

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-04-20T10:35:15.690
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4120809395806543360
 2Mass ID (if available) : 17264804-2139528

Saturn 2046-04-20T10:35:15 K8.91 G14.04 PgtRgt

ICRS Star Coord at Epoch: 17h 26m 48.03017s -21:39:53.03961s

RUWE (>1.4 is poor) : 1.12
 K magnitude : 8.909
 G magnitude : 14.044
 RP magnitude : 12.743
 BP magnitude : 16.003
 DUPflag : 0
 Distance (au) : 9.386
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -8.59
 Sun-Target sep (deg) : 127.58
 Sun-Moon sep (deg) : 57.22
 B (ring opening deg) : 26.49
 PA of pole (deg) : 4.77

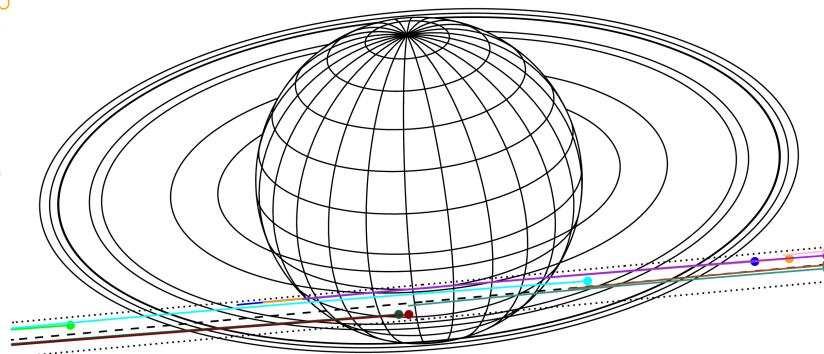
a(km) ring

- 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



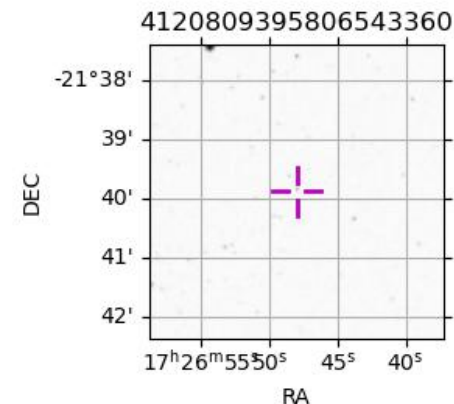
2046-04-20T10:35:15.6900 α: 17 26 48.0302 δ: -21 39 53.040 C/A 6.576° PA 5.29 deg v_sky - 8.59 km/s D 09.39 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 PMO
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 AAT
 MSO

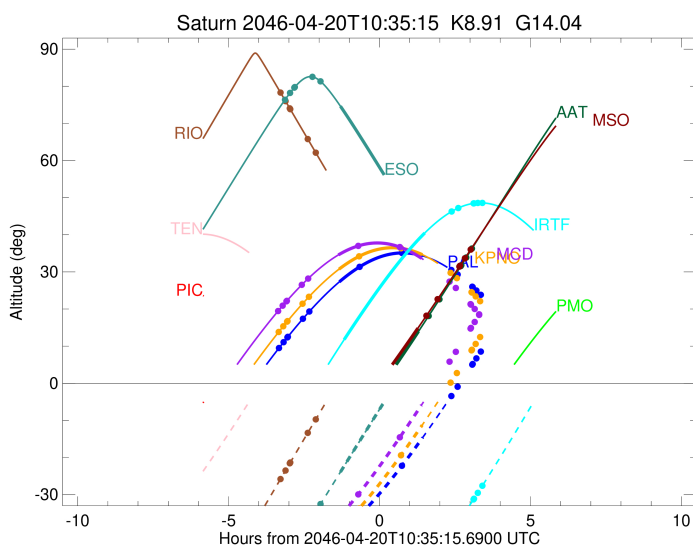
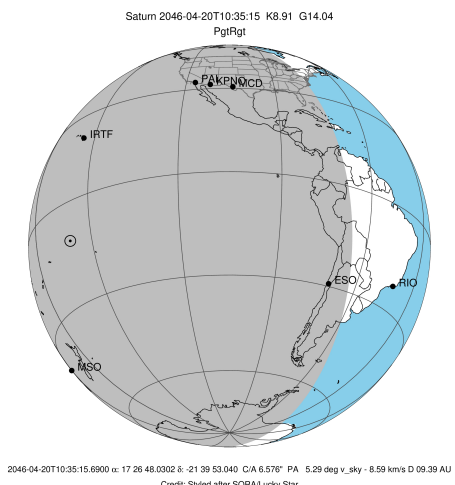


