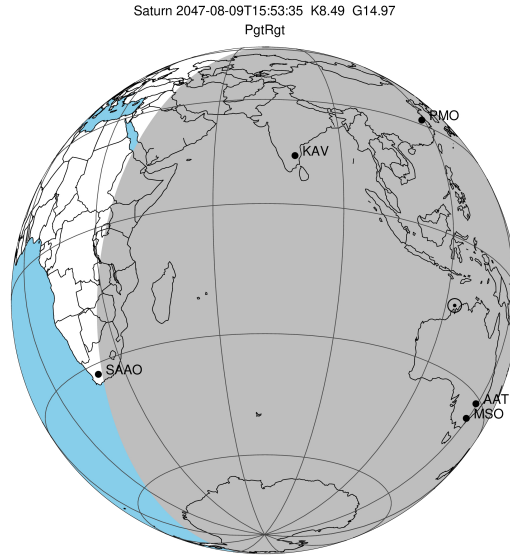


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-09T15:53:35.780
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4068930146608710400
 2Mass ID (if available) : 17501351-2226362

Saturn 2047-08-09T15:53:35 K8.49 G14.97 PgtRgt

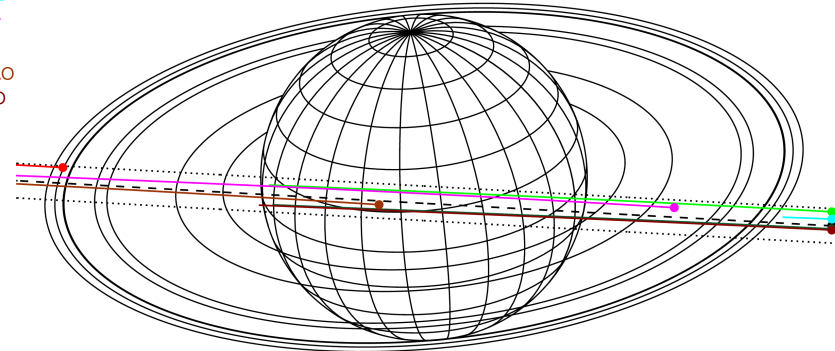
ICRS Star Coord at Epoch: 17h 50m 13.50682s -22:26:36.52025s

RUWE (>1.4 is poor) : 0.92
 K magnitude : 8.493
 G magnitude : 14.969
 RP magnitude : 13.445
 BP magnitude : 18.423
 DUPflag : 0
 Distance (au) : 9.347
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -10.14
 Sun-Target sep (deg) : 131.38
 Sun-Moon sep (deg) : 93.55
 B (ring opening deg) : 26.79
 PA of pole (deg) : 5.32



2047-08-09T15:53:35.7800 at: 17 50 13.50682 s: -22 26 36.520 C/A 1.407° PA 356.83 deg v_sky -10.14 km/s D 09.35 AU
 Credit: Styled after SORA/Lucky Star

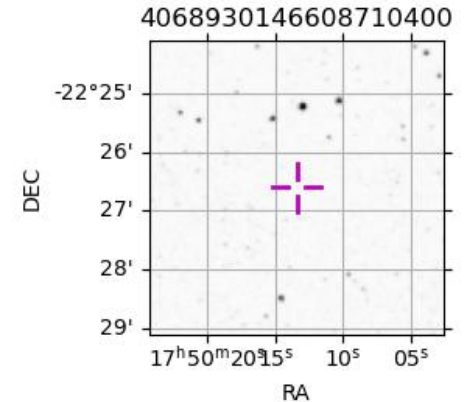
Earth
 PIC
 PMO
 IRTF
 KAV
 AAT
 SAAO
 MSO



