

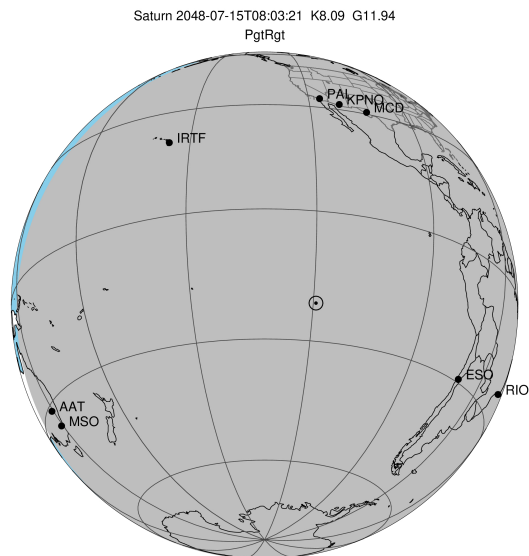
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-15T08:03:21.380
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4078863886201947904
 2Mass ID (if available) : 18482085-2226057

Saturn 2048-07-15T08:03:21 K8.09 G11.94 PgtRgt

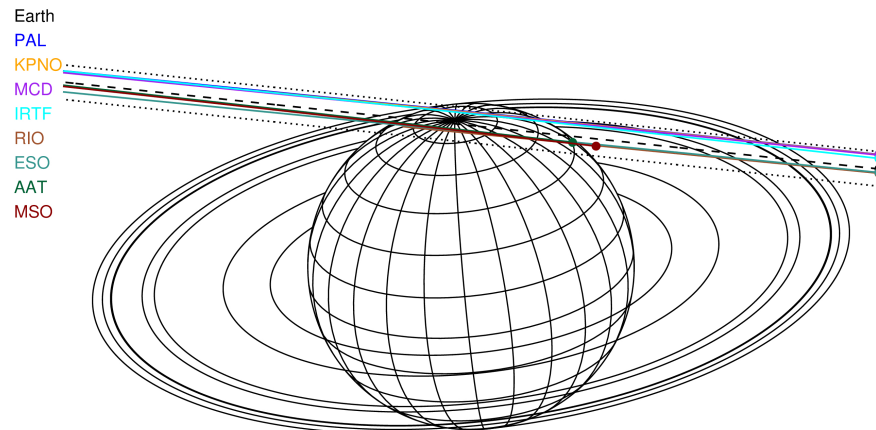
ICRS Star Coord at Epoch: 18h 48m 20.84883s -22:26:06.03290s

RUWE (>1.4 is poor) : 0.93
 K magnitude : 8.089
 G magnitude : 11.935
 RP magnitude : 10.878
 BP magnitude : 13.094
 DUPflag : 0
 Distance (au) : 9.038
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.55
 Sun-Target sep (deg) : 168.30
 Sun-Moon sep (deg) : 120.59
 B (ring opening deg) : 25.41
 PA of pole (deg) : 6.33

#	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

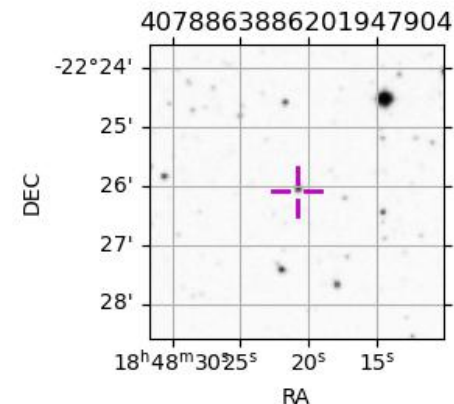


2048-07-15T08:03:21.3800 at: 18 48 20.8488 6: -22 26 06.033 C/A 7.896° PA 173.92 deg v_sky -19.55 km/s D 09.04 AU
 Credit: Styled after SORA/Lucky Star

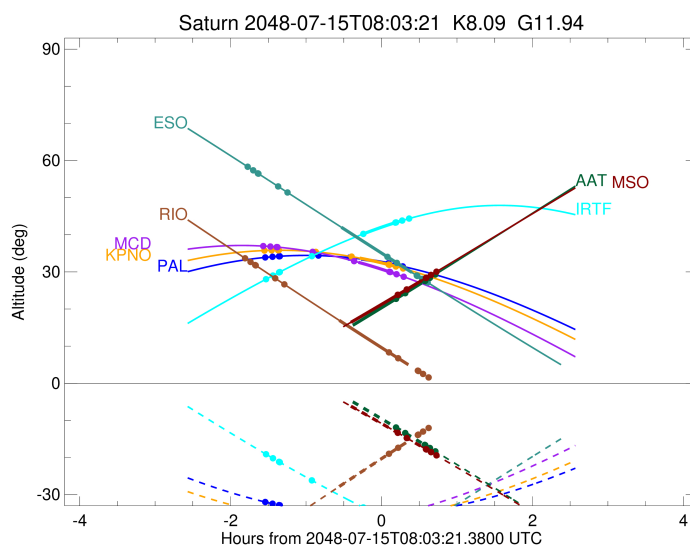
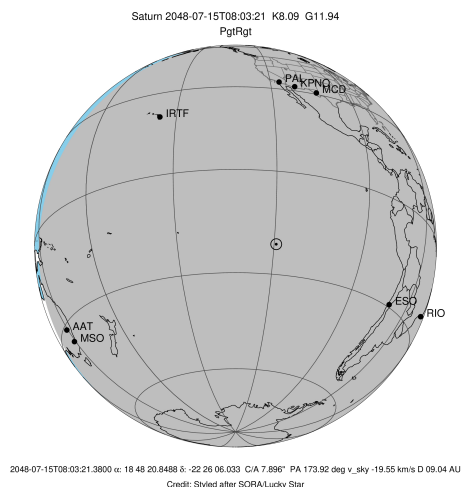


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEncode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1	+	+	+	JUL 15 06:30 - JUL 15 08:20	PieRie
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4	+	+	+	JUL 15 06:30 - JUL 15 08:20	PieRie
MCD	McDonald Obs.	30.7	256.0	+	+	+	JUL 15 06:29 - JUL 15 08:21	PieRie
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+	+	+	JUL 15 06:31 - JUL 15 08:25	PieRie
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+	+	+	JUL 15 06:14 - JUL 15 07:29	PinRin
ESO	European South	-29.3	289.3	+	+	+	JUL 15 06:16 - JUL 15 08:40	PieRie
AAT	Siding Spring	-31.3	149.1		+	+	JUL 15 08:35 - JUL 15 08:46	PneRne
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0		+	+	JUL 15 07:39 - JUL 15 08:47	PieRne



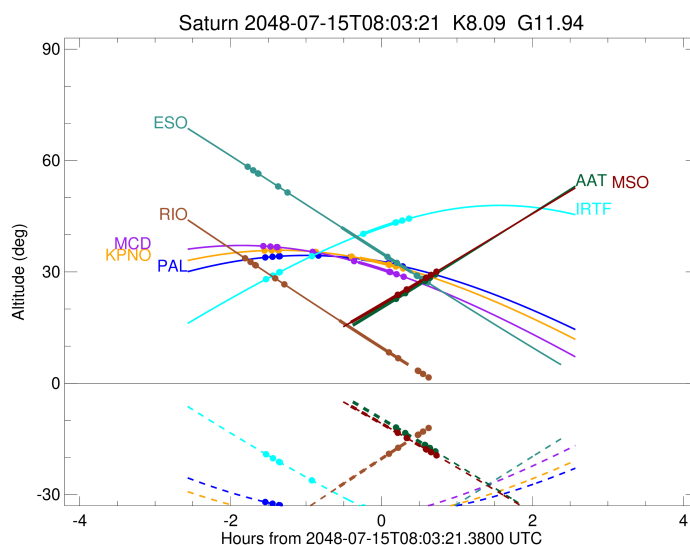
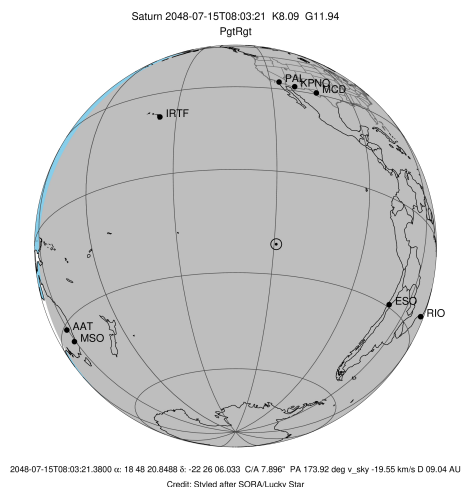
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-15T08:01:54.750