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1	+ + + + +	+ +		APR 20 07:15 - APR 20 12:01	PieRin
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4	+ + + + +	+ +		APR 20 07:14 - APR 20 12:00	PieRin
MCD	McDonald Obs.	30.7	256.0	+ + + + +	+ +		APR 20 07:13 - APR 20 11:58	PieRin
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5		+ +	+ + + + +	APR 20 09:24 - APR 20 13:59	PieRne
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+ + + + +			APR 20 07:18 - APR 20 08:28	PnnRin
ESO	European South	-29.3	289.3	+ + + + +	+		APR 20 07:27 - APR 20 09:17	PinRin
AAT	Siding Spring	-31.3	149.1		+	+ + + + +	APR 20 11:53 - APR 20 13:39	PneRne
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0		+	+ + + + +	APR 20 11:51 - APR 20 13:36	PneRne

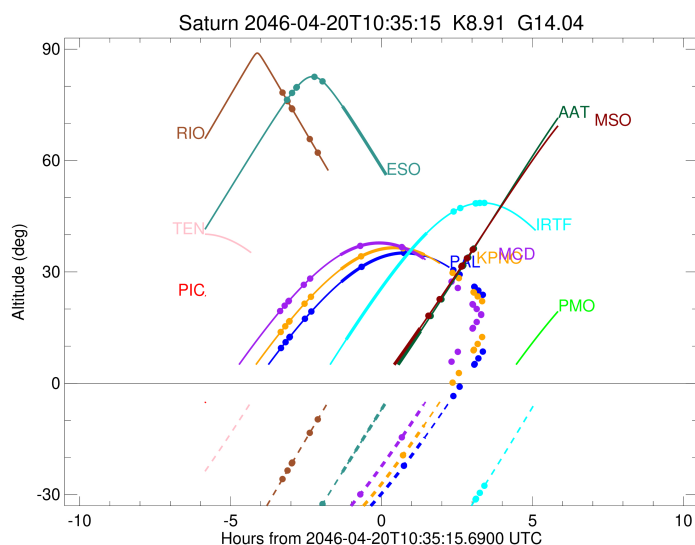
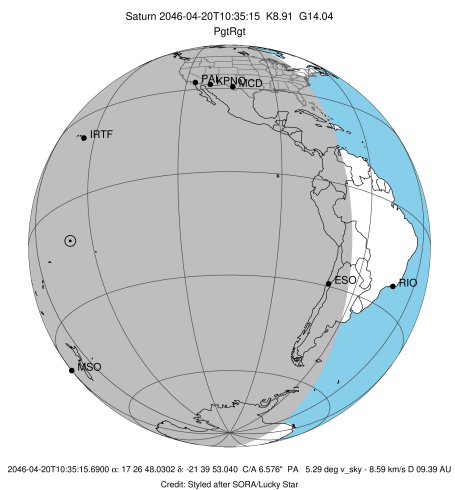


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-04-20T10:38:36.430
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4120809395806543360
 2Mass ID (if available) : 17264804-2139528
 ICRS Star Coord at Epoch: 17h 26m 48.03017s -21:39:53.03961s
 RUWE (>1.4 is poor) : 1.12
 K magnitude : 8.909
 G magnitude : 14.044
 RP magnitude : 12.743
 BP magnitude : 16.003
 DUPflag : 0
 Distance (au) : 9.386
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -8.59
 Sun-Target sep (deg) : 127.58
 Sun-Moon sep (deg) : 57.64
 B (ring opening deg) : 26.49
 PA of pole (deg) : 4.77
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.832
 C/A sky separation (km) : 39699.8
 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	2046-04-20T07:15:32.259		9.50	-44.62	140461.00	-6.78		
A (OER)	I	2046-04-20T07:24:40.254		11.08	-44.91	136774.40	-6.67		
Encke (OEG)	I	2046-04-20T07:32:17.859		12.38	-45.08	133744.89	-6.57		
Encke (IEG)	I	2046-04-20T07:33:06.858		12.51	-45.10	133423.31	-6.56		
A (IER)	I	2046-04-20T08:03:05.876		17.38	-45.02	122050.38	-6.06		
B (OER)	I	2046-04-20T08:15:40.867		19.31	-44.65	117571.16	-5.80		
B (IER)	I	2046-04-20T09:55:55.367	b	31.38	-35.56	91984.69	-2.23		
Saturn	I	2046-04-20T09:15:27.391		27.32	-40.40	59763.79		-36.48	-42.03
Saturn	E	2046-04-20T12:01:13.761		34.32	-14.59	59757.20		-36.76	-42.32
B (IER)	E	2046-04-20T11:19:49.057	b	35.12	-22.22	91984.69	2.25		
B (OER)	E	2046-04-20T12:58:30.182		30.47	-3.36x	117571.16	5.94		
A (IER)	E	2046-04-20T13:10:46.457		29.27	-0.89x	122050.38	6.22		
Encke (IEG)	E	2046-04-20T13:39:54.889		25.98	5.07x	133423.31	6.76		
Encke (OEG)	E	2046-04-20T13:40:42.394		25.88	5.23x	133744.89	6.78		
A (OER)	E	2046-04-20T13:48:05.756		24.95	6.75x	136774.40	6.89		
F ring	E	2046-04-20T13:56:56.007		23.79	8.58x	140461.00	7.01		