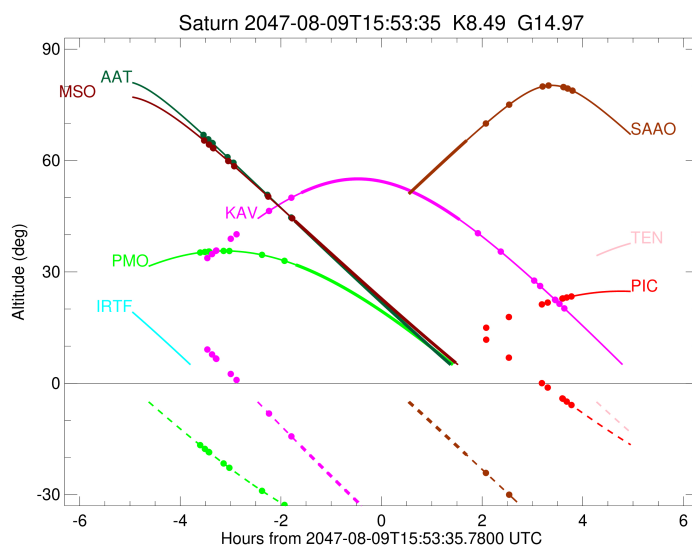
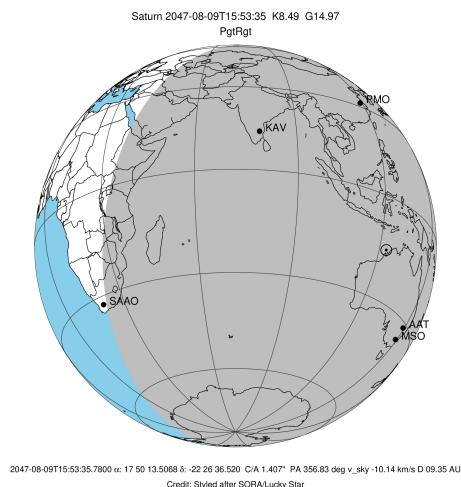
#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring

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	OEncode
PIC	Pic du Midi	42.9	0.1			+	AUG 09 19:40 - AUG 09 19:40	PnnRne
PAL	Palomar Mt (20	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs	32.1	118.8	+	+		AUG 09 12:17 - AUG 09 14:11	PinRin
KPNO	Kitt Peak Natl	32.0	248.4					PnnRnn
MCD	McDonald Obs.	30.7	256.0					PnnRnn
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observ	12.6	78.8	+	+	+	AUG 09 13:39 - AUG 09 19:31	PieRie
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3					PnnRnn
AAT	Siding Spring	-31.3	149.1	+	+		AUG 09 12:21 - AUG 09 14:09	PinRin
SAAO	So. Afr. Astro	-32.4	20.8		+	+	AUG 09 17:35 - AUG 09 19:41	PneRne
MSO	Mt. Stromlo Ob	-35.3	149.0	+	+	+	AUG 09 12:22 - AUG 09 17:22	PieRin

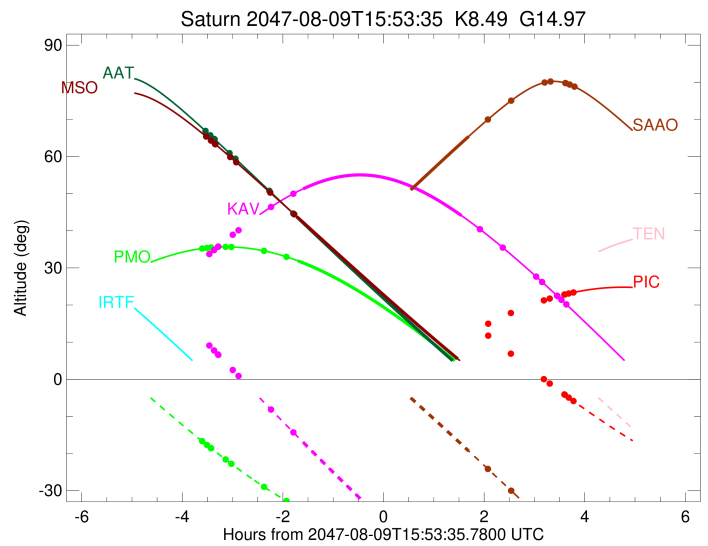
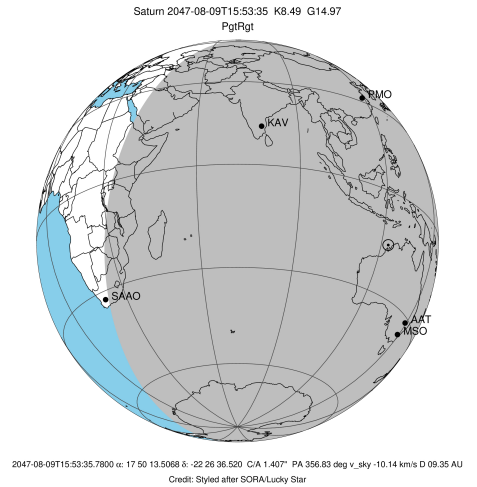


