T05:13:27.151	b	-36.08x	-46.96	91984.69	1.95		
B (OER)	E	2032-03-03T06:59:20.017		-60.35x	-25.61	117571.16	5.71		
A (IER)	E	2032-03-03T07:12:03.910		-63.28x	-22.84	122050.38	6.01		
Encke (IEG)	E	2032-03-03T07:42:04.237		-70.22x	-16.20	133423.31	6.60		
Encke (OEG)	E	2032-03-03T07:42:52.900		-70.40x	-16.02	133744.89	6.62		
A (OER)	E	2032-03-03T07:50:26.451		-72.15x	-14.33	136774.40	6.74		
F ring	E	2032-03-03T07:59:27.456		-74.24x	-12.31	140461.00	6.88		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-03-03T05:15:50.660
 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 : 3412095914578812928
 2Mass ID (if available) : 04590697+2122430
 ICRS Star Coord at Epoch: 04h 59m 06.97572s +21:22:42.83765s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.760
 G magnitude : 12.255
 RP magnitude : 11.475
 BP magnitude : 12.900
 DUPflag : 0
 Distance (au) : 8.914
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 8.09
 Sun-Target sep (deg) : 93.11
 Sun-Moon sep (deg) : 154.62
 B (ring opening deg) : -26.71
 PA of pole (deg) : -4.08
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.711
 C/A sky separation (km) : 43387.2
 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	2032-03-03T00:49:18.527		32.86	-21.06	140461.00	-5.91		
A (OER)	I	2032-03-03T00:59:48.767		31.63	-23.19	136774.40	-5.79		
Encke (OEG)	I	2032-03-03T01:08:37.081		30.53	-24.96	133744.89	-5.68		
Encke (IEG)	I	2032-03-03T01:09:33.766		30.41	-25.15	133423.31	-5.67		
A (IER)	I	2032-03-03T01:44:32.802		25.54	-31.96	122050.38	-5.14		
B (OER)	I	2032-03-03T01:59:26.466		23.24	-34.73	117571.16	-4.87		
Saturn	I	2032-03-03T03:49:49.357		3.49x	-51.01	59824.94		-33.47	-38.90
Saturn	E	2032-03-03T06:38:56.955		-31.73x	-46.40	59494.54		-47.04	-52.53
B (OER)	E	2032-03-03T06:51:37.239		-34.48x	-44.58	117571.16	5.24		
A (IER)	E	2032-03-03T07:05:25.443		-37.48x	-42.46	122050.38	5.57		
Encke (IEG)	E	2032-03-03T07:37:30.534		-44.49x	-37.06	133423.31	6.22		
Encke (OEG)	E	2032-03-03T07:38:22.160		-44.68x	-36.91	133744.89	6.24		
A (OER)	E	2032-03-03T07:46:22.472		-46.43x	-35.47	136774.40	6.38		
F ring	E	2032-03-03T07:55:53.520		-48.52x	-33.72	140461.00	6.53		