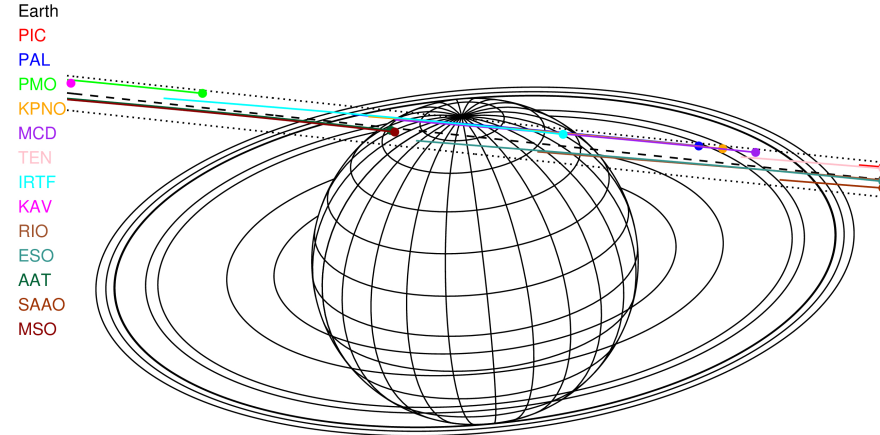
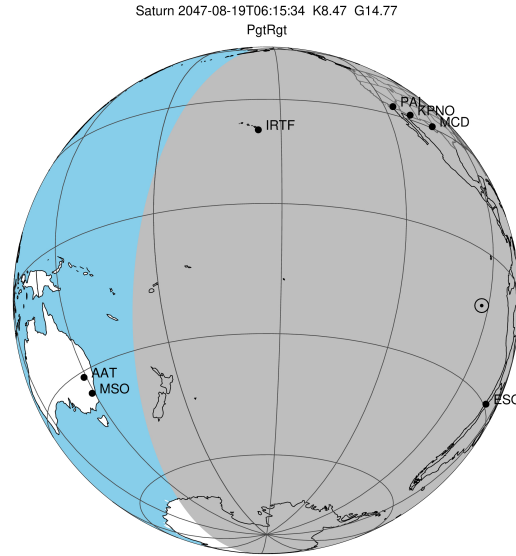


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-19T06:15:34.080
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4068971309590683776
 2Mass ID (if available) : 17490156-2227419

Saturn 2047-08-19T06:15:34 K8.47 G14.77 PgtRgt

ICRS Star Coord at Epoch: 17h 49m 01.57337s -22:27:42.23525s

RUWE (>1.4 is poor) : 0.86
 K magnitude : 8.468
 G magnitude : 14.767
 RP magnitude : 13.253
 BP magnitude : 18.119
 DUPflag : 0
 Distance (au) : 9.474
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -6.22
 Sun-Target sep (deg) : 121.89
 Sun-Moon sep (deg) : 148.77
 B (ring opening deg) : 26.84
 PA of pole (deg) : 5.30

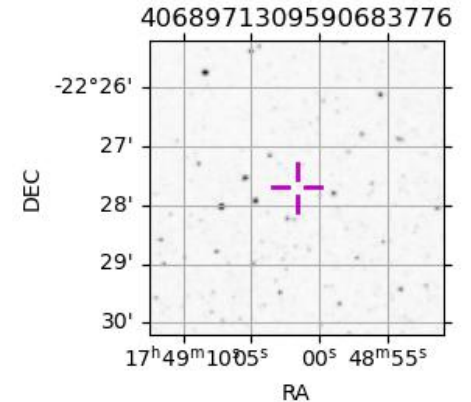


2047-08-19T06:15:34.0800 α: 17 49 01.5734 δ: -22 27 42.235 C/A 6.661° PA 173.94 deg v_sky - 6.22 km/s D 09.47 AU
 Credit: Styled after SORA/Lucky Star

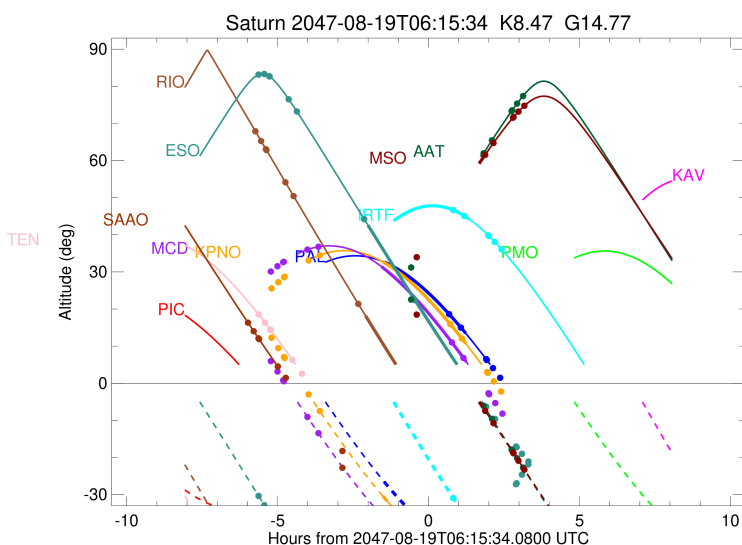
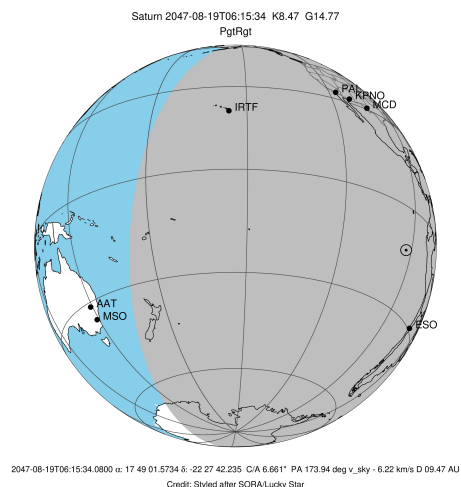
#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring