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-09T16:00:26.150
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 4068930146608710400
 2Mass ID (if available) : 17501351-2226362
 ICRS Star Coord at Epoch: 17h 50m 13.50682s -22:26:36.52025s
 RUWE (>1.4 is poor) : 0.92
 K magnitude : 8.493
 G magnitude : 14.969
 RP magnitude : 13.445
 BP magnitude : 18.423
 DUPflag : 0
 Distance (au) : 9.347
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -10.14
 Sun-Target sep (deg) : 131.38
 Sun-Moon sep (deg) : 93.48
 B (ring opening deg) : 26.79
 PA of pole (deg) : 5.32
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.688
 C/A sky separation (km) : 4666.0
 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



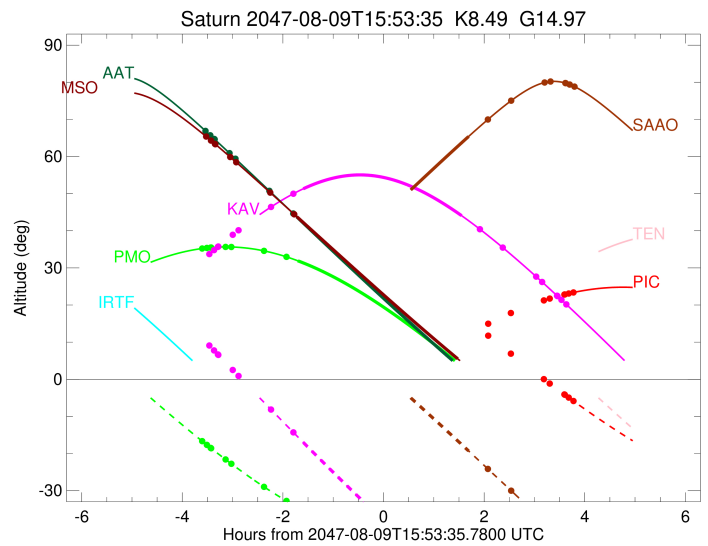
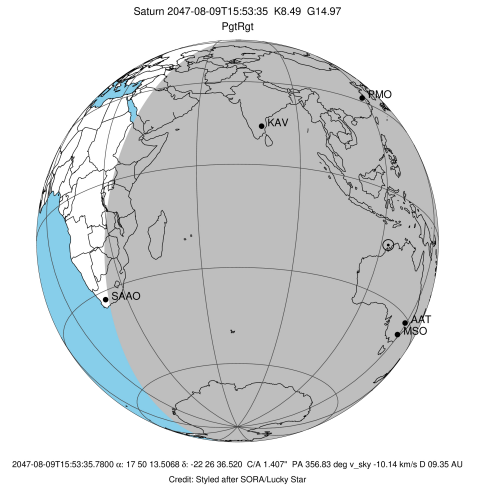
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-08-09T12:25:06.117	-39.63x	62.68x	140461.00	-10.47			
A (OER)	I	2047-08-09T12:30:58.274	-38.55x	62.45x	136774.40	-10.47			
Encke (OEG)	I	2047-08-09T12:35:47.520	-37.67x	62.23x	133744.89	-10.48			
Encke (IEG)	I	2047-08-09T12:36:18.215	-37.57x	62.20x	133423.31	-10.48			
A (IER)	I	2047-08-09T12:54:22.884	-34.25x	61.02x	122050.38	-10.49			
B (OER)	I	2047-08-09T13:01:29.612	-32.94x	60.43x	117571.16	-10.50			
B (IER)	I	2047-08-09T13:42:02.938	-25.50x	55.95x	91984.69	-10.53			
C (IER)	I	2047-08-09T14:09:44.320	-20.48x	52.07x	74490.58	-10.53			
Saturn	I	2047-08-09T14:22:24.481	-18.21x	50.14x	60202.61			-12.13	-14.77
Saturn	E	2047-08-09T17:37:31.519	12.46	15.54x	60260.47			4.08	5.01
C (IER)	E	2047-08-09T17:58:24.151	14.96	11.75x	74490.58	10.75			
B (IER)	E	2047-08-09T18:25:27.418	17.84	6.90x	91984.69	10.80			
B (OER)	E	2047-08-09T19:04:53.146	21.24	0.03x	117571.16	10.83			
A (IER)	E	2047-08-09T19:11:46.722	21.73	-1.15x	122050.38	10.83			
Encke (IEG)	E	2047-08-09T19:29:16.414	22.82	-4.08x	133423.31	10.84			
Encke (OEG)	E	2047-08-09T19:29:46.089	22.85	-4.16x	133744.89	10.84			
A (OER)	E	2047-08-09T19:34:25.641	23.10	-4.93x	136774.40	10.84			
F ring	E	2047-08-09T19:40:05.809	23.38	-5.85	140461.00	10.84			