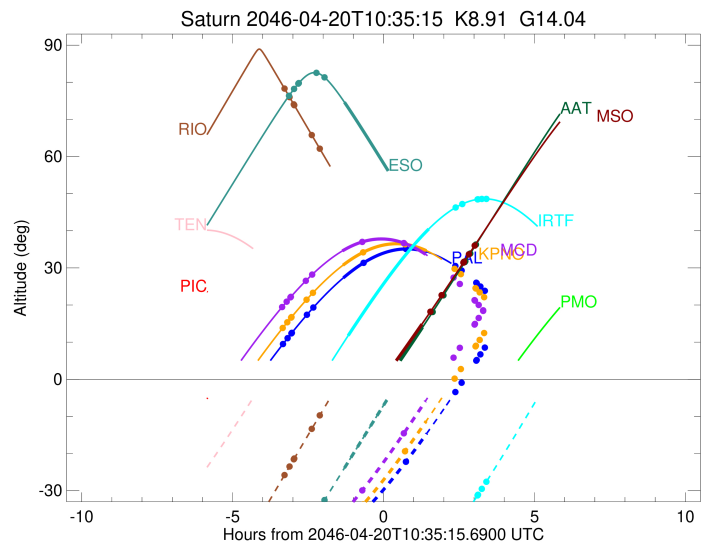
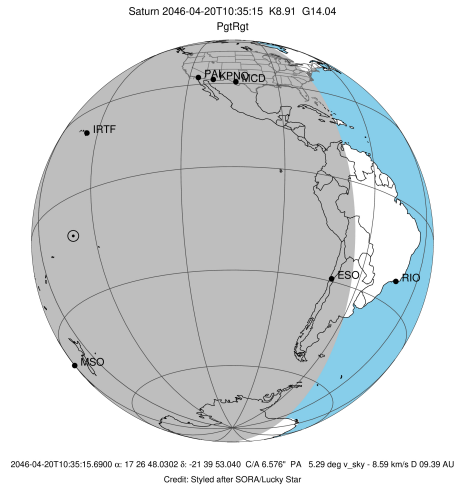
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-04-20T10:37:37.400
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 4120809395806543360
 2Mass ID (if available) : 17264804-2139528
 ICRS Star Coord at Epoch: 17h 26m 48.03017s -21:39:53.03961s
 RUWE (>1.4 is poor) : 1.12
 K magnitude : 8.909
 G magnitude : 14.044
 RP magnitude : 12.743
 BP magnitude : 16.003
 DUPflag : 0
 Distance (au) : 9.386
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -8.59
 Sun-Target sep (deg) : 127.58
 Sun-Moon sep (deg) : 57.70
 B (ring opening deg) : 26.49
 PA of pole (deg) : 4.77
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.835
 C/A sky separation (km) : 39724.3
 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	2046-04-20T07:14:58.423		13.83	-46.53	140461.00	-6.81		
A (OER)	I	2046-04-20T07:24:04.043		15.36	-46.60	136774.40	-6.70		
Encke (OEG)	I	2046-04-20T07:31:39.720		16.62	-46.57	133744.89	-6.60		
Encke (IEG)	I	2046-04-20T07:32:28.516		16.75	-46.56	133423.31	-6.58		
A (IER)	I	2046-04-20T08:02:20.546		21.44	-45.69	122050.38	-6.08		
B (OER)	I	2046-04-20T08:14:52.923		23.28	-44.99	117571.16	-5.82		
B (IER)	I	2046-04-20T09:55:03.318	b	34.21	-33.68	91984.69	-2.21		
Saturn	I	2046-04-20T09:14:41.048		30.73	-39.28	59764.43		-36.45	-42.00
Saturn	E	2046-04-20T12:00:08.408		34.66	-11.26	59755.02		-36.85	-42.41
B (IER)	E	2046-04-20T11:18:01.084	b	36.35	-19.40	91984.69	2.23		
B (OER)	E	2046-04-20T12:56:57.625		29.70	0.25x	117571.16	5.93		
A (IER)	E	2046-04-20T13:09:15.070		28.29	2.80x	122050.38	6.21		
Encke (IEG)	E	2046-04-20T13:38:26.634		24.52	8.91x	133423.31	6.75		
Encke (OEG)	E	2046-04-20T13:39:14.232		24.41	9.08x	133744.89	6.76		
A (OER)	E	2046-04-20T13:46:38.488		23.36	10.64x	136774.40	6.87		
F ring	E	2046-04-20T13:55:29.862		22.08	12.51x	140461.00	7.00		