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4078863886201947904
 2Mass ID (if available) : 18482085-2226057
 ICRS Star Coord at Epoch: 18h 48m 20.84883s -22:26:06.03290s
 RUWE (>1.4 is poor) : 0.93
 K magnitude : 8.089
 G magnitude : 11.935
 RP magnitude : 10.878
 BP magnitude : 13.094
 DUPflag : 0
 Distance (au) : 9.038
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.55
 Sun-Target sep (deg) : 168.30
 Sun-Moon sep (deg) : 120.84
 B (ring opening deg) : 25.41
 PA of pole (deg) : 6.33
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 8.661
 C/A sky separation (km) : 56775.5
 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	2048-07-15T06:30:48.241		33.90	-31.98	140461.00	-11.10		
A (OER)	I	2048-07-15T06:36:34.268		34.07	-32.43	136774.40	-10.20		
Encke (OEG)	I	2048-07-15T06:41:44.554		34.20	-32.81	133744.89	-9.32		
Encke (IEG)	I	2048-07-15T06:42:19.239		34.21	-32.85	133423.31	-9.22		
A (IER)	I	2048-07-15T07:12:43.838		34.40	-34.58	122050.38	-2.97		
Saturn	I	2048-07-15T07:47:05.327		33.47	-35.42	59473.50		51.85	57.08
Saturn	E	2048-07-15T08:16:02.952		31.79	-35.18	59232.31		64.24	68.26
A (IER)	E	2048-07-15T07:38:09.284		33.82	-35.31	122050.38	2.97		
Encke (IEG)	E	2048-07-15T08:08:39.570	b	32.29	-35.32	133423.31	9.17		
Encke (OEG)	E	2048-07-15T08:09:14.430	b	32.25	-35.31	133744.89	9.27		
A (OER)	E	2048-07-15T08:14:26.373	b	31.90	-35.21	136774.40	10.14		
F ring	E	2048-07-15T08:20:14.404		31.48	-35.07	140461.00	11.03		

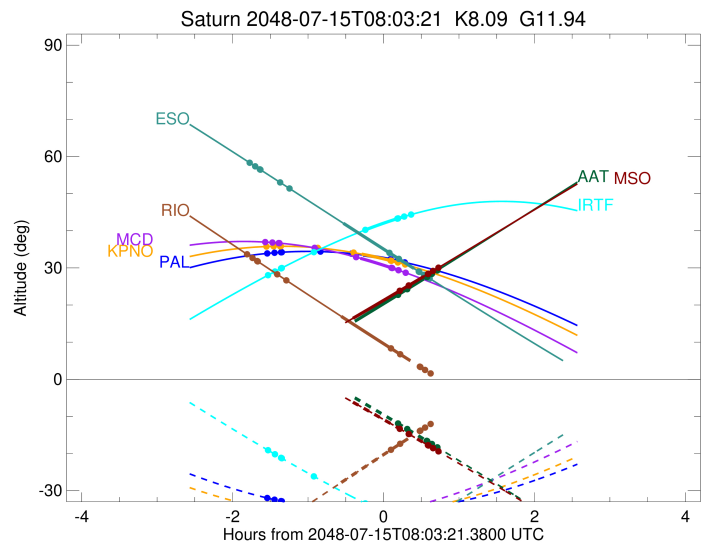
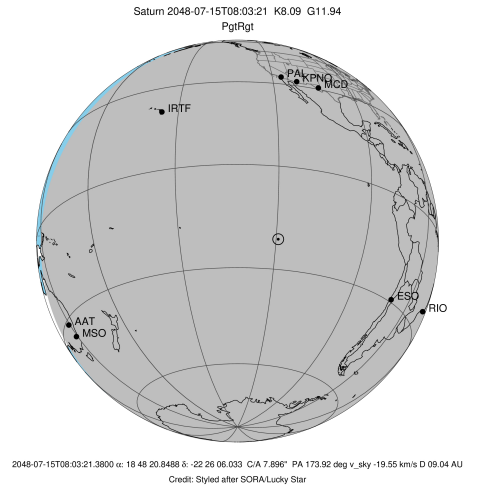
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-15T08:01:32.610
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 4078863886201947904
 2Mass ID (if available) : 18482085-2226057
 ICRS Star Coord at Epoch: 18h 48m 20.84883s -22:26:06.03290s
 RUWE (>1.4 is poor) : 0.93
 K magnitude : 8.089
 G magnitude : 11.935
 RP magnitude : 10.878
 BP magnitude : 13.094
 DUPflag : 0
 Distance (au) : 9.038
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.55
