

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2029-01-08T15:58:37.650
 Event type : XRgt
 : No Saturn occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 2570406981697389568
 2Mass ID (if available) : 02102830+1031368

Saturn 2029-01-08T15:58:37 K9.88 G12.13 XRgt

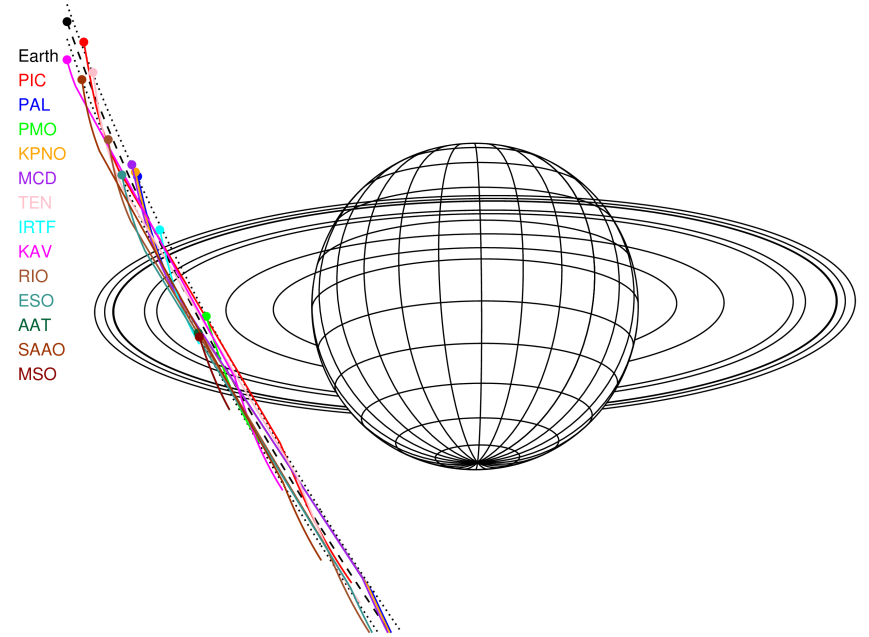
ICRS Star Coord at Epoch: 02h 10m 28.40897s +10:31:35.98601s

RUWE (>1.4 is poor) : 1.16
 K magnitude : 9.885
 G magnitude : 12.129
 RP magnitude : 11.422
 BP magnitude : 12.684
 DUPflag : 0
 Distance (au) : 8.887
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 2.08
 Sun-Target sep (deg) : 105.74
 Sun-Moon sep (deg) : 172.42
 B (ring opening deg) : -16.96
 PA of pole (deg) : 0.94

#	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

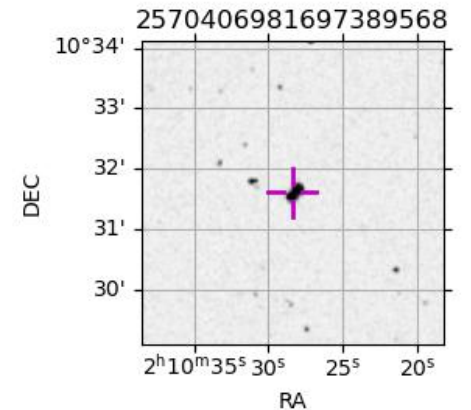


2029-01-08T15:58:37.6500 a: 02 10 28.4090 s: +10 31 35.986 C/A ***** PA 300.47 deg v_sky + 2.08 km/s D 08.89 AU
 Credit: Styled after SORA/Lucky Star