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-09T15:46:43.750
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 4068930146608710400
 2Mass ID (if available) : 17501351-2226362
 ICRS Star Coord at Epoch: 17h 50m 13.50682s -22:26:36.52025s
 RUWE (>1.4 is poor) : 0.92
 K magnitude : 8.493
 G magnitude : 14.969
 RP magnitude : 13.445
 BP magnitude : 18.423
 DUPflag : 0
 Distance (au) : 9.347
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -10.14
 Sun-Target sep (deg) : 131.38
 Sun-Moon sep (deg) : 93.90
 B (ring opening deg) : 26.79
 PA of pole (deg) : 5.32
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.768
 C/A sky separation (km) : 5209.1
 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



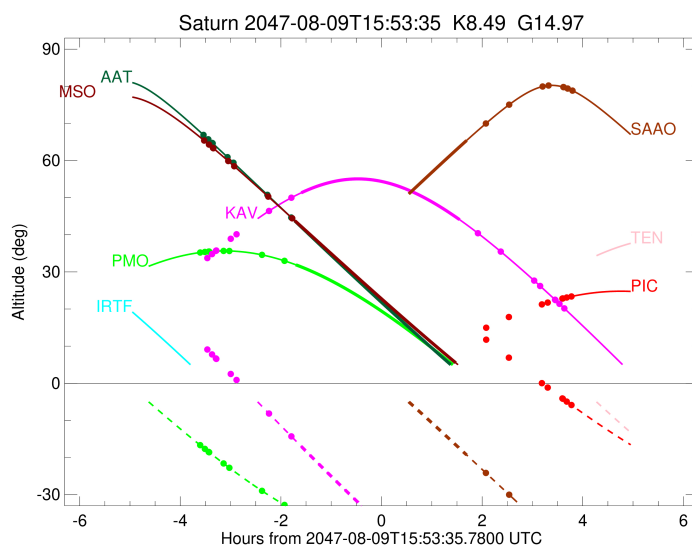
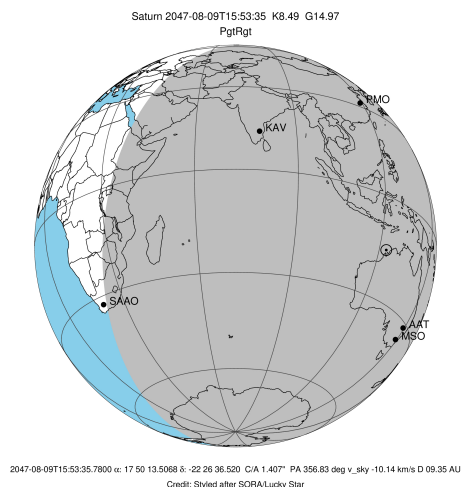
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-08-09T12:17:25.317		35.22	-16.68	140461.00	-11.00		
A (OER)	I	2047-08-09T12:23:00.587		35.37	-17.69	136774.40	-10.99		
Encke (OEG)	I	2047-08-09T12:27:36.207		35.48	-18.51	133744.89	-10.99		
Encke (IEG)	I	2047-08-09T12:28:05.469		35.48	-18.60	133423.31	-10.99		
A (IER)	I	2047-08-09T12:45:21.207		35.65	-21.61	122050.38	-10.97		
B (OER)	I	2047-08-09T12:52:09.631		35.63	-22.77	117571.16	-10.96		
B (IER)	I	2047-08-09T13:31:09.980		34.58	-28.99	91984.69	-10.90		
C (IER)	I	2047-08-09T13:58:00.473		32.97	-32.79	74490.58	-10.82		
Saturn	I	2047-08-09T14:11:18.428		31.92	-34.49	60209.43		-11.47	-13.98
Saturn	E	2047-08-09T17:23:34.179		4.11x	-39.25	60265.29		2.45	3.01
C (IER)	E	2047-08-09T17:45:48.505		-0.06x	-37.17	74490.58	10.43		
B (IER)	E	2047-08-09T18:13:46.266		-5.46x	-33.94	91984.69	10.42		
B (OER)	E	2047-08-09T18:54:48.147		-13.63x	-28.19	117571.16	10.37		
A (IER)	E	2047-08-09T19:02:00.518		-15.09x	-27.08	122050.38	10.35		
Encke (IEG)	E	2047-08-09T19:20:20.428		-18.84x	-24.13	133423.31	10.33		
Encke (OEG)	E	2047-08-09T19:20:51.574		-18.95x	-24.05	133744.89	10.32		
A (OER)	E	2047-08-09T19:25:45.114		-19.95x	-23.23	136774.40	10.32		
F ring	E	2047-08-09T19:31:42.625		-21.18x	-22.23	140461.00	10.31		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-09T15:52:00.430
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 4068930146608710400
 2Mass ID (if available) : 17501351-2226362
 ICRS Star Coord at Epoch: 17h 50m 13.50682s -22:26:36.52025s
 RUWE (>1.4 is poor) : 0.92