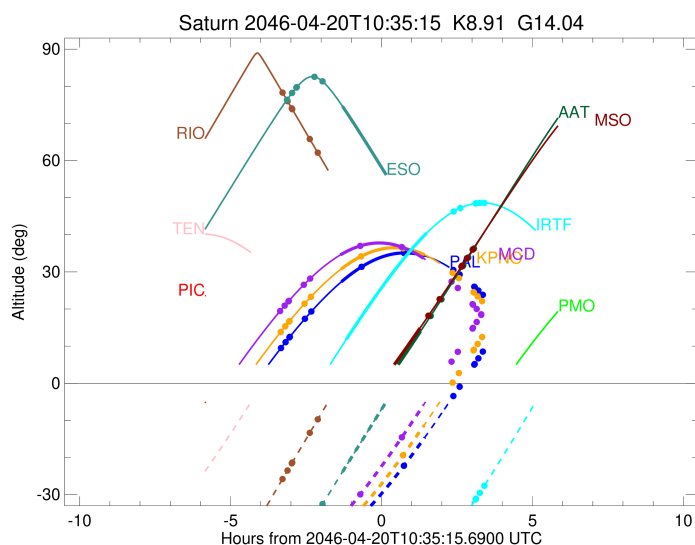
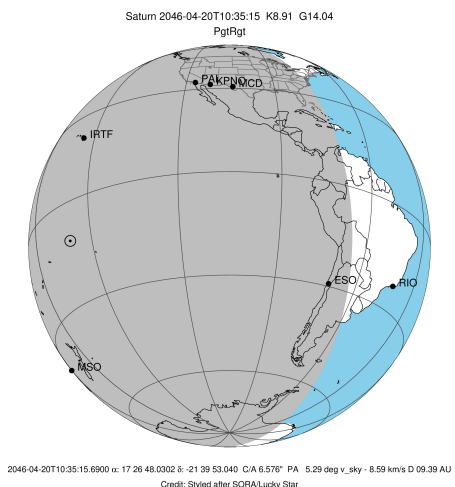
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-04-20T10:36:08.390
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 4120809395806543360
 2Mass ID (if available) : 17264804-2139528
 ICRS Star Coord at Epoch: 17h 26m 48.03017s -21:39:53.03961s
 RUWE (>1.4 is poor) : 1.12
 K magnitude : 8.909
 G magnitude : 14.044
 RP magnitude : 12.743
 BP magnitude : 16.003
 DUPflag : 0
 Distance (au) : 9.386
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -8.59
 Sun-Target sep (deg) : 127.58
 Sun-Moon sep (deg) : 57.78
 B (ring opening deg) : 26.49
 PA of pole (deg) : 4.77
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.838
 C/A sky separation (km) : 39740.3
 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	2046-04-20T07:13:47.109		19.47	-47.65	140461.00	-6.85		
A (OER)	I	2046-04-20T07:22:49.515		20.91	-47.36	136774.40	-6.74		
Encke (OEG)	I	2046-04-20T07:30:22.587		22.09	-47.03	133744.89	-6.63		
Encke (IEG)	I	2046-04-20T07:31:11.108		22.21	-46.99	133423.31	-6.62		
A (IER)	I	2046-04-20T08:00:53.688		26.53	-44.99	122050.38	-6.11		
B (OER)	I	2046-04-20T08:13:22.499		28.19	-43.85	117571.16	-5.85		
B (IER)	I	2046-04-20T09:53:19.424	b	37.02	-29.89	91984.69	-2.21		
Saturn	I	2046-04-20T09:13:23.626		34.57	-36.31	59766.10		-36.38	-41.93
Saturn	E	2046-04-20T11:58:37.254		33.68	-5.88	59752.26		-36.97	-42.53
B (IER)	E	2046-04-20T11:15:40.928	b	36.69	-14.56	91984.69	2.21		
B (OER)	E	2046-04-20T12:54:53.043		27.32	5.90x	117571.16	5.92		
A (IER)	E	2046-04-20T13:07:12.559		25.63	8.52x	122050.38	6.19		
Encke (IEG)	E	2046-04-20T13:36:29.763		21.28	14.79x	133423.31	6.73		
Encke (OEG)	E	2046-04-20T13:37:17.529		21.15	14.96x	133744.89	6.74		
A (OER)	E	2046-04-20T13:44:43.390		19.97	16.56x	136774.40	6.85		
F ring	E	2046-04-20T13:53:36.775		18.53	18.47x	140461.00	6.97		