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		++	++	AUG 19 04:47 - AUG 19 08:11	PieRne
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4	+	++		AUG 19 02:38 - AUG 19 07:29	PieRin
MCD	McDonald Obs.	30.7	256.0	++	++		AUG 19 02:14 - AUG 19 07:30	PieRin
TEN	Teide Obs./Ten	28.3	343.5	+++++			AUG 19 00:37 - AUG 19 01:44	PnnRin
IRTF	Mauna Kea/IRTF	19.8	204.5		+	++++	AUG 19 07:35 - AUG 19 08:40	PneRne
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++	+		AUG 19 00:31 - AUG 19 04:10	PinRin
ESO	European South	-29.3	289.3	+++++	+		AUG 19 00:37 - AUG 19 04:15	PinRin
AAT	Siding Spring	-31.3	149.1		+	++++	AUG 19 08:07 - AUG 19 09:23	PneRne
SAAO	So. Afr. Astro	-32.4	20.8	+++			AUG 19 00:16 - AUG 19 00:38	PnnRin
MSO	Mt. Stromlo Ob	-35.3	149.0		+	++++	AUG 19 08:08 - AUG 19 09:26	PneRne

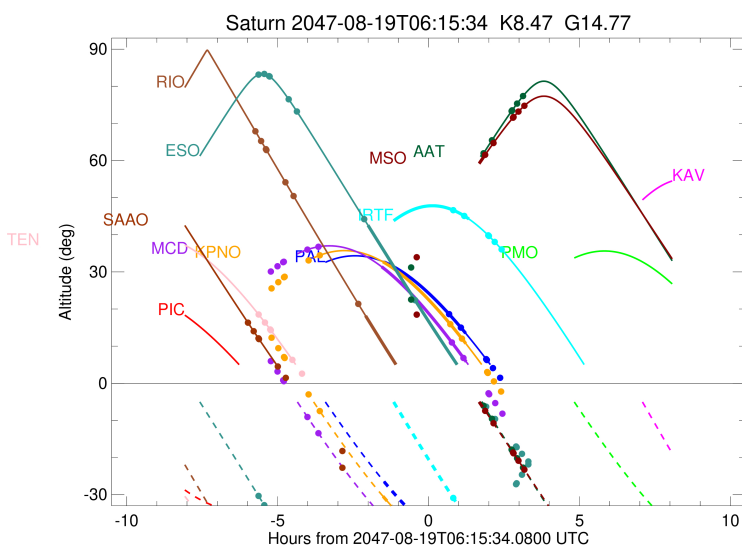
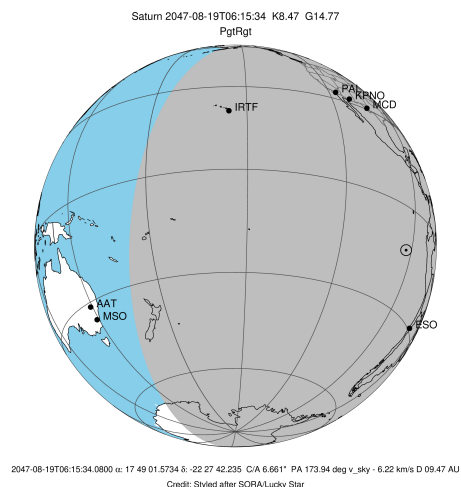


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-19T06:08:28.930
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4068971309590683776
 2Mass ID (if available) : 17490156-2227419
 ICRS Star Coord at Epoch: 17h 49m 01.57337s -22:27:42.23525s
 RUWE (>1.4 is poor) : 0.86
 K magnitude : 8.468
 G magnitude : 14.767
 RP magnitude : 13.253
 BP magnitude : 18.119
 DUPflag : 0
 Distance (au) : 9.474
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -6.22
 Sun-Target sep (deg) : 121.89
 Sun-Moon sep (deg) : 148.56
 B (ring opening deg) : 26.84
 PA of pole (deg) : 5.30
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.324
 C/A sky separation (km) : 50324.3
 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



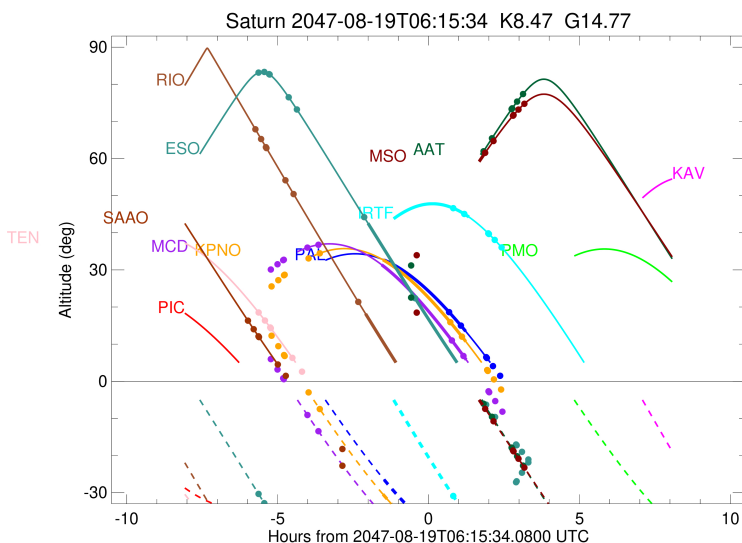
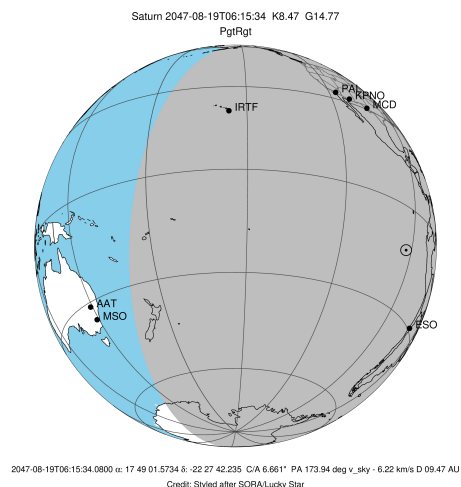
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-08-19T01:04:20.361		21.77	16.68x	140461.00	-4.64		
A (OER)	I	2047-08-19T01:17:49.278		23.58	13.87x	136774.40	-4.48		
Encke (OEG)	I	2047-08-19T01:29:17.350		25.03	11.49x	133744.89	-4.33		
Encke (IEG)	I	2047-08-19T01:30:31.793		25.18	11.23x	133423.31	-4.31		
A (IER)	I	2047-08-19T02:18:27.272		30.24	1.39x	122050.38	-3.56		
B (OER)	I	2047-08-19T02:40:41.059		31.96	-3.08x	117571.16	-3.14		
Saturn	I	2047-08-19T04:47:01.855		32.67	-26.47	59640.72		40.83	46.45
Saturn	E	2047-08-19T07:29:22.257		13.48	-43.78	59268.96		56.00	60.90
B (OER)	E	2047-08-19T06:56:48.796	b	18.58	-42.27	117571.16	3.03		
A (IER)	E	2047-08-19T07:19:58.072	b	15.00	-43.47	122050.38	3.41		
Encke (IEG)	E	2047-08-19T08:10:17.385		6.49	-43.85	133423.31	4.08		
Encke (OEG)	E	2047-08-19T08:11:35.967		6.26	-43.82	133744.89	4.10		
A (OER)	E	2047-08-19T08:23:43.238		4.08x	-43.43	136774.40	4.23		
F ring	E	2047-08-19T08:38:00.382		1.47x	-42.74	140461.00	4.37		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-19T06:07:36.480
 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 : 4068971309590683776
 2Mass ID (if available) : 17490156-2227419
 ICRS Star Coord at Epoch: 17h 49m 01.57337s -22:27:42.23525s
 RUWE (>1.4 is poor) : 0.86
 K magnitude : 8.468
 G magnitude : 14.767
 RP magnitude : 13.253
 BP magnitude : 18.119
 DUPflag : 0
 Distance (au) : 9.474
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -6.22
 Sun-Target sep (deg) : 121.89
 Sun-Moon sep (deg) : 148.49
 B (ring opening deg) : 26.84
 PA of pole (deg) : 5.30
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.287
 C/A sky separation (km) : 50075.5
 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