 K magnitude : 8.493
 G magnitude : 14.969
 RP magnitude : 13.445
 BP magnitude : 18.423
 DUPflag : 0
 Distance (au) : 9.347
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -10.14
 Sun-Target sep (deg) : 131.38
 Sun-Moon sep (deg) : 94.31
 B (ring opening deg) : 26.79
 PA of pole (deg) : 5.32
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.877
 C/A sky separation (km) : 5945.6
 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	2047-08-09T12:25:58.031		33.74	9.07x	140461.00	-10.98		
A (OER)	I	2047-08-09T12:31:33.654		34.81	7.75x	136774.40	-10.99		
Encke (OEG)	I	2047-08-09T12:36:09.416		35.68	6.66x	133744.89	-10.99		
Encke (IEG)	I	2047-08-09T12:36:38.686		35.77	6.55x	133423.31	-10.99		
A (IER)	I	2047-08-09T12:53:53.733		38.93	2.48x	122050.38	-10.99		
B (OER)	I	2047-08-09T13:00:41.387		40.14	0.89x	117571.16	-10.99		
B (IER)	I	2047-08-09T13:39:32.302		46.43	-8.18	91984.69	-10.96		
C (IER)	I	2047-08-09T14:06:12.121		49.99	-14.33	74490.58	-10.90		
Saturn	I	2047-08-09T14:17:51.275		51.31	-16.99	60198.25		-12.53	-15.26
Saturn	E	2047-08-09T17:26:42.788		44.08	-55.06	60265.97		2.12	2.60
C (IER)	E	2047-08-09T17:48:32.326		40.43	-57.95	74490.58	10.69		
B (IER)	E	2047-08-09T18:15:47.141		35.48	-60.55	91984.69	10.70		
B (OER)	E	2047-08-09T18:55:42.063		27.65	-61.78	117571.16	10.66		
A (IER)	E	2047-08-09T19:02:42.438		26.21	-61.64	122050.38	10.65		
Encke (IEG)	E	2047-08-09T19:20:31.749		22.52	-60.83	133423.31	10.62		
Encke (OEG)	E	2047-08-09T19:21:02.028		22.41	-60.80	133744.89	10.62		
A (OER)	E	2047-08-09T19:25:47.406		21.41	-60.47	136774.40	10.61		
F ring	E	2047-08-09T19:31:34.990		20.18	-60.01	140461.00	10.60		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-09T15:44:53.360
 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 : 4068930146608710400
 2Mass ID (if available) : 17501351-2226362
 ICRS Star Coord at Epoch: 17h 50m 13.50682s -22:26:36.52025s
 RUWE (>1.4 is poor) : 0.92
 K magnitude : 8.493
 G magnitude : 14.969
 RP magnitude : 13.445
 BP magnitude : 18.423
 DUPflag : 0
 Distance (au) : 9.347
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -10.14
 Sun-Target sep (deg) : 131.38
 Sun-Moon sep (deg) : 93.95
 B (ring opening deg) : 26.79
 PA of pole (deg) : 5.32
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.823
 C/A sky separation (km) : 12355.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk