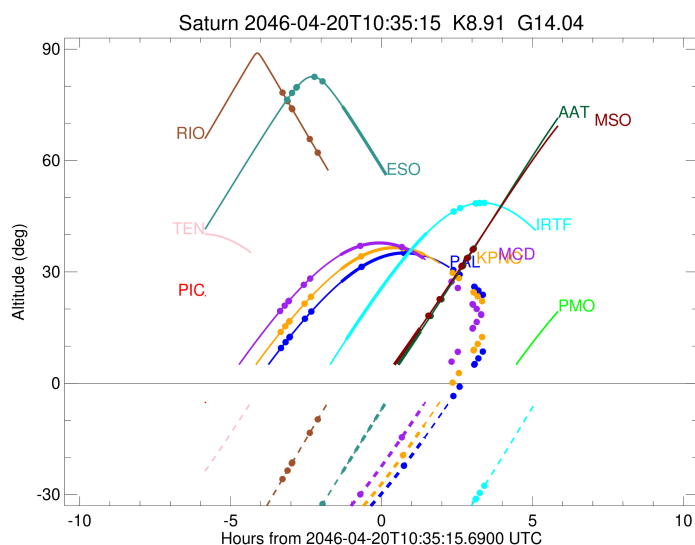
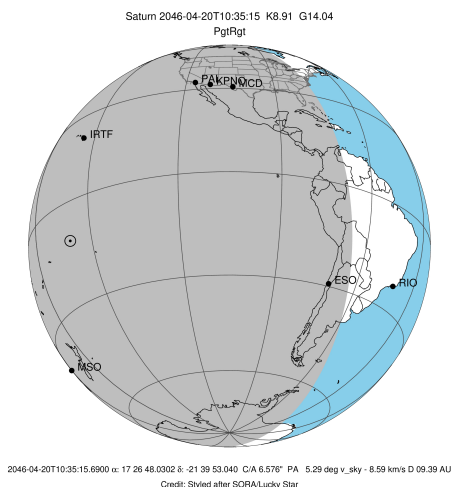
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-04-20T10:45:45.780
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 4120809395806543360
 2Mass ID (if available) : 17264804-2139528
 ICRS Star Coord at Epoch: 17h 26m 48.03017s -21:39:53.03961s
 RUWE (>1.4 is poor) : 1.12
 K magnitude : 8.909
 G magnitude : 14.044
 RP magnitude : 12.743
 BP magnitude : 16.003
 DUPflag : 0
 Distance (au) : 9.386
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -8.59
 Sun-Target sep (deg) : 127.58
 Sun-Moon sep (deg) : 57.21
 B (ring opening deg) : 26.49
 PA of pole (deg) : 4.77
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.123
 C/A sky separation (km) : 41682.8
 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