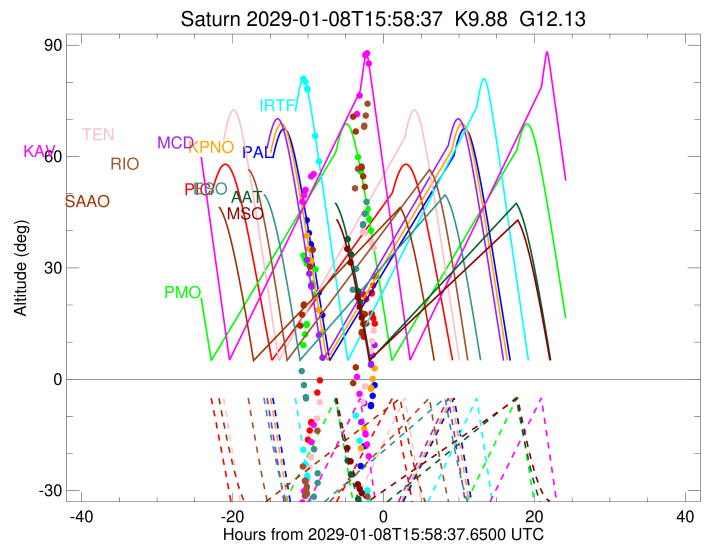
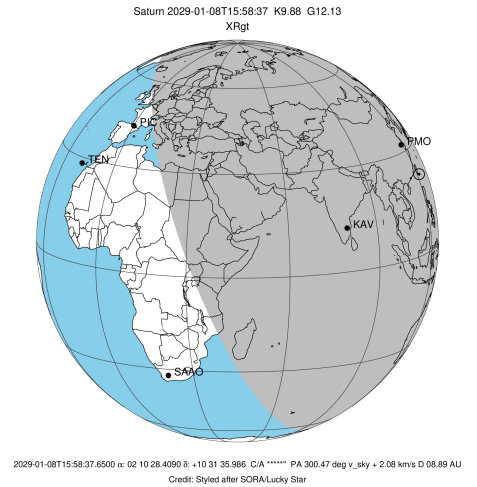


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1	+	+	+	JAN 08 05:48 - JAN 08 07:51	PnnRin
PMO	Purple Mtn Obs	32.1	118.8			+	JAN 08 12:36 - JAN 08 14:20	PnnRne
KPNO	Kitt Peak Natl	32.0	248.4	+	+	+	JAN 08 05:49 - JAN 08 07:52	PnnRin
MCD	McDonald Obs.	30.7	256.0	+	+	+	JAN 08 05:50 - JAN 08 07:53	PnnRin
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+	+	+	JAN 08 05:20 - JAN 08 07:25	PnnRin
KAV	Kavalur Observ	12.6	78.8			+	JAN 08 13:35 - JAN 08 14:02	PnnRne
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3					PnnRnn
AAT	Siding Spring	-31.3	149.1			+	JAN 08 11:14 - JAN 08 13:09	PnnRne
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0			+	JAN 08 11:11 - JAN 08 13:06	PnnRne