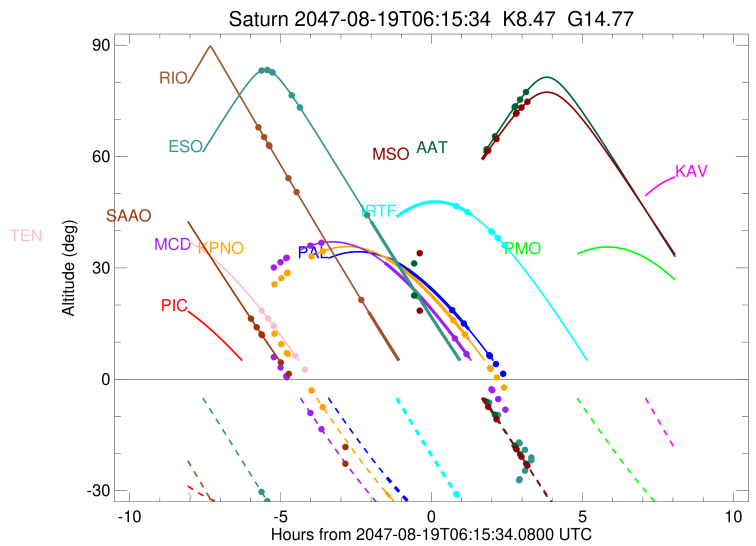
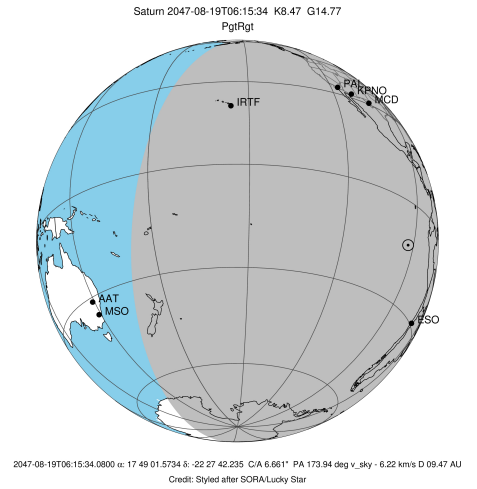
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-08-19T01:03:26.519		25.53	12.31x	140461.00	-4.67		
A (OER)	I	2047-08-19T01:16:49.600		27.21	9.49x	136774.40	-4.51		
Encke (OEG)	I	2047-08-19T01:28:12.389		28.53	7.11x	133744.89	-4.36		
Encke (IEG)	I	2047-08-19T01:29:26.240		28.67	6.85x	133423.31	-4.35		
A (IER)	I	2047-08-19T02:16:54.143		33.08	-2.94x	122050.38	-3.61		
B (OER)	I	2047-08-19T02:38:49.933		34.44	-7.36	117571.16	-3.19		
Saturn	I	2047-08-19T04:45:01.793		32.71	-30.43	59647.80		40.55	46.17
Saturn	E	2047-08-19T07:29:48.794		10.69	-45.46	59276.40		55.68	60.61
B (OER)	E	2047-08-19T06:59:09.120	b	15.87	-44.84	117571.16	3.06		
A (IER)	E	2047-08-19T07:22:06.053	b	12.02	-45.42	122050.38	3.44		
Encke (IEG)	E	2047-08-19T08:12:12.530		3.02x	-44.34	133423.31	4.09		
Encke (OEG)	E	2047-08-19T08:13:30.944		2.78x	-44.27	133744.89	4.11		
A (OER)	E	2047-08-19T08:25:36.942		0.50x	-43.52	136774.40	4.24		
F ring	E	2047-08-19T08:39:53.163		-2.23x	-42.43	140461.00	4.37		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-19T06:06:27.380
 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 : 4068971309590683776
 2Mass ID (if available) : 17490156-2227419
 ICRS Star Coord at Epoch: 17h 49m 01.57337s -22:27:42.23525s
 RUWE (>1.4 is poor) : 0.86
 K magnitude : 8.468
 G magnitude : 14.767
 RP magnitude : 13.253
 BP magnitude : 18.119
 DUPflag : 0
 Distance (au) : 9.474
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -6.22
 Sun-Target sep (deg) : 121.89
 Sun-Moon sep (deg) : 148.39
 B (ring opening deg) : 26.84
 PA of pole (deg) : 5.30
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.239
 C/A sky separation (km) : 49742.8
 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