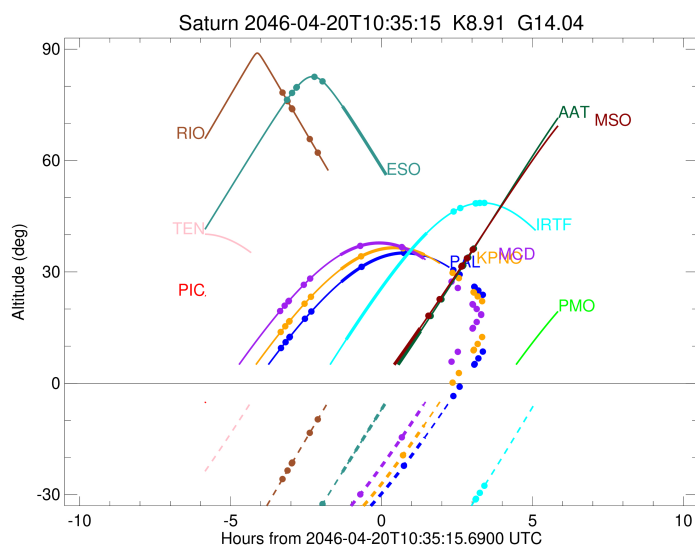
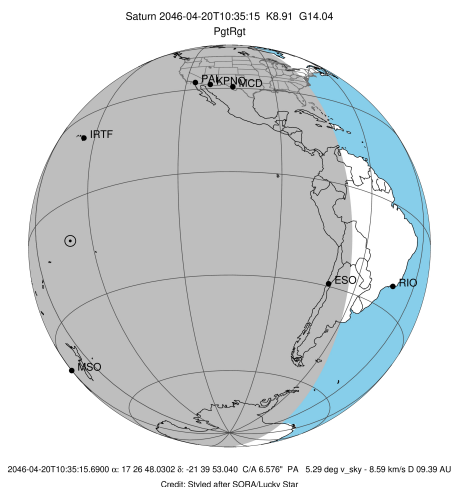
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-04-20T07:27:38.528	-13.71x	-37.13	140461.00	-6.32			
A (OER)	I	2046-04-20T07:37:27.616	-11.51x	-39.05	136774.40	-6.20			
Encke (OEG)	I	2046-04-20T07:45:40.835	-9.68x	-40.63	133744.89	-6.09			
Encke (IEG)	I	2046-04-20T07:46:33.726	-9.49x	-40.80	133423.31	-6.07			
A (IER)	I	2046-04-20T08:19:09.621	-2.31x	-46.68	122050.38	-5.53			
B (OER)	I	2046-04-20T08:33:01.823	0.71x	-48.96	117571.16	-5.23			
Saturn	I	2046-04-20T09:24:56.142		11.74	-55.78	59702.23		-39.07	-44.68
Saturn	E	2046-04-20T12:05:20.498		40.50	-49.40	59717.25		-38.44	-44.04
B (OER)	E	2046-04-20T12:59:05.897		46.31	-39.94	117571.16	5.55		
A (IER)	E	2046-04-20T13:12:08.423		47.22	-37.40	122050.38	5.89		
Encke (IEG)	E	2046-04-20T13:42:31.131		48.46	-31.23	133423.31	6.56		
Encke (OEG)	E	2046-04-20T13:43:20.111		48.48	-31.06	133744.89	6.57		
A (OER)	E	2046-04-20T13:50:56.110		48.58	-29.47	136774.40	6.71		
F ring	E	2046-04-20T13:59:58.987		48.58	-27.56	140461.00	6.87		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-04-20T10:24:08.520
 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 : 4120809395806543360
 2Mass ID (if available) : 17264804-2139528
 ICRS Star Coord at Epoch: 17h 26m 48.03017s -21:39:53.03961s
 RUWE (>1.4 is poor) : 1.12
 K magnitude : 8.909
 G magnitude : 14.044
 RP magnitude : 12.743
 BP magnitude : 16.003
 DUPflag : 0
 Distance (au) : 9.386
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -8.59
 Sun-Target sep (deg) : 127.58
 Sun-Moon sep (deg) : 58.11
 B (ring opening deg) : 26.49
 PA of pole (deg) : 4.77
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.684
 C/A sky separation (km) : 45502.8
 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	2046-04-20T07:18:33.732		78.29	-25.79	140461.00	-6.26		
A (OER)	I	2046-04-20T07:28:32.212		75.99	-23.49	136774.40	-6.06		
Encke (OEG)	I	2046-04-20T07:36:59.380		74.04	-21.55	133744.89	-5.88		
Encke (IEG)	I	2046-04-20T07:37:54.131		73.83	-21.34	133423.31	-5.86		
A (IER)	I	2046-04-20T08:12:43.080		65.78	-13.35	122050.38	-4.99		
B (OER)	I	2046-04-20T08:28:25.652		62.15	-9.77	117571.16	-4.51		
Saturn	I	2046-04-20T09:11:51.052		52.15	0.07x	59627.60		-42.16	-47.77
Saturn	E	2046-04-20T11:37:04.917		19.26	31.22x	59576.78		-44.24	-49.82
B (OER)	E	2046-04-20T12:06:48.868		12.69	36.94x	117571.16	4.35		
A (IER)	E	2046-04-20T12:23:08.149		9.13	39.91x	122050.38	4.79		
Encke (IEG)	E	2046-04-20T12:59:34.195		1.29x	45.95x	133423.31	5.58		
Encke (OEG)	E	2046-04-20T13:00:31.773		1.08x	46.09x	133744.89	5.59		
A (OER)	E	2046-04-20T13:09:25.800		-0.80x	47.41x	136774.40	5.75		
F ring	E	2046-04-20T13:19:57.484		-3.02x	48.87x	140461.00	5.92		