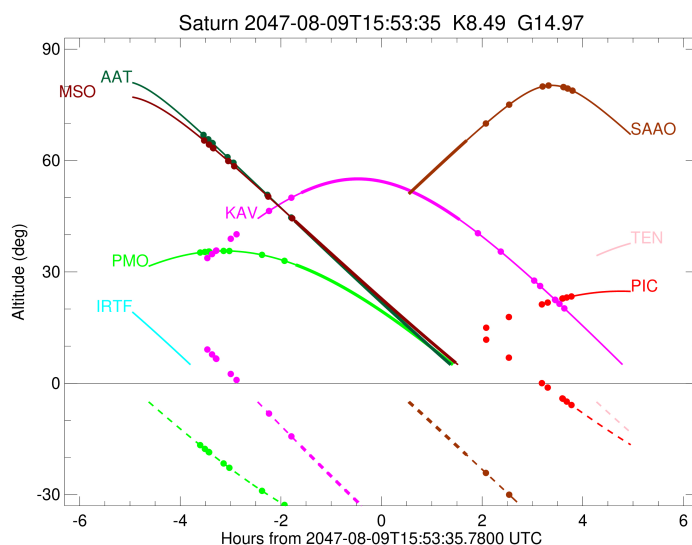
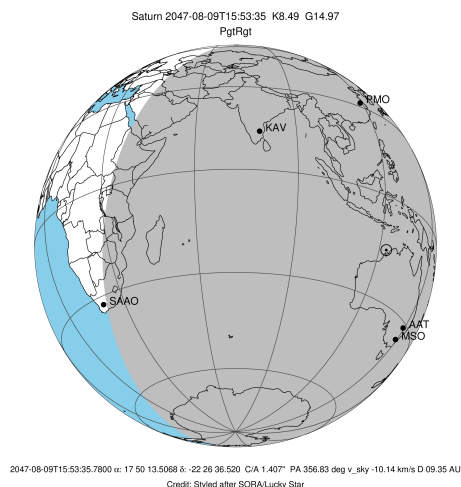


b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-08-09T12:21:23.090		66.88	-61.03	140461.00	-10.77		
A (OER)	I	2047-08-09T12:27:05.814		65.70	-62.13	136774.40	-10.75		
Encke (OEG)	I	2047-08-09T12:31:47.913		64.72	-63.01	133744.89	-10.73		
Encke (IEG)	I	2047-08-09T12:32:17.882		64.62	-63.10	133423.31	-10.73		
A (IER)	I	2047-08-09T12:50:01.213		60.89	-66.30	122050.38	-10.66		
B (OER)	I	2047-08-09T12:57:02.026		59.40	-67.50	117571.16	-10.63		
B (IER)	I	2047-08-09T13:37:35.436		50.73	-73.04	91984.69	-10.38		
C (IER)	I	2047-08-09T14:06:03.983		44.62	-74.63	74490.58	-10.07		
Saturn	I	2047-08-09T14:09:53.667		43.80	-74.65	60136.48		-17.35	-20.96
Saturn	E	2047-08-09T17:21:50.388		3.89x	-43.60	60261.59		-3.77	-4.62
C (IER)	E	2047-08-09T17:45:35.803		-0.71x	-38.55	74490.58	9.65		
B (IER)	E	2047-08-09T18:15:28.237		-6.32x	-32.15	91984.69	9.84		
B (OER)	E	2047-08-09T18:58:32.465		-13.96x	-22.94	117571.16	9.94		
A (IER)	E	2047-08-09T19:06:02.842		-15.23x	-21.34	122050.38	9.95		
Encke (IEG)	E	2047-08-09T19:25:05.134		-18.34x	-17.30	133423.31	9.96		
Encke (OEG)	E	2047-08-09T19:25:37.415		-18.42x	-17.18	133744.89	9.96		
A (OER)	E	2047-08-09T19:30:41.490		-19.22x	-16.11	136774.40	9.96		
F ring	E	2047-08-09T19:36:51.447		-20.18x	-14.81	140461.00	9.97		