 Sun-Target sep (deg) : 168.30
 Sun-Moon sep (deg) : 120.81
 B (ring opening deg) : 25.41
 PA of pole (deg) : 6.33
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 8.631
 C/A sky separation (km) : 56578.0
 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	2048-07-15T06:30:09.176		35.75	-34.77	140461.00	-11.19		
A (OER)	I	2048-07-15T06:35:52.016		35.81	-35.12	136774.40	-10.30		
Encke (OEG)	I	2048-07-15T06:40:58.741		35.83	-35.41	133744.89	-9.44		
Encke (IEG)	I	2048-07-15T06:41:32.976		35.83	-35.44	133423.31	-9.34		
A (IER)	I	2048-07-15T07:10:41.712		35.41	-36.57	122050.38	-3.40		
Saturn	I	2048-07-15T07:46:10.230		33.71	-36.72	59483.07		51.41	56.66
Saturn	E	2048-07-15T08:16:14.144		31.33	-35.80	59234.39		64.12	68.15
A (IER)	E	2048-07-15T07:39:50.719		34.10	-36.80	122050.38	3.40		
Encke (IEG)	E	2048-07-15T08:09:05.887	b	31.97	-36.11	133423.31	9.29		
Encke (OEG)	E	2048-07-15T08:09:40.318	b	31.92	-36.09	133744.89	9.39		
A (OER)	E	2048-07-15T08:14:48.893	b	31.46	-35.87	136774.40	10.24		
F ring	E	2048-07-15T08:20:33.971		30.93	-35.59	140461.00	11.12		

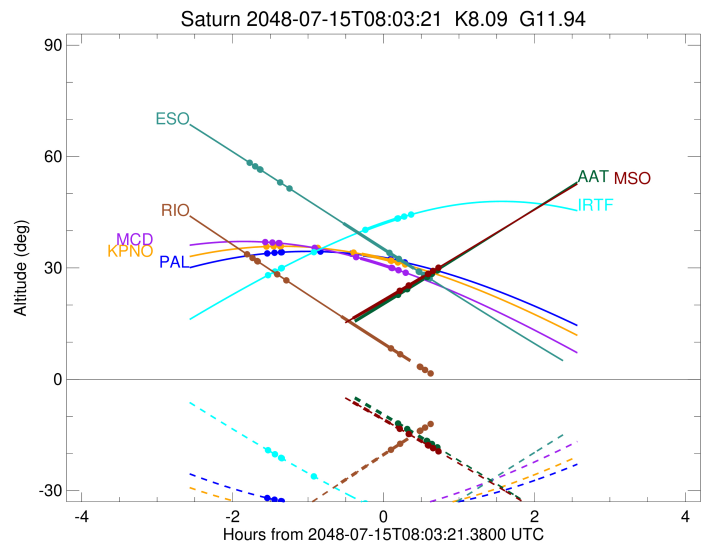
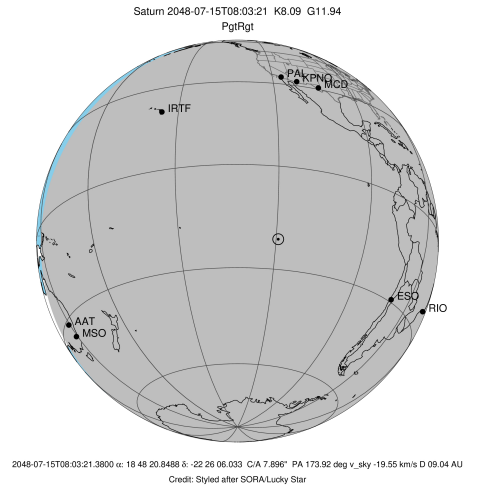
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-15T08:01:01.600
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 4078863886201947904
 2Mass ID (if available) : 18482085-2226057
 ICRS Star Coord at Epoch: 18h 48m 20.84883s -22:26:06.03290s
 RUWE (>1.4 is poor) : 0.93
 K magnitude : 8.089
 G magnitude : 11.935
 RP magnitude : 10.878
 BP magnitude : 13.094
 DUPflag : 0
 Distance (au) : 9.038
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.55
 Sun-Target sep (deg) : 168.30
 Sun-Moon sep (deg) : 120.74
 B (ring opening deg) : 25.41
 PA of pole (deg) : 6.33
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 8.590
 C/A sky separation (km) : 56308.9
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2048-07-15T06:29:13.214		36.96	-37.51	140461.00	-11.31		
A (OER)	I	2048-07-15T06:34:51.976		36.84	-37.70	136774.40	-10.44		