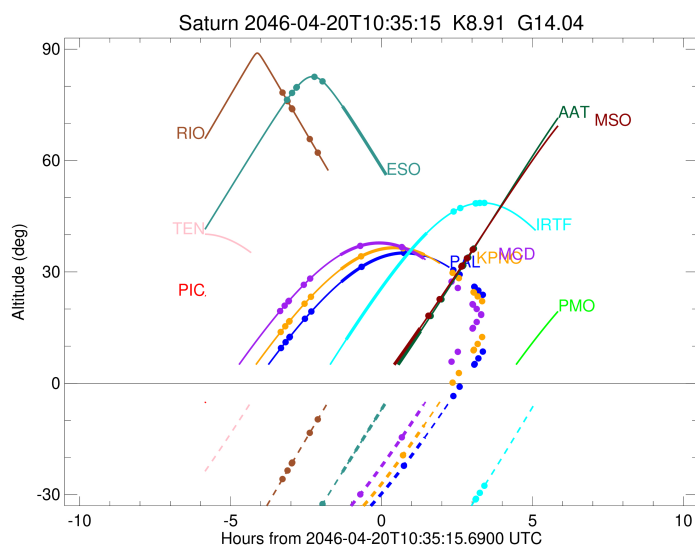
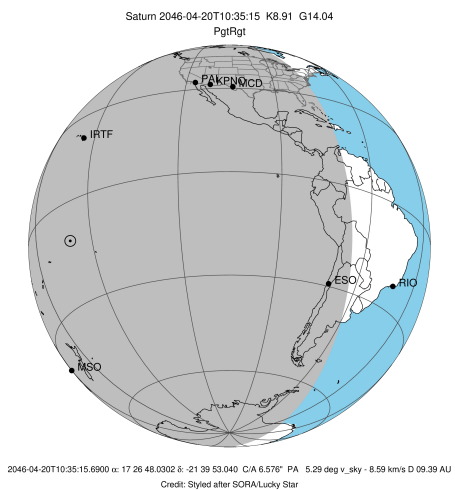
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-04-20T10:28:43.860
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4120809395806543360
 2Mass ID (if available) : 17264804-2139528
 ICRS Star Coord at Epoch: 17h 26m 48.03017s -21:39:53.03961s
 RUWE (>1.4 is poor) : 1.12
 K magnitude : 8.909
 G magnitude : 14.044
 RP magnitude : 12.743
 BP magnitude : 16.003
 DUPflag : 0
 Distance (au) : 9.386
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -8.59
 Sun-Target sep (deg) : 127.58
 Sun-Moon sep (deg) : 58.20
 B (ring opening deg) : 26.49
 PA of pole (deg) : 4.77
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.706
 C/A sky separation (km) : 45649.9
 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	2046-04-20T07:27:27.237		76.38	-47.71	140461.00	-6.21		
A (OER)	I	2046-04-20T07:37:30.317		78.22	-45.58	136774.40	-6.02		
Encke (OEG)	I	2046-04-20T07:46:01.169		79.65	-43.77	133744.89	-5.84		
Encke (IEG)	I	2046-04-20T07:46:56.306		79.79	-43.58	133423.31	-5.82		
A (IER)	I	2046-04-20T08:21:59.467		82.55	-36.03	122050.38	-4.95		
B (OER)	I	2046-04-20T08:37:49.119		81.36	-32.59	117571.16	-4.47		
Saturn	I	2046-04-20T09:17:34.071		74.64	-23.92	59614.40		-42.70	-48.31
Saturn	E	2046-04-20T11:40:09.784		43.97	6.74x	59580.23		-44.10	-49.68
B (OER)	E	2046-04-20T12:10:39.046		37.32	13.02x	117571.16	4.40		
A (IER)	E	2046-04-20T12:26:44.680		33.82	16.26x	122050.38	4.86		
Encke (IEG)	E	2046-04-20T13:02:29.850		26.10	23.24x	133423.31	5.70		
Encke (OEG)	E	2046-04-20T13:03:26.207		25.90	23.42x	133744.89	5.72		
A (OER)	E	2046-04-20T13:12:08.628		24.03	25.06x	136774.40	5.88		
F ring	E	2046-04-20T13:22:25.987		21.83	26.96x	140461.00	6.06		