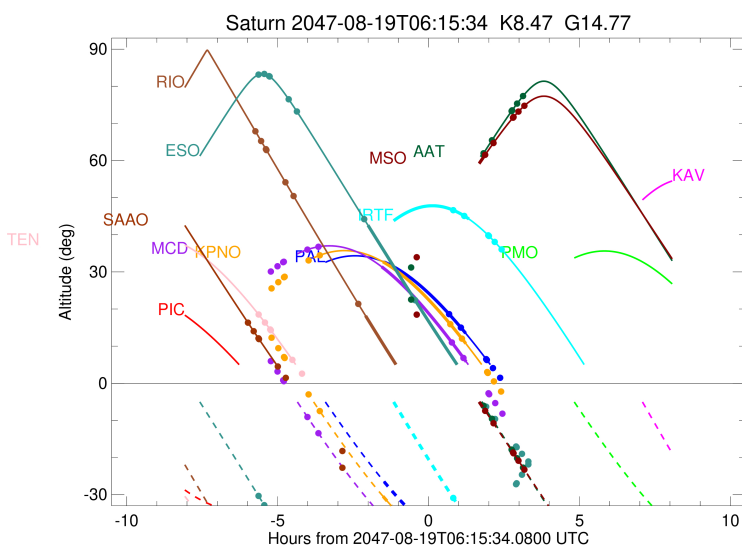
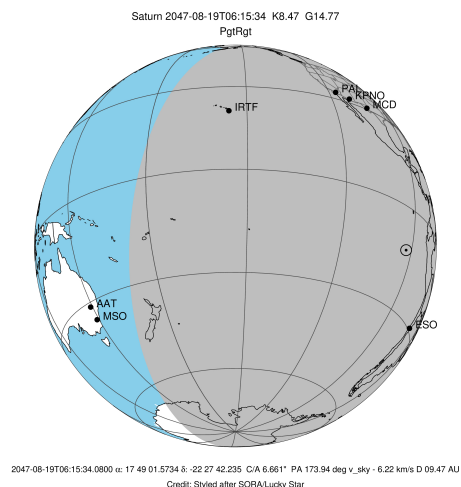
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-08-19T01:01:59.615		30.08	6.00x	140461.00	-4.71		
A (OER)	I	2047-08-19T01:15:15.308		31.50	3.21x	136774.40	-4.55		
Encke (OEG)	I	2047-08-19T01:26:31.424		32.60	0.85x	133744.89	-4.41		
Encke (IEG)	I	2047-08-19T01:27:44.528		32.71	0.60x	133423.31	-4.39		
A (IER)	I	2047-08-19T02:14:37.731		35.99	-9.03	122050.38	-3.66		
B (OER)	I	2047-08-19T02:36:10.990		36.75	-13.33	117571.16	-3.26		
Saturn	I	2047-08-19T04:42:17.311		31.41	-35.54	59657.21		40.17	45.79
Saturn	E	2047-08-19T07:30:30.789		5.80	-46.12	59286.18		55.25	60.22
B (OER)	E	2047-08-19T07:02:19.307	b	10.94	-46.74	117571.16	3.10		
A (IER)	E	2047-08-19T07:25:01.167	b	6.82	-46.32	122050.38	3.47		
Encke (IEG)	E	2047-08-19T08:14:52.296		-2.70x	-43.13	133423.31	4.10		
Encke (OEG)	E	2047-08-19T08:16:10.517		-2.96x	-43.01	133744.89	4.12		
A (OER)	E	2047-08-19T08:28:15.080		-5.35x	-41.80	136774.40	4.24		
F ring	E	2047-08-19T08:42:30.313		-8.20x	-40.19	140461.00	4.38		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-19T06:06:12.820
 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 : 4068971309590683776
 2Mass ID (if available) : 17490156-2227419
 ICRS Star Coord at Epoch: 17h 49m 01.57337s -22:27:42.23525s
 RUWE (>1.4 is poor) : 0.86
 K magnitude : 8.468
 G magnitude : 14.767
 RP magnitude : 13.253
 BP magnitude : 18.119
 DUPflag : 0
 Distance (au) : 9.474
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -6.22
 Sun-Target sep (deg) : 121.89
 Sun-Moon sep (deg) : 147.89
 B (ring opening deg) : 26.84
 PA of pole (deg) : 5.30
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.783
 C/A sky separation (km) : 46607.8
 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