Encke (OEG)	I	2048-07-15T06:39:54.155		36.70	-37.83	133744.89	-9.60		
Encke (IEG)	I	2048-07-15T06:40:27.816		36.68	-37.85	133423.31	-9.50		
A (IER)	I	2048-07-15T07:08:12.588		35.42	-38.09	122050.38	-3.91		
Saturn	I	2048-07-15T07:44:55.893		32.59	-37.10	59495.75		50.82	56.11
Saturn	E	2048-07-15T08:16:26.979		29.24	-35.13	59237.52		63.94	67.99
A (IER)	E	2048-07-15T07:41:48.176		32.88	-37.24	122050.38	3.90		
Encke (IEG)	E	2048-07-15T08:09:40.383	b	30.02	-35.64	133423.31	9.44		
Encke (OEG)	E	2048-07-15T08:10:14.268	b	29.96	-35.60	133744.89	9.54		
A (OER)	E	2048-07-15T08:15:18.556	b	29.37	-35.22	136774.40	10.36		
F ring	E	2048-07-15T08:20:59.871		28.69	-34.76	140461.00	11.23		

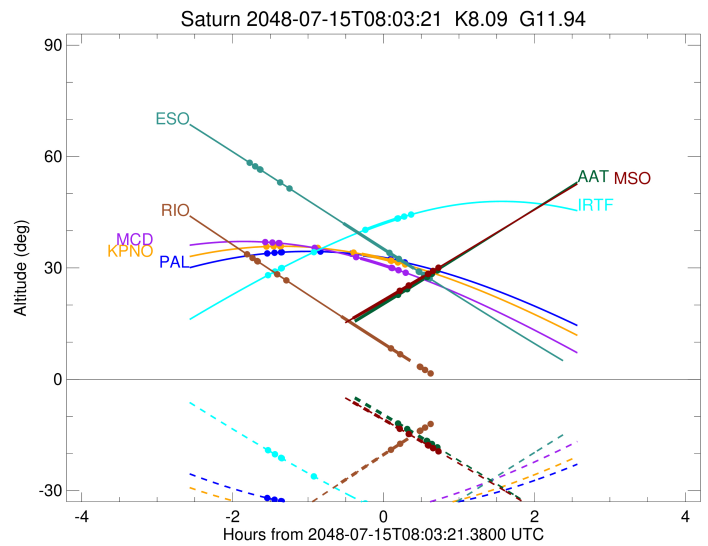
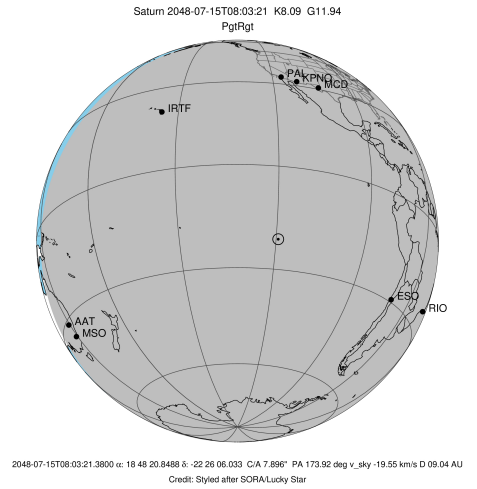
```

target                : Saturn
target radius (km)   : 60268.00
C/A epoch             : 2048-07-15T08:04:55.370
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       : 4078863886201947904
2Mass ID (if available) : 18482085-2226057
ICRS Star Coord at Epoch: 18h 48m 20.84883s -22:26:06.03290s
RUWE (>1.4 is poor) : 0.93
K magnitude           : 8.089
G magnitude           : 11.935
RP magnitude          : 10.878
BP magnitude          : 13.094
DUPflag              : 0
Distance (au)        : 9.038
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -19.55
Sun-Target sep (deg) : 168.30
Sun-Moon sep (deg)   : 121.24
B (ring opening deg) : 25.41
PA of pole (deg)     : 6.33
Pole direction: RA (deg): 40.60000
Dec (deg): 83.50000
C/A sky separation (") : 8.557
C/A sky separation (km) : 56095.0
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl.spk
Saturn_ring_plane.tf
sat378.bsp
sat286.bsp
vgr1.sat286.bsp
vgr2.sat286.bsp
HST1081HSPephemUTC.bsp
pfb10000r.bsp
cassini.bsp
earthstns_itr93_040916.bsp
earth_200101_990628_predict.bpc
earth_720101_070426.bpc
cpck28Mar2008.tpc
pck.sat440.tpc
IAU_SATURN_for_RINGFIT.tpc
naif0012.tls
earth_flat_IAU.spk
    