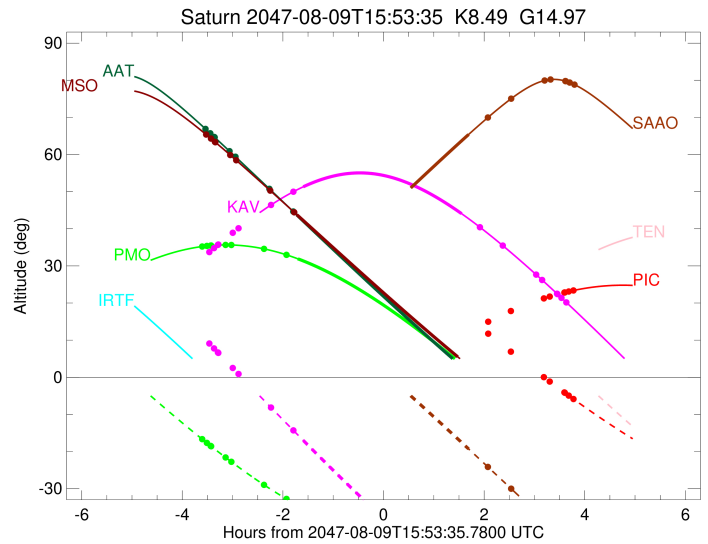
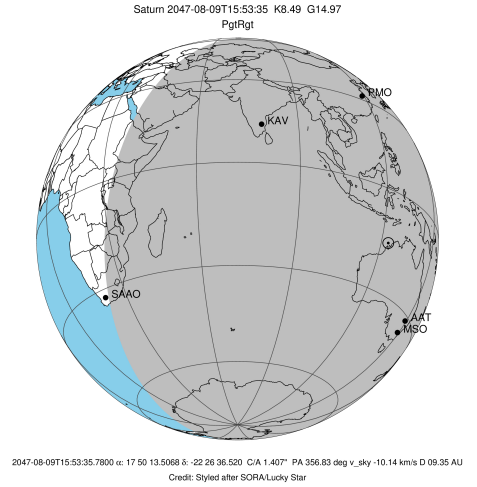
```

target                : Saturn
target radius (km)   : 60268.00
C/A epoch            : 2047-08-09T16:00:38.730
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       : 4068930146608710400
2Mass ID (if available) : 17501351-2226362
ICRS Star Coord at Epoch: 17h 50m 13.50682s -22:26:36.52025s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 8.493
G magnitude           : 14.969
RP magnitude          : 13.445
BP magnitude          : 18.423
DUPflag              : 0
Distance (au)        : 9.347
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -10.14
Sun-Target sep (deg) : 131.38
Sun-Moon sep (deg)  : 94.15
B (ring opening deg) : 26.79
PA of pole (deg)    : 5.32
Pole direction: RA (deg): 40.60000
Dec (deg): 83.50000
C/A sky separation (") : 1.634
C/A sky separation (km) : 11076.7
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
    
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Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-08-09T12:36:43.453		3.64x	34.74x	140461.00	-10.49		
A (OER)	I	2047-08-09T12:42:34.759		4.77x	34.04x	136774.40	-10.49		
Encke (OEG)	I	2047-08-09T12:47:23.437		5.71	33.43x	133744.89	-10.49		
Encke (IEG)	I	2047-08-09T12:47:54.080		5.81	33.37x	133423.31	-10.49		
A (IER)	I	2047-08-09T13:05:57.986		9.37	30.96x	122050.38	-10.49		
B (OER)	I	2047-08-09T13:13:05.119		10.78	29.96x	117571.16	-10.48		
B (IER)	I	2047-08-09T13:53:53.076		19.04	23.64x	91984.69	-10.40		
C (IER)	I	2047-08-09T14:22:06.067		24.86	18.83x	74490.58	-10.24		
Saturn	I	2047-08-09T14:25:28.107		25.56	18.23x	60133.55		-17.55	-21.19
Saturn	E	2047-08-09T17:35:10.165		65.42	-19.33	60266.92		-1.54	-1.90
C (IER)	E	2047-08-09T17:58:02.928		69.97	-24.14	74490.58	10.40		
B (IER)	E	2047-08-09T18:25:48.560		75.04	-30.01	91984.69	10.59		
B (OER)	E	2047-08-09T19:05:48.305		79.94	-38.45	117571.16	10.72		
A (IER)	E	2047-08-09T19:12:46.060		80.21	-39.92	122050.38	10.73		
Encke (IEG)	E	2047-08-09T19:30:25.010		79.79	-43.62	133423.31	10.75		
Encke (OEG)	E	2047-08-09T19:30:54.924		79.76	-43.72	133744.89	10.75		