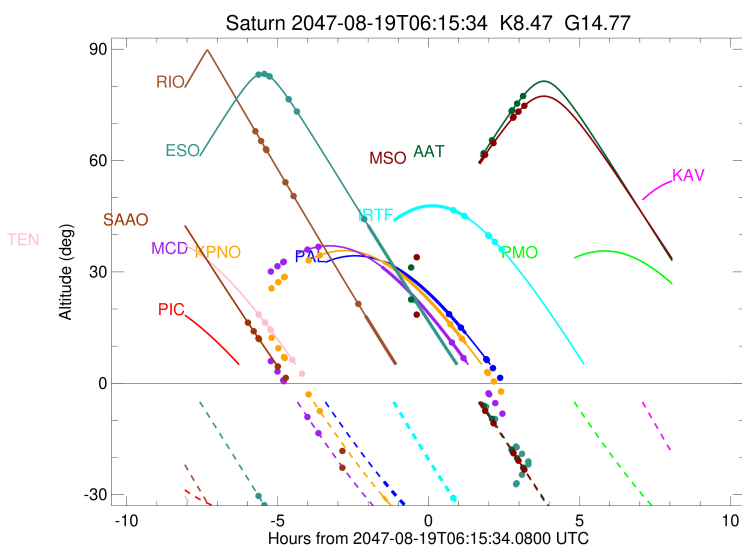
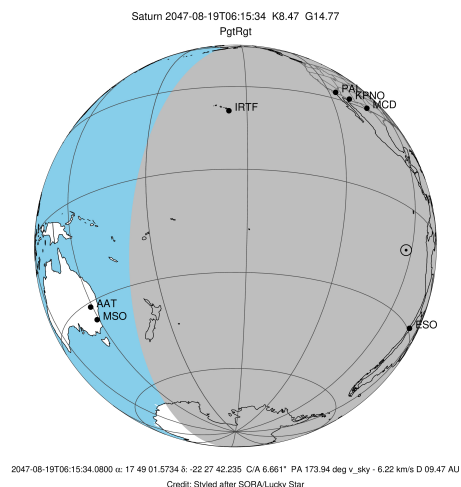
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-08-19T00:37:47.708		18.55	-48.30	140461.00	-4.99		
A (OER)	I	2047-08-19T00:50:16.535		16.39	-48.76	136774.40	-4.85		
Encke (OEG)	I	2047-08-19T01:00:49.102		14.52	-48.97	133744.89	-4.73		
Encke (IEG)	I	2047-08-19T01:01:57.257		14.32	-48.99	133423.31	-4.71		
A (IER)	I	2047-08-19T01:44:47.907		6.34	-48.17	122050.38	-4.11		
B (OER)	I	2047-08-19T02:03:37.864		2.68x	-47.01	117571.16	-3.81		
Saturn	I	2047-08-19T04:23:09.722		-26.29x	-27.83	59763.97		35.82	41.35
Saturn	E	2047-08-19T07:49:57.354		-71.64x	14.75x	59352.60		52.44	57.63
B (OER)	E	2047-08-19T07:38:46.882	b	-69.22x	12.31x	117571.16	3.59		
A (IER)	E	2047-08-19T07:58:49.853		-73.53x	16.70x	122050.38	3.86		
Encke (IEG)	E	2047-08-19T08:44:45.922		-82.40x	26.80x	133423.31	4.38		
Encke (OEG)	E	2047-08-19T08:45:59.319		-82.58x	27.07x	133744.89	4.39		
A (OER)	E	2047-08-19T08:57:21.250		-83.92x	29.58x	136774.40	4.50		
F ring	E	2047-08-19T09:10:50.085		-84.28x	32.55x	140461.00	4.62		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-19T06:15:42.400
 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 : 4068971309590683776
 2Mass ID (if available) : 17490156-2227419
 ICRS Star Coord at Epoch: 17h 49m 01.57337s -22:27:42.23525s
 RUWE (>1.4 is poor) : 0.86
 K magnitude : 8.468
 G magnitude : 14.767
 RP magnitude : 13.253
 BP magnitude : 18.119
 DUPflag : 0
 Distance (au) : 9.474
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -6.22
 Sun-Target sep (deg) : 121.89
 Sun-Moon sep (deg) : 149.15
 B (ring opening deg) : 26.84
 PA of pole (deg) : 5.30
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.286
 C/A sky separation (km) : 50065.8
 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	2047-08-19T01:03:24.248		1.05x	51.59x	140461.00	-4.63		
A (OER)	I	2047-08-19T01:16:52.386		3.93x	48.43x	136774.40	-4.49		
Encke (OEG)	I	2047-08-19T01:28:17.302		6.35	45.74x	133744.89	-4.36		
Encke (IEG)	I	2047-08-19T01:29:31.255		6.61	45.45x	133423.31	-4.34		
A (IER)	I	2047-08-19T02:16:39.906		16.32	34.35x	122050.38	-3.67		
B (OER)	I	2047-08-19T02:38:06.690		20.56	29.31x	117571.16	-3.29		
Saturn	I	2047-08-19T04:53:56.390		42.46	-2.23x	59666.17		39.81	45.42
Saturn	E	2047-08-19T07:35:52.654		44.25	-37.13	59267.51		56.06	60.96
B (OER)	E	2047-08-19T07:05:02.609	b	46.61	-30.95	117571.16	3.26		
A (IER)	E	2047-08-19T07:26:42.616	b	45.07	-35.33	122050.38	3.63		
Encke (IEG)	E	2047-08-19T08:14:24.698		39.84	-44.25	133423.31	4.29		
Encke (OEG)	E	2047-08-19T08:15:39.610		39.67	-44.46	133744.89	4.30		
A (OER)	E	2047-08-19T08:27:13.636		38.07	-46.42	136774.40	4.43		
F ring	E	2047-08-19T08:40:53.085		36.06	-48.59	140461.00	4.57		

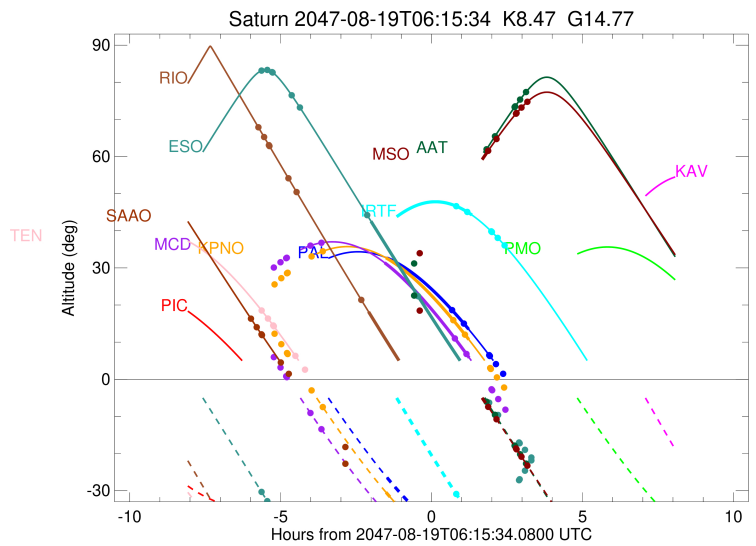
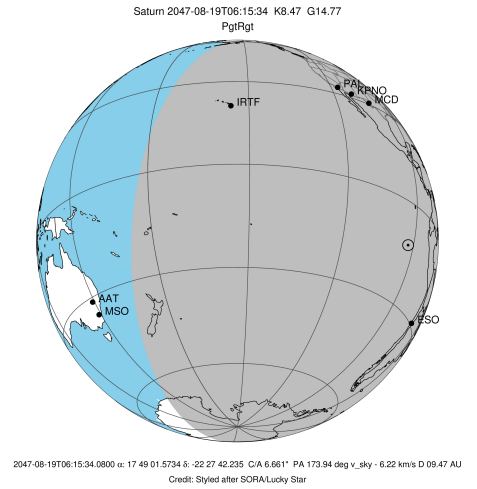
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-19T06:04:08.690
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 4068971309590683776
 2Mass ID (if available) : 17490156-2227419
 ICRS Star Coord at Epoch: 17h 49m 01.57337s -22:27:42.23525s
 RUWE (>1.4 is poor) : 0.86
 K magnitude : 8.468
 G magnitude : 14.767
 RP magnitude : 13.253
 BP magnitude : 18.119
 DUPflag : 0
 Distance (au) : 9.474
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -6.22
 Sun-Target sep (deg) : 121.89
 Sun-Moon sep (deg) : 147.99
 B (ring opening deg) : 26.84
 PA of pole (deg) : 5.30
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.148
 C/A sky separation (km) : 42245.0
 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	2047-08-19T00:31:22.467		67.90	-54.15	140461.00	-5.46		
A (OER)	I	2047-08-19T00:42:44.622		65.28	-56.73	136774.40	-5.35		
Encke (OEG)	I	2047-08-19T00:52:16.226		63.08	-58.87	133744.89	-5.25		
Encke (IEG)	I	2047-08-19T00:53:17.538		62.85	-59.10	133423.31	-5.24		
A (IER)	I	2047-08-19T01:31:02.900		54.17	-67.39	122050.38	-4.78		
B (OER)	I	2047-08-19T01:47:01.745		50.51	-70.73	117571.16	-4.56		
B (IER)	I	2047-08-19T03:55:37.098		21.47	-72.79	91984.69	-1.79		
Saturn	I	2047-08-19T04:10:24.715		18.19	-69.82	59880.58		30.82	36.08
Saturn	E	2047-08-19T08:00:26.797		-28.08x	-17.65	59476.94		47.37	52.85
B (IER)	E	2047-08-19T05:58:47.108	b	-5.03x	-45.66	91984.69	1.73		
B (OER)	E	2047-08-19T08:15:45.676		-30.57x	-14.15	117571.16	4.17		
A (IER)	E	2047-08-19T08:33:14.759		-33.24x	-10.16	122050.38	4.36		
Encke (IEG)	E	2047-08-19T09:14:52.041		-38.73x	-0.76x	133423.31	4.73		
Encke (OEG)	E	2047-08-19T09:15:59.956		-38.86x	-0.51x	133744.89	4.74		
A (OER)	E	2047-08-19T09:26:33.846		-40.01x	1.86x	136774.40	4.82		
F ring	E	2047-08-19T09:39:11.948		-41.24x	4.67x	140461.00	4.91		