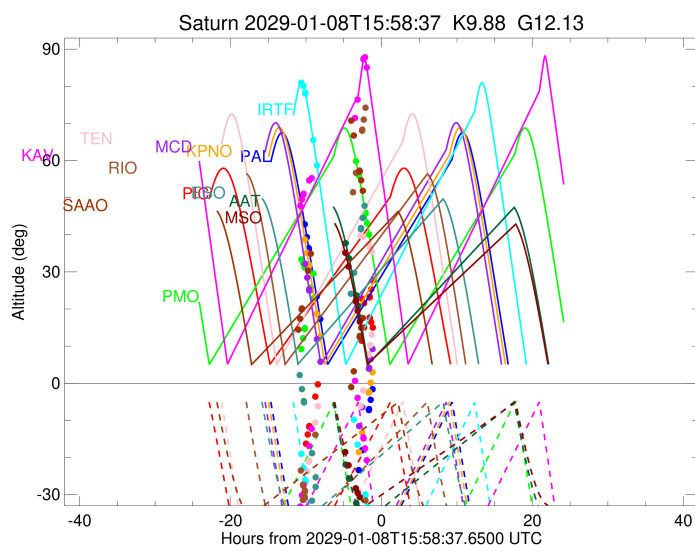
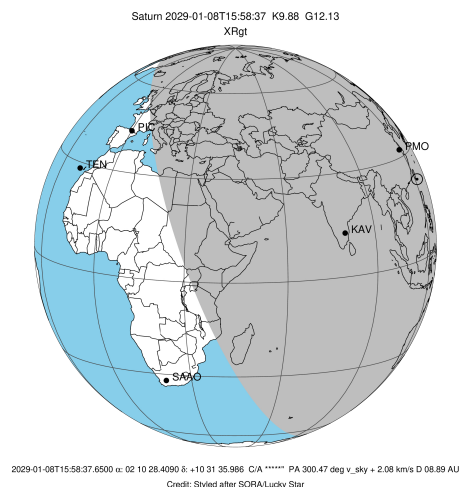
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2029-01-08T17:27:58.410
 Event type : XRgt
 : No Saturn occs
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 2570406981697389568
 2Mass ID (if available) : 02102830+1031368
 ICRS Star Coord at Epoch: 02h 10m 28.40897s +10:31:35.98601s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 9.885
 G magnitude : 12.129
 RP magnitude : 11.422
 BP magnitude : 12.684
 DUPflag : 0
 Distance (au) : 8.888
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 2.08
 Sun-Target sep (deg) : 105.74
 Sun-Moon sep (deg) : 171.62
 B (ring opening deg) : -16.96
 PA of pole (deg) : 0.94
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 13.431
 C/A sky separation (km) : 86575.3
 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	2029-01-08T05:48:07.544		42.88	-60.16	140461.00	-3.64		
A (OER)	I	2029-01-08T06:05:20.002		39.41	-63.63	136774.40	-3.50		
Encke (OEG)	I	2029-01-08T06:19:59.406		36.42	-66.51	133744.89	-3.38		
Encke (IEG)	I	2029-01-08T06:21:34.601		36.09	-66.82	133423.31	-3.37		
A (IER)	I	2029-01-08T07:22:54.417		23.33	-77.02	122050.38	-2.79		
B (OER)	I	2029-01-08T07:51:19.679		17.37	-78.98	117571.16	-2.46		
No planet occultations									
B (OER)	E	2029-01-08T12:58:15.604		-39.20x	-23.21	117571.16	2.69		
A (IER)	E	2029-01-08T13:24:05.792		-42.02x	-17.95	122050.38	3.08		
Encke (IEG)	E	2029-01-08T14:18:51.019		-45.69x	-7.10	133423.31	3.82		
Encke (OEG)	E	2029-01-08T14:20:15.074		-45.73x	-6.82	133744.89	3.83		
A (OER)	E	2029-01-08T14:33:09.657		-46.05x	-4.34x	136774.40	3.99		
F ring	E	2029-01-08T14:48:14.951		-46.15x	-1.47x	140461.00	4.16		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2029-01-08T17:01:48.080
 Event type : XRgt
 : No Saturn occs
 : 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 : 2570406981697389568
 2Mass ID (if available) : 02102830+1031368
 ICRS Star Coord at Epoch: 02h 10m 28.40897s +10:31:35.98601s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 9.885
 G magnitude : 12.129
 RP magnitude : 11.422
 BP magnitude : 12.684
 DUPflag : 0
 Distance (au) : 8.887
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 2.08
 Sun-Target sep (deg) : 105.74
 Sun-Moon sep (deg) : 172.40
 B (ring opening deg) : -16.96
 PA of pole (deg) : 0.94
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 14.617
 C/A sky separation (km) : 94216.0
 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



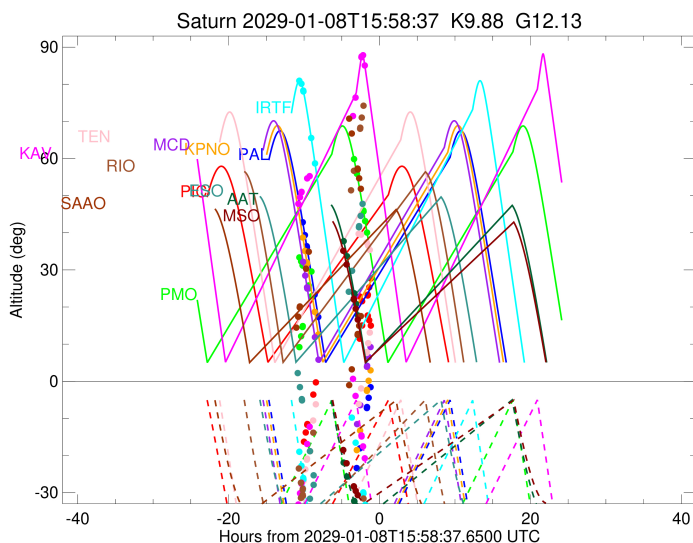
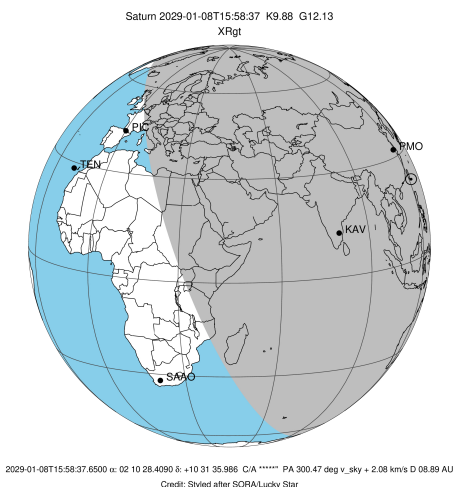
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg
 Ring I/E UTC b? alt alt-sun radius r-dot lat-geo lat-geodetic