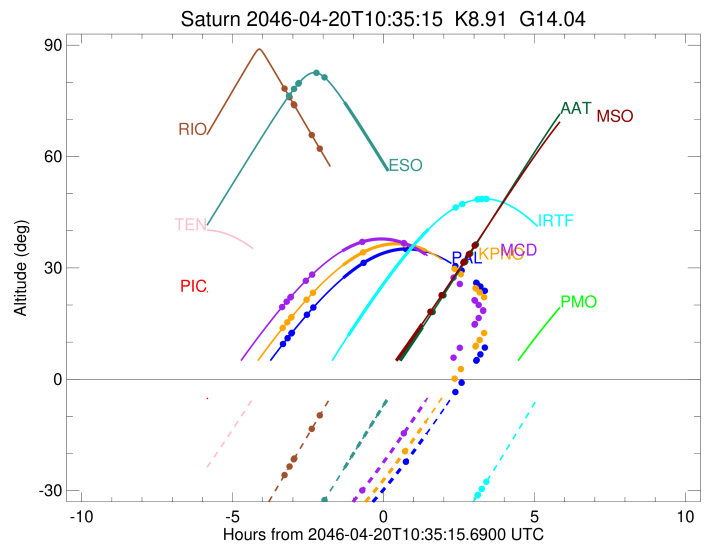
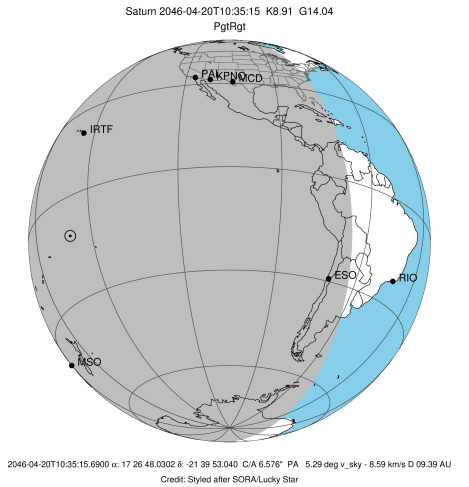
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-04-20T10:46:26.780
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 4120809395806543360
 2Mass ID (if available) : 17264804-2139528
 ICRS Star Coord at Epoch: 17h 26m 48.03017s -21:39:53.03961s
 RUWE (>1.4 is poor) : 1.12
 K magnitude : 8.909
 G magnitude : 14.044
 RP magnitude : 12.743
 BP magnitude : 16.003
 DUPflag : 0
 Distance (au) : 9.386
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -8.59
 Sun-Target sep (deg) : 127.58
 Sun-Moon sep (deg) : 56.72
 B (ring opening deg) : 26.49
 PA of pole (deg) : 4.77
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.160
 C/A sky separation (km) : 48739.4
 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	2046-04-20T07:50:40.387		-28.47x	-3.47x	140461.00	-5.07		
A (OER)	I	2046-04-20T08:03:02.651		-26.89x	-6.08	136774.40	-4.86		
Encke (OEG)	I	2046-04-20T08:13:38.161		-25.46x	-8.31	133744.89	-4.67		
Encke (IEG)	I	2046-04-20T08:14:47.183		-25.30x	-8.56	133423.31	-4.65		
A (IER)	I	2046-04-20T09:00:15.561		-18.44x	-18.25	122050.38	-3.64		
B (OER)	I	2046-04-20T09:22:37.881		-14.71x	-23.04	117571.16	-3.02		
Saturn	I	2046-04-20T09:38:49.590		-11.90x	-26.51	59500.54		-47.38	-52.86
Saturn	E	2046-04-20T11:53:01.975		14.02	-54.36	59513.78		-46.84	-52.34
B (OER)	E	2046-04-20T12:13:36.857		18.27	-58.23	117571.16	3.17		
A (IER)	E	2046-04-20T12:34:48.748		22.69	-61.94	122050.38	3.86		
Encke (IEG)	E	2046-04-20T13:17:11.560		31.65	-67.94	133423.31	5.04		
Encke (OEG)	E	2046-04-20T13:18:15.198		31.87	-68.06	133744.89	5.07		
A (OER)	E	2046-04-20T13:27:59.632		33.95	-69.02	136774.40	5.30		
F ring	E	2046-04-20T13:39:18.908		36.36	-69.87	140461.00	5.55		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-04-20T10:45:51.340
 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 : 4120809395806543360
 2Mass ID (if available) : 17264804-2139528
 ICRS Star Coord at Epoch: 17h 26m 48.03017s -21:39:53.03961s
 RUWE (>1.4 is poor) : 1.12
 K magnitude : 8.909
 G magnitude : 14.044
 RP magnitude : 12.743
 BP magnitude : 16.003
 DUPflag : 0
 Distance (au) : 9.386
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -8.59
 Sun-Target sep (deg) : 127.58
 Sun-Moon sep (deg) : 56.77
 B (ring opening deg) : 26.49
 PA of pole (deg) : 4.77
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.205
 C/A sky separation (km) : 49050.5
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-04-20T07:51:51.521	-25.03x	-4.46x	140461.00	-5.03			
A (OER)	I	2046-04-20T08:04:19.793	-23.55x	-6.97	136774.40	-4.82			
Encke (OEG)	I	2046-04-20T08:15:01.495	-22.20x	-9.13	133744.89	-4.62			
Encke (IEG)	I	2046-04-20T08:16:11.256	-22.05x	-9.37	133423.31	-4.60			
A (IER)	I	2046-04-20T09:02:24.899	-15.47x	-18.79	122050.38	-3.55			
B (OER)	I	2046-04-20T09:25:30.404	-11.82x	-23.52	117571.16	-2.90			
Saturn	I	2046-04-20T09:39:12.667	-9.56x	-26.32	59491.48			-47.76	-53.22
Saturn	E	2046-04-20T11:51:32.007	14.84	-52.15	59503.06			-47.28	-52.76
B (OER)	E	2046-04-20T12:09:14.634	18.34	-55.20	117571.16	3.03			
A (IER)	E	2046-04-20T12:31:12.519	22.73	-58.69	122050.38	3.75			
Encke (IEG)	E	2046-04-20T13:14:28.004	31.50	-64.12	133423.31	4.97			
Encke (OEG)	E	2046-04-20T13:15:32.596	31.72	-64.23	133744.89	4.99			
A (OER)	E	2046-04-20T13:25:25.254	33.74	-65.08	136774.40	5.23			
F ring	E	2046-04-20T13:36:53.041	36.09	-65.84	140461.00	5.49			