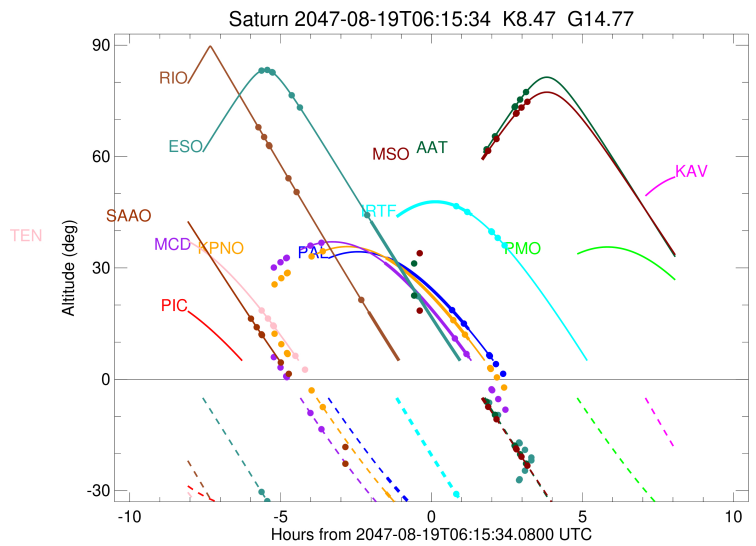
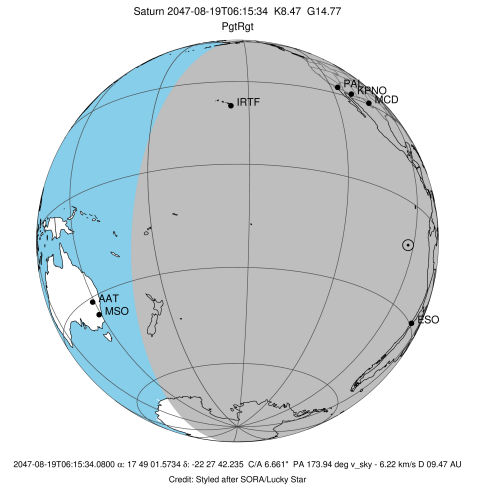
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-19T06:04:37.330
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4068971309590683776
 2Mass ID (if available) : 17490156-2227419
 ICRS Star Coord at Epoch: 17h 49m 01.57337s -22:27:42.23525s
 RUWE (>1.4 is poor) : 0.86
 K magnitude : 8.468
 G magnitude : 14.767
 RP magnitude : 13.253
 BP magnitude : 18.119
 DUPflag : 0
 Distance (au) : 9.474
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -6.22
 Sun-Target sep (deg) : 121.89
 Sun-Moon sep (deg) : 148.21
 B (ring opening deg) : 26.84
 PA of pole (deg) : 5.30
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.216
 C/A sky separation (km) : 42713.5
 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	2047-08-19T00:37:38.627		83.14	-30.33	140461.00	-5.44		
A (OER)	I	2047-08-19T00:49:03.530		83.33	-32.82	136774.40	-5.33		
Encke (OEG)	I	2047-08-19T00:58:37.329		82.75	-34.90	133744.89	-5.23		
Encke (IEG)	I	2047-08-19T00:59:38.874		82.65	-35.12	133423.31	-5.22		
A (IER)	I	2047-08-19T01:37:33.246		76.53	-43.33	122050.38	-4.76		
B (OER)	I	2047-08-19T01:53:36.957		73.28	-46.77	117571.16	-4.53		
B (IER)	I	2047-08-19T04:07:18.165		44.31	-71.32	91984.69	-1.52		
Saturn	I	2047-08-19T04:15:07.528		42.60	-72.14	59869.10		31.33	36.62
Saturn	E	2047-08-19T07:56:18.317		-3.65x	-43.14	59470.71		47.62	53.09
B (IER)	E	2047-08-19T05:48:33.817	b	22.43	-68.23	91984.69	1.48		
B (OER)	E	2047-08-19T08:10:20.561		-6.33x	-40.11	117571.16	4.16		
A (IER)	E	2047-08-19T08:27:52.644		-9.61x	-36.30	122050.38	4.35		
Encke (IEG)	E	2047-08-19T09:09:36.340		-17.04x	-27.19	133423.31	4.72		
Encke (OEG)	E	2047-08-19T09:10:44.461		-17.23x	-26.95	133744.89	4.72		
A (OER)	E	2047-08-19T09:21:20.437		-19.01x	-24.63	136774.40	4.80		
F ring	E	2047-08-19T09:34:01.481		-21.07x	-21.86	140461.00	4.89		