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2029-01-08T05:21:16.624		9.13	33.38x	140461.00	-4.49		
A (OER)	I	2029-01-08T05:35:08.581		12.07	32.32x	136774.40	-4.37		
Encke (OEG)	I	2029-01-08T05:46:51.635		14.56	31.29x	133744.89	-4.25		
Encke (IEG)	I	2029-01-08T05:48:07.412		14.82	31.17x	133423.31	-4.24		
A (IER)	I	2029-01-08T06:35:55.203		24.99	25.82x	122050.38	-3.67		
B (OER)	I	2029-01-08T06:57:07.419		29.49	22.95x	117571.16	-3.37		

No planet occultations

B (OER)	E	2029-01-08T12:36:46.349		59.74	-41.67	117571.16	3.16		
A (IER)	E	2029-01-08T12:59:27.427		55.81	-46.48	122050.38	3.42		
Encke (IEG)	E	2029-01-08T13:51:03.363		45.89	-57.39	133423.31	3.90		
Encke (OEG)	E	2029-01-08T13:52:25.610		45.61	-57.68	133744.89	3.92		
A (OER)	E	2029-01-08T14:05:09.591		43.03	-60.34	136774.40	4.01		
F ring	E	2029-01-08T14:20:15.516		39.93	-63.46	140461.00	4.12		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2029-01-08T17:21:26.660
 Event type : XRgt
 : No Saturn occs
 : 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 : 2570406981697389568
 2Mass ID (if available) : 02102830+1031368
 ICRS Star Coord at Epoch: 02h 10m 28.40897s +10:31:35.98601s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 9.885
 G magnitude : 12.129
 RP magnitude : 11.422
 BP magnitude : 12.684
 DUPflag : 0
 Distance (au) : 8.887
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 2.08
 Sun-Target sep (deg) : 105.74
 Sun-Moon sep (deg) : 171.61
 B (ring opening deg) : -16.96
 PA of pole (deg) : 0.94
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 13.395
 C/A sky separation (km) : 86343.8
 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



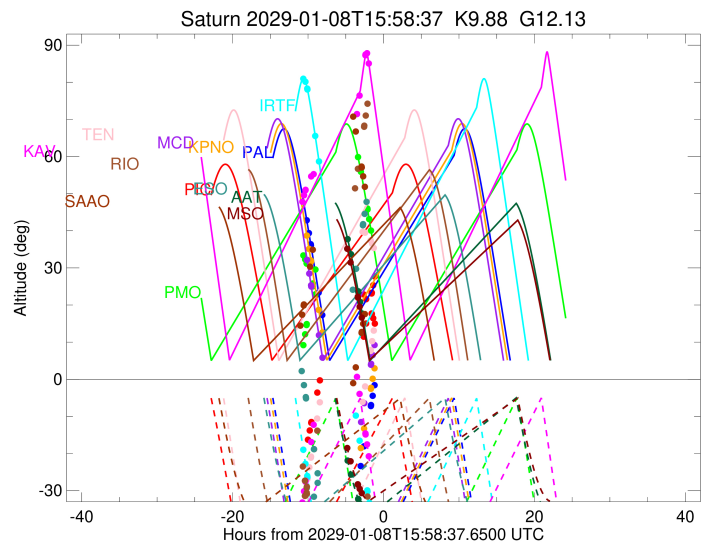
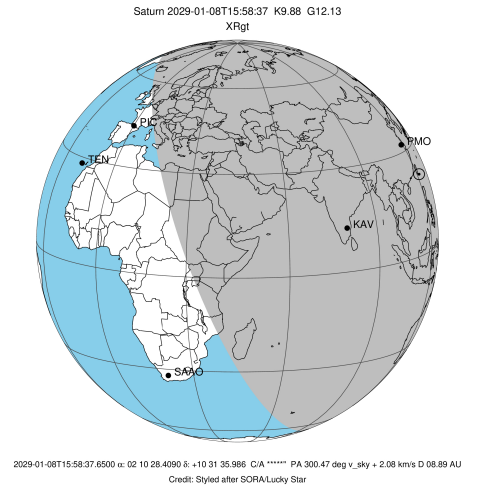
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2029-01-08T05:49:05.208		38.76	-65.00	140461.00	-3.63		
A (OER)	I	2029-01-08T06:06:20.108		35.16	-68.47	136774.40	-3.50		
Encke (OEG)	I	2029-01-08T06:21:00.940		32.06	-71.33	133744.89	-3.38		
Encke (IEG)	I	2029-01-08T06:22:36.251		31.73	-71.63	133423.31	-3.37		
A (IER)	I	2029-01-08T07:23:53.979		18.70	-80.18	122050.38	-2.79		
B (OER)	I	2029-01-08T07:52:12.929		12.67	-79.50	117571.16	-2.47		