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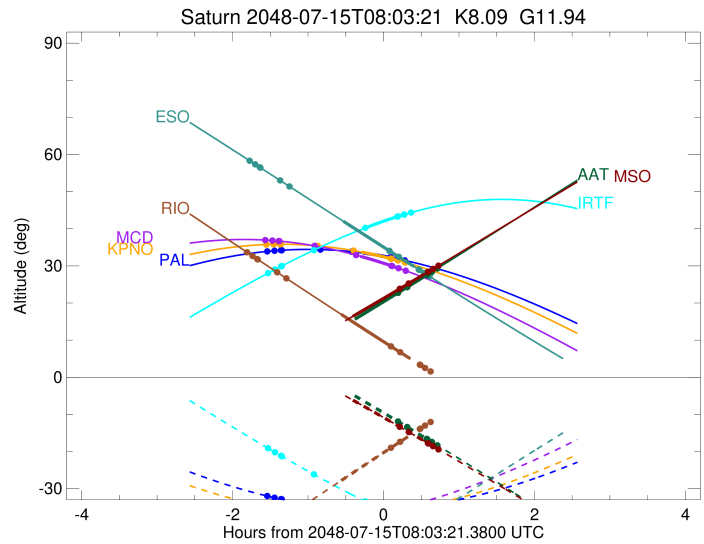
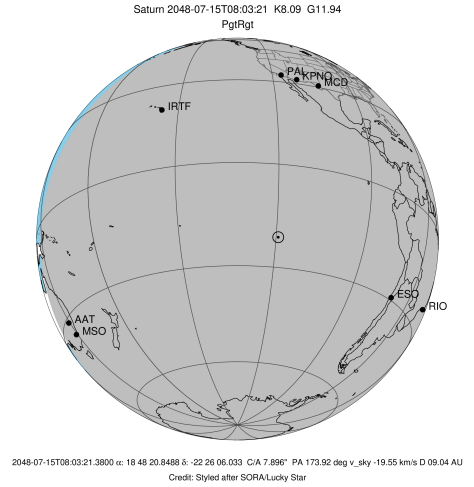
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2048-07-15T06:31:26.203		28.01	-19.09	140461.00	-11.60		
A (OER)	I	2048-07-15T06:36:55.796		28.99	-20.18	136774.40	-10.76		
Encke (OEG)	I	2048-07-15T06:41:47.936		29.85	-21.14	133744.89	-9.97		
Encke (IEG)	I	2048-07-15T06:42:20.346		29.94	-21.24	133423.31	-9.88		
A (IER)	I	2048-07-15T07:07:40.483		34.20	-26.10	122050.38	-4.86		
Saturn	I	2048-07-15T07:48:18.323		40.16	-33.34	59512.56		50.04	55.38
Saturn	E	2048-07-15T08:20:50.018		43.94	-38.50	59238.65		63.87	67.93
A (IER)	E	2048-07-15T07:49:03.746	b	40.26	-33.47	122050.38	4.86		
Encke (IEG)	E	2048-07-15T08:14:24.632	b	43.27	-37.53	133423.31	9.87		
Encke (OEG)	E	2048-07-15T08:14:57.067	b	43.33	-37.62	133744.89	9.96		
A (OER)	E	2048-07-15T08:19:49.429	b	43.83	-38.35	136774.40	10.76		
F ring	E	2048-07-15T08:25:19.233		44.37	-39.15	140461.00	11.59		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-15T07:58:56.220
 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 : 4078863886201947904
 2Mass ID (if available) : 18482085-2226057
 ICRS Star Coord at Epoch: 18h 48m 20.84883s -22:26:06.03290s
 RUWE (>1.4 is poor) : 0.93
 K magnitude : 8.089
 G magnitude : 11.935
 RP magnitude : 10.878
 BP magnitude : 13.094
 DUPflag : 0
 Distance (au) : 9.038
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.55
 Sun-Target sep (deg) : 168.30
 Sun-Moon sep (deg) : 120.32
 B (ring opening deg) : 25.41
 PA of pole (deg) : 6.33
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.467
 C/A sky separation (km) : 48945.6
 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



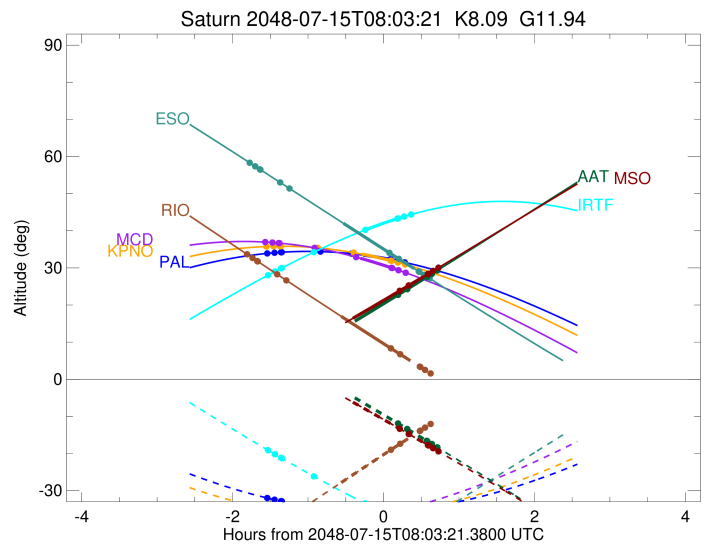
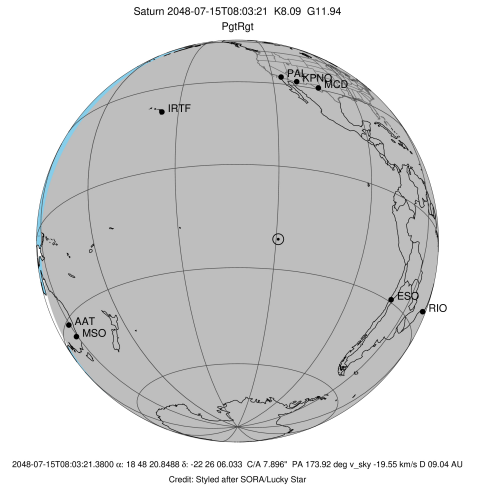
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2048-07-15T06:14:48.217		33.68	-44.80	140461.00	-14.36		
A (OER)	I	2048-07-15T06:19:09.414		32.70	-43.81	136774.40	-13.86		