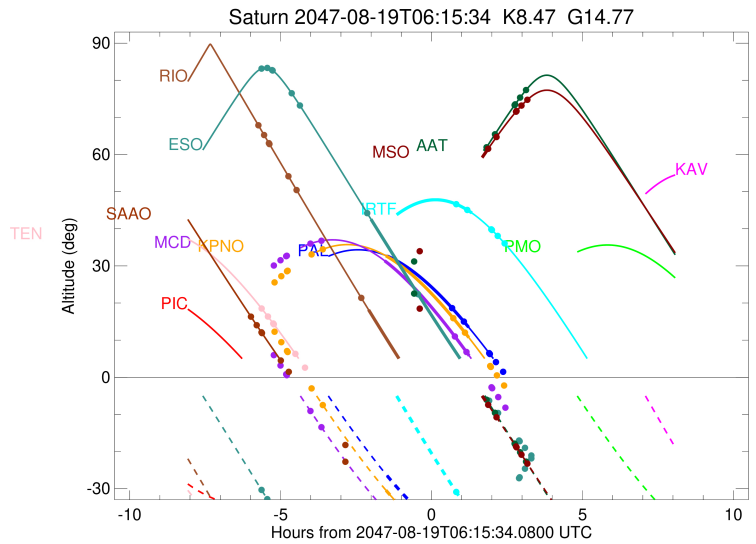
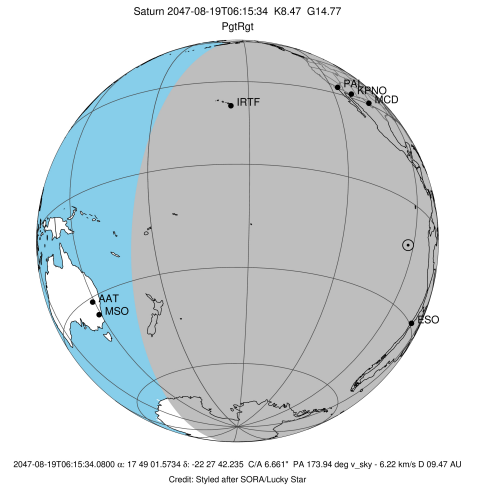
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-19T06:26:10.230
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 4068971309590683776
 2Mass ID (if available) : 17490156-2227419
 ICRS Star Coord at Epoch: 17h 49m 01.57337s -22:27:42.23525s
 RUWE (>1.4 is poor) : 0.86
 K magnitude : 8.468
 G magnitude : 14.767
 RP magnitude : 13.253
 BP magnitude : 18.119
 DUPflag : 0
 Distance (au) : 9.475
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -6.22
 Sun-Target sep (deg) : 121.89
 Sun-Moon sep (deg) : 149.66
 B (ring opening deg) : 26.84
 PA of pole (deg) : 5.30
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.469
 C/A sky separation (km) : 44455.5
 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	2047-08-19T00:38:12.900		-25.23x	41.11x	140461.00	-5.03		
A (OER)	I	2047-08-19T00:50:32.999		-23.52x	42.33x	136774.40	-4.93		
Encke (OEG)	I	2047-08-19T01:00:52.051		-22.02x	43.24x	133744.89	-4.85		
Encke (IEG)	I	2047-08-19T01:01:58.394		-21.86x	43.33x	133423.31	-4.84		
A (IER)	I	2047-08-19T01:42:42.561		-15.43x	45.66x	122050.38	-4.44		
B (OER)	I	2047-08-19T01:59:54.018		-12.50x	46.03x	117571.16	-4.24		
B (IER)	I	2047-08-19T04:27:13.211		15.76	34.74x	91984.69	-1.13		
Saturn	I	2047-08-19T04:41:16.393		18.66	32.64x	59870.86		31.25	36.54
Saturn	E	2047-08-19T08:07:33.432		62.49	-6.59	59389.78		50.91	56.20
B (IER)	E	2047-08-19T05:41:07.480	b	31.21	22.53x	91984.69	1.14		
B (OER)	E	2047-08-19T08:05:09.764	b	61.98	-6.09	117571.16	4.40		
A (IER)	E	2047-08-19T08:21:42.748		65.45	-9.57	122050.38	4.62		
Encke (IEG)	E	2047-08-19T09:00:46.740		73.31	-17.87	133423.31	5.06		
Encke (OEG)	E	2047-08-19T09:01:50.224		73.51	-18.10	133744.89	5.07		
A (OER)	E	2047-08-19T09:11:42.333		75.34	-20.20	136774.40	5.16		
F ring	E	2047-08-19T09:23:29.683		77.37	-22.72	140461.00	5.26		