No planet occultations

B (OER)	E	2029-01-08T12:59:10.213		-42.84x	-18.38	117571.16	2.72		
A (IER)	E	2029-01-08T13:24:42.111		-45.17x	-13.18	122050.38	3.12		
Encke (IEG)	E	2029-01-08T14:18:53.816		-47.52x	-2.46x	133423.31	3.85		
Encke (OEG)	E	2029-01-08T14:20:17.083		-47.53x	-2.19x	133744.89	3.87		
A (OER)	E	2029-01-08T14:33:04.539		-47.50x	0.26x	136774.40	4.02		
F ring	E	2029-01-08T14:48:01.805		-47.18x	3.08x	140461.00	4.19		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2029-01-08T17:11:37.820
 Event type : XRgt
 : No Saturn occs
 : 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 : 2570406981697389568
 2Mass ID (if available) : 02102830+1031368
 ICRS Star Coord at Epoch: 02h 10m 28.40897s +10:31:35.98601s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 9.885
 G magnitude : 12.129
 RP magnitude : 11.422
 BP magnitude : 12.684
 DUPflag : 0
 Distance (au) : 8.887
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 2.08
 Sun-Target sep (deg) : 105.74
 Sun-Moon sep (deg) : 171.58
 B (ring opening deg) : -16.96
 PA of pole (deg) : 0.94
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 13.346
 C/A sky separation (km) : 86024.8
 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

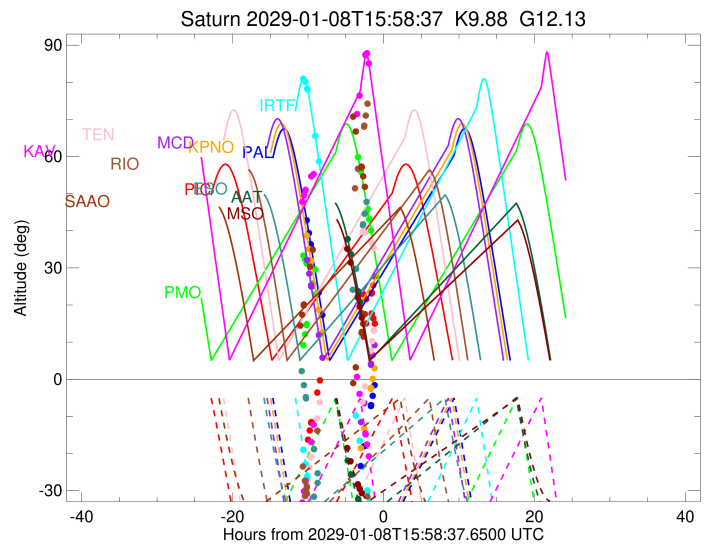
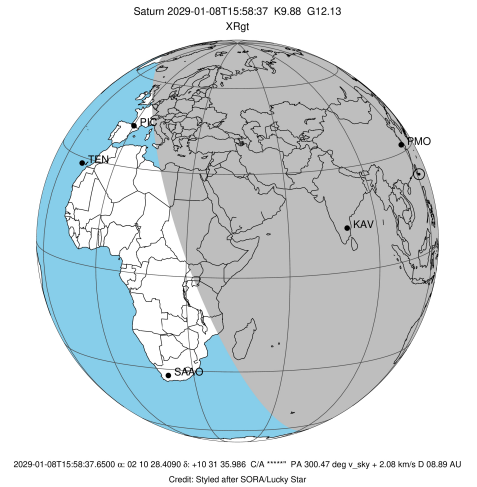


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2029-01-08T05:50:49.772		32.21	-71.90	140461.00	-3.63		
A (OER)	I	2029-01-08T06:08:03.629		28.51	-75.21	136774.40	-3.50		
Encke (OEG)	I	2029-01-08T06:22:42.351		25.35	-77.77	133744.89	-3.39		
Encke (IEG)	I	2029-01-08T06:24:17.363		25.01	-78.03	133423.31	-3.38		
A (IER)	I	2029-01-08T07:25:11.075		11.87	-80.29	122050.38	-2.82		
B (OER)	I	2029-01-08T07:53:08.538		5.88	-76.01	117571.16	-2.51		