Encke (OEG)	I	2048-07-15T06:22:51.648		31.86	-42.97	133744.89	-13.40		
Encke (IEG)	I	2048-07-15T06:23:15.692		31.77	-42.87	133423.31	-13.35		
A (IER)	I	2048-07-15T06:38:43.822		28.30	-39.35	122050.38	-11.06		
B (OER)	I	2048-07-15T06:45:53.032		26.69	-37.73	117571.16	-9.79		
Saturn	I	2048-07-15T07:29:44.075		16.95	-27.83	59775.06		38.11	43.70
Saturn	E	2048-07-15T08:27:37.488		4.38x	-14.94	59376.55		56.52	61.37
B (OER)	E	2048-07-15T08:09:20.710	b	8.31	-18.98	117571.16	9.69		
A (IER)	E	2048-07-15T08:16:34.486	b	6.75	-17.38	122050.38	10.94		
Encke (IEG)	E	2048-07-15T08:32:13.957		3.40x	-13.93	133423.31	13.18		
Encke (OEG)	E	2048-07-15T08:32:38.318		3.31x	-13.84	133744.89	13.23		
A (OER)	E	2048-07-15T08:36:23.528		2.51x	-13.02	136774.40	13.67		
F ring	E	2048-07-15T08:40:48.342		1.58x	-12.05	140461.00	14.16		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-15T07:59:45.720
 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 : 4078863886201947904
 2Mass ID (if available) : 18482085-2226057
 ICRS Star Coord at Epoch: 18h 48m 20.84883s -22:26:06.03290s
 RUWE (>1.4 is poor) : 0.93
 K magnitude : 8.089
 G magnitude : 11.935
 RP magnitude : 10.878
 BP magnitude : 13.094
 DUPflag : 0
 Distance (au) : 9.038
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.55
 Sun-Target sep (deg) : 168.30
 Sun-Moon sep (deg) : 120.72
 B (ring opening deg) : 25.41
 PA of pole (deg) : 6.33
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.540
 C/A sky separation (km) : 49428.3
 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



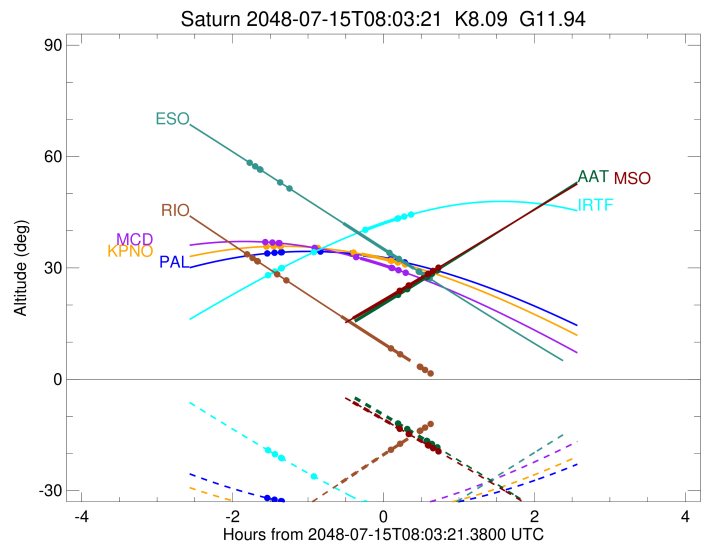
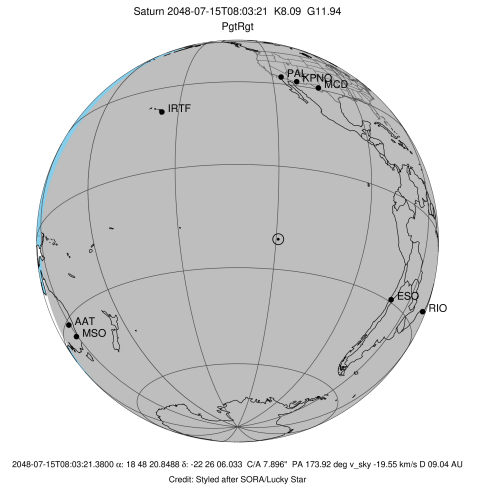
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2048-07-15T06:16:53.650		58.34	-68.71	140461.00	-14.30		
A (OER)	I	2048-07-15T06:21:16.220		57.38	-67.79	136774.40	-13.78		
Encke (OEG)	I	2048-07-15T06:24:59.961		56.57	-67.00	133744.89	-13.30		
Encke (IEG)	I	2048-07-15T06:25:24.191		56.48	-66.92	133423.31	-13.25		
A (IER)	I	2048-07-15T06:41:04.019		53.05	-63.57	122050.38	-10.85		