A (OER)	E	2047-08-09T19:35:36.680		79.40	-44.70	136774.40	10.75		
F ring	E	2047-08-09T19:41:19.422		78.84	-45.89	140461.00	10.76		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-08-09T15:45:19.220
 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 : 4068930146608710400
 2Mass ID (if available) : 17501351-2226362
 ICRS Star Coord at Epoch: 17h 50m 13.50682s -22:26:36.52025s
 RUWE (>1.4 is poor) : 0.92
 K magnitude : 8.493
 G magnitude : 14.969
 RP magnitude : 13.445
 BP magnitude : 18.423
 DUPflag : 0
 Distance (au) : 9.347
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -10.14
 Sun-Target sep (deg) : 131.38
 Sun-Moon sep (deg) : 93.96
 B (ring opening deg) : 26.79
 PA of pole (deg) : 5.32
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.875
 C/A sky separation (km) : 12712.2
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-08-09T12:22:11.050		65.37	-59.18	140461.00	-10.74		
A (OER)	I	2047-08-09T12:27:54.654		64.29	-60.17	136774.40	-10.72		
Encke (OEG)	I	2047-08-09T12:32:37.488		63.40	-60.96	133744.89	-10.70		
Encke (IEG)	I	2047-08-09T12:33:07.537		63.30	-61.04	133423.31	-10.70		
A (IER)	I	2047-08-09T12:50:53.751		59.85	-63.85	122050.38	-10.63		
B (OER)	I	2047-08-09T12:57:55.763		58.46	-64.88	117571.16	-10.60		
B (IER)	I	2047-08-09T13:38:37.140		50.26	-69.43	91984.69	-10.34		
C (IER)	I	2047-08-09T14:07:13.258		44.42	-70.61	74490.58	-10.02		
Saturn	I	2047-08-09T14:10:22.829		43.77	-70.61	60131.47		-17.69	-21.35
Saturn	E	2047-08-09T17:22:09.172		5.50	-42.90	60260.63		-4.04	-4.96
C (IER)	E	2047-08-09T17:45:51.082		1.11x	-38.12	74490.58	9.62		
B (IER)	E	2047-08-09T18:15:47.864		-4.25x	-32.02	91984.69	9.82		
B (OER)	E	2047-08-09T18:58:54.340		-11.50x	-23.21	117571.16	9.94		
A (IER)	E	2047-08-09T19:06:24.799		-12.70x	-21.68	122050.38	9.95		
Encke (IEG)	E	2047-08-09T19:25:26.999		-15.63x	-17.80	133423.31	9.96		
Encke (OEG)	E	2047-08-09T19:25:59.271		-15.71x	-17.69	133744.89	9.96		
A (OER)	E	2047-08-09T19:31:03.255		-16.47x	-16.66	136774.40	9.97		
F ring	E	2047-08-09T19:37:13.068		-17.37x	-15.42	140461.00	9.97		