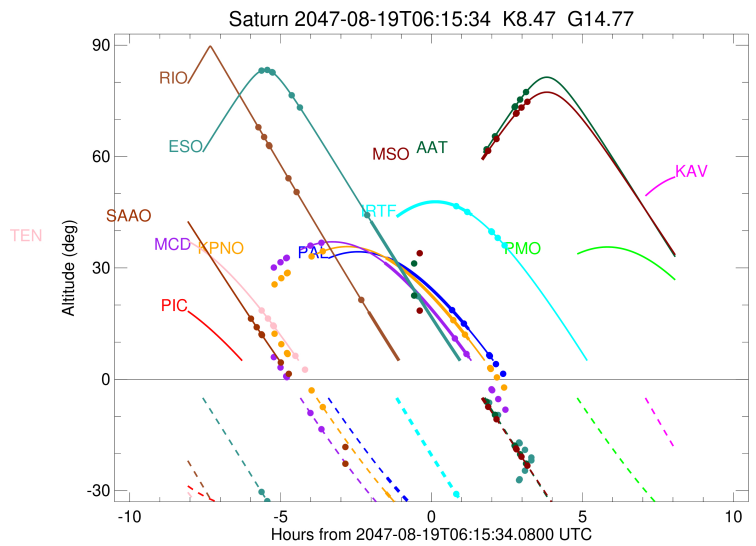
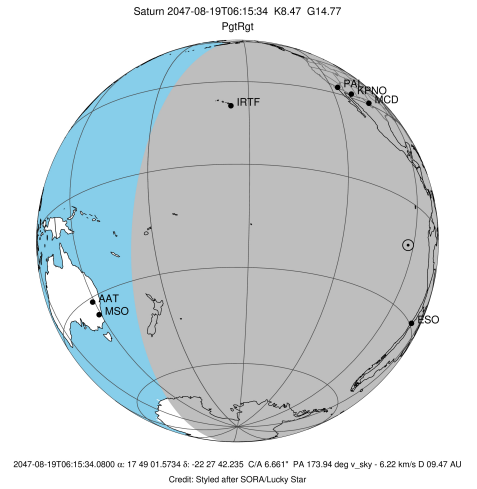
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-19T06:15:07.480
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : SAAO
 Location : So. Afr. Astro. Obs. (Sutherland)
 Latitude (deg) : -32.37953
 E. Longitude (deg) : 20.81070
 Altitude (km) : 1.768
 Gaia source ID : 4068971309590683776
 2Mass ID (if available) : 17490156-2227419
 ICRS Star Coord at Epoch: 17h 49m 01.57337s -22:27:42.23525s
 RUWE (>1.4 is poor) : 0.86
 K magnitude : 8.468
 G magnitude : 14.767
 RP magnitude : 13.253
 BP magnitude : 18.119
 DUPflag : 0
 Distance (au) : 9.474
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -6.22
 Sun-Target sep (deg) : 121.89
 Sun-Moon sep (deg) : 148.40
 B (ring opening deg) : 26.84
 PA of pole (deg) : 5.30
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.904
 C/A sky separation (km) : 40567.9
 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	2047-08-19T00:16:38.643		16.34	-60.68	140461.00	-5.45		
A (OER)	I	2047-08-19T00:28:01.384		14.03	-58.68	136774.40	-5.35		
Encke (OEG)	I	2047-08-19T00:37:32.158		12.12	-56.94	133744.89	-5.26		
Encke (IEG)	I	2047-08-19T00:38:33.299		11.92	-56.75	133423.31	-5.25		
A (IER)	I	2047-08-19T01:15:57.574		4.53x	-49.52	122050.38	-4.87		
B (OER)	I	2047-08-19T01:31:35.782		1.52x	-46.37	117571.16	-4.68		
B (IER)	I	2047-08-19T03:24:08.935		-18.21x	-22.81	91984.69	-2.69		
Saturn	I	2047-08-19T04:10:46.415		-24.88x	-12.97	59947.92		27.73	32.72
Saturn	E	2047-08-19T08:18:45.883		-30.26x	33.72x	59486.65		46.98	52.48
B (IER)	E	2047-08-19T06:39:34.089	b	-35.32x	16.99x	91984.69	2.65		
B (OER)	E	2047-08-19T08:34:39.621		-28.62x	35.92x	117571.16	4.55		
A (IER)	E	2047-08-19T08:50:44.131		-26.78x	37.97x	122050.38	4.73		
Encke (IEG)	E	2047-08-19T09:29:16.093		-21.68x	41.95x	133423.31	5.09		
Encke (OEG)	E	2047-08-19T09:30:19.171		-21.53x	42.04x	133744.89	5.10		
A (OER)	E	2047-08-19T09:40:08.255		-20.09x	42.82x	136774.40	5.18		
F ring	E	2047-08-19T09:51:53.439		-18.31x	43.60x	140461.00	5.27		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-19T06:25:51.810
 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 : 4068971309590683776
 2Mass ID (if available) : 17490156-2227419
 ICRS Star Coord at Epoch: 17h 49m 01.57337s -22:27:42.23525s
 RUWE (>1.4 is poor) : 0.86
 K magnitude : 8.468
 G magnitude : 14.767
 RP magnitude : 13.253
 BP magnitude : 18.119
 DUPflag : 0
 Distance (au) : 9.475
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -6.22
 Sun-Target sep (deg) : 121.89
 Sun-Moon sep (deg) : 149.63
 B (ring opening deg) : 26.84
 PA of pole (deg) : 5.30
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.408
 C/A sky separation (km) : 44031.8
 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	2047-08-19T00:37:11.849		-22.22x	37.45x	140461.00	-5.06		
A (OER)	I	2047-08-19T00:49:26.221		-20.65x	38.56x	136774.40	-4.97		
Encke (OEG)	I	2047-08-19T00:59:40.175		-19.27x	39.39x	133744.89	-4.89		
Encke (IEG)	I	2047-08-19T01:00:45.953		-19.12x	39.47x	133423.31	-4.88		
A (IER)	I	2047-08-19T01:41:06.116		-13.15x	41.62x	122050.38	-4.50		
B (OER)	I	2047-08-19T01:58:04.916		-10.44x	41.98x	117571.16	-4.29		
B (IER)	I	2047-08-19T04:17:26.856		14.95	33.05x	91984.69	-1.44		
Saturn	I	2047-08-19T04:39:35.089		19.31	30.07x	59881.76		30.76	36.02
Saturn	E	2047-08-19T08:08:41.928		61.64	-7.52	59400.94		50.45	55.77
B (IER)	E	2047-08-19T05:52:05.004	b	33.94	18.50x	91984.69	1.45		
B (OER)	E	2047-08-19T08:08:23.653	b	61.58	-7.46	117571.16	4.45		
A (IER)	E	2047-08-19T08:24:46.511		64.72	-10.76	122050.38	4.67		
Encke (IEG)	E	2047-08-19T09:03:33.226		71.54	-18.65	133423.31	5.09		
Encke (OEG)	E	2047-08-19T09:04:36.341		71.71	-18.86	133744.89	5.10		
A (OER)	E	2047-08-19T09:14:25.207		73.19	-20.87	136774.40	5.19		
F ring	E	2047-08-19T09:26:09.111		74.75	-23.27	140461.00	5.29		