B (OER)	I	2048-07-15T06:48:23.481		51.44	-62.00	117571.16	-9.51		
Saturn	I	2048-07-15T07:31:25.570		42.03	-52.64	59760.66		38.77	44.37
Saturn	E	2048-07-15T08:27:33.829		29.84	-40.39	59365.81		57.06	61.86
B (OER)	E	2048-07-15T08:08:10.017	b	34.03	-44.62	117571.16	9.42		
A (IER)	E	2048-07-15T08:15:33.707	b	32.43	-43.01	122050.38	10.74		
Encke (IEG)	E	2048-07-15T08:31:24.018		29.02	-39.55	133423.31	13.09		
Encke (OEG)	E	2048-07-15T08:31:48.538		28.93	-39.46	133744.89	13.14		
A (OER)	E	2048-07-15T08:35:35.015		28.12	-38.64	136774.40	13.61		
F ring	E	2048-07-15T08:40:00.901		27.17	-37.68	140461.00	14.12		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-15T08:07:49.540
 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 : 4078863886201947904
 2Mass ID (if available) : 18482085-2226057
 ICRS Star Coord at Epoch: 18h 48m 20.84883s -22:26:06.03290s
 RUWE (>1.4 is poor) : 0.93
 K magnitude : 8.089
 G magnitude : 11.935
 RP magnitude : 10.878
 BP magnitude : 13.094
 DUPflag : 0
 Distance (au) : 9.038
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.55
 Sun-Target sep (deg) : 168.30
 Sun-Moon sep (deg) : 121.30
 B (ring opening deg) : 25.41
 PA of pole (deg) : 6.33
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.592
 C/A sky separation (km) : 49766.2
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2048-07-15T06:22:28.445	0.05x	9.85x	140461.00	-14.27			
A (OER)	I	2048-07-15T06:26:51.419	0.89x	9.06x	136774.40	-13.77			
Encke (OEG)	I	2048-07-15T06:30:35.188	1.62x	8.38x	133744.89	-13.31			
Encke (IEG)	I	2048-07-15T06:30:59.401	1.69x	8.31x	133423.31	-13.25			
A (IER)	I	2048-07-15T06:46:35.049	4.75x	5.42x	122050.38	-10.95			
B (OER)	I	2048-07-15T06:53:49.224	6.18	4.06x	117571.16	-9.66			
Saturn	I	2048-07-15T07:39:42.872	15.45	-4.83x	59765.85			38.53	44.13
Saturn	E	2048-07-15T08:35:13.827	27.00	-16.07	59348.32			57.94	62.66
B (OER)	E	2048-07-15T08:15:00.025	b	22.76	-11.93	117571.16	9.69		
A (IER)	E	2048-07-15T08:22:12.721	b	24.27	-13.40	122050.38	10.99		
Encke (IEG)	E	2048-07-15T08:37:43.682		27.53	-16.59	133423.31	13.34		
Encke (OEG)	E	2048-07-15T08:38:07.742		27.61	-16.67	133744.89	13.39		
A (OER)	E	2048-07-15T08:41:50.012		28.39	-17.44	136774.40	13.86		
F ring	E	2048-07-15T08:46:11.037		29.31	-18.34	140461.00	14.38		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-15T08:07:40.390
 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 : 4078863886201947904
 2Mass ID (if available) : 18482085-2226057
 ICRS Star Coord at Epoch: 18h 48m 20.84883s -22:26:06.03290s
 RUWE (>1.4 is poor) : 0.93
 K magnitude : 8.089
 G magnitude : 11.935
 RP magnitude : 10.878
 BP magnitude : 13.094
 DUPflag : 0
 Distance (au) : 9.038
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.55
 Sun-Target sep (deg) : 168.30
 Sun-Moon sep (deg) : 121.30
 B (ring opening deg) : 25.41
 PA of pole (deg) : 6.33
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.532
 C/A sky separation (km) : 49372.6
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2048-07-15T06:21:53.854		1.69x	7.81x	140461.00	-14.40		
A (OER)	I	2048-07-15T06:26:14.191		2.49x	7.06x	136774.40	-13.91		
Encke (OEG)	I	2048-07-15T06:29:55.437		3.17x	6.43x	133744.89	-13.47		
Encke (IEG)	I	2048-07-15T06:30:19.360		3.24x	6.36x	133423.31	-13.42		
A (IER)	I	2048-07-15T06:45:40.125		6.12	3.66x	122050.38	-11.18		
B (OER)	I	2048-07-15T06:52:43.637		7.45	2.40x	117571.16	-9.94		
Saturn	I	2048-07-15T07:39:02.481		16.42	-6.17	59778.10		37.96	43.55
Saturn	E	2048-07-15T08:35:36.317		27.73	-17.15	59356.79		57.51	62.27
B (OER)	E	2048-07-15T08:16:21.937	b	23.85	-13.36	117571.16	9.97		
A (IER)	E	2048-07-15T08:23:24.089	b	25.27	-14.74	122050.38	11.23		
Encke (IEG)	E	2048-07-15T08:38:40.441		28.35	-17.76	133423.31	13.50		
Encke (OEG)	E	2048-07-15T08:39:04.219		28.43	-17.83	133744.89	13.55		
A (OER)	E	2048-07-15T08:42:44.042		29.18	-18.56	136774.40	14.01		
F ring	E	2048-07-15T08:47:02.528		30.05	-19.42	140461.00	14.51		