No planet occultations

B (OER)	E	2029-01-08T13:01:16.110		-46.88x	-11.37	117571.16	2.79		
A (IER)	E	2029-01-08T13:26:13.886		-48.27x	-6.34	122050.38	3.18		
Encke (IEG)	E	2029-01-08T14:19:27.136		-48.39x	4.02x	133423.31	3.92		
Encke (OEG)	E	2029-01-08T14:20:49.086		-48.34x	4.28x	133744.89	3.93		
A (OER)	E	2029-01-08T14:33:24.753		-47.78x	6.63x	136774.40	4.08		
F ring	E	2029-01-08T14:48:08.973		-46.85x	9.34x	140461.00	4.25		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2029-01-08T18:11:05.820
 Event type : XRgt
 : No Saturn occs
 : 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 : 2570406981697389568
 2Mass ID (if available) : 02102830+1031368
 ICRS Star Coord at Epoch: 02h 10m 28.40897s +10:31:35.98600s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 9.885
 G magnitude : 12.129
 RP magnitude : 11.422
 BP magnitude : 12.684
 DUPflag : 0
 Distance (au) : 8.888
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 2.08
 Sun-Target sep (deg) : 105.74
 Sun-Moon sep (deg) : 172.03
 B (ring opening deg) : -16.96
 PA of pole (deg) : 0.94
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 13.890
 C/A sky separation (km) : 89538.1
 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

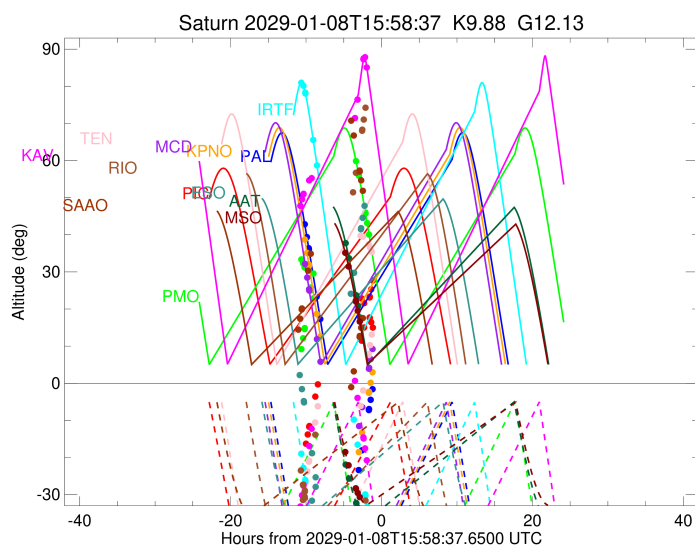
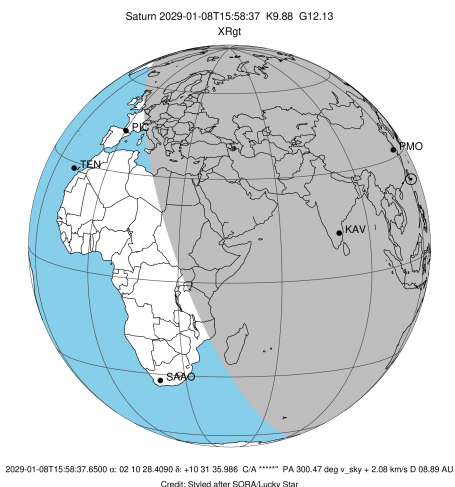


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2029-01-08T05:20:49.281		80.96	-18.93	140461.00	-3.72		
A (OER)	I	2029-01-08T05:37:42.153		80.17	-22.72	136774.40	-3.56		
Encke (OEG)	I	2029-01-08T05:52:10.769		78.34	-25.99	133744.89	-3.42		
Encke (IEG)	I	2029-01-08T05:53:45.154		78.09	-26.35	133423.31	-3.40		
A (IER)	I	2029-01-08T06:55:42.653		65.56	-40.48	122050.38	-2.70		
B (OER)	I	2029-01-08T07:25:30.167		58.77	-47.33	117571.16	-2.31		

No planet occultations

B (OER)	E	2029-01-08T12:19:35.645		-9.98x	-64.03	117571.16	2.33		
A (IER)	E	2029-01-08T12:49:07.925		-16.66x	-57.20	122050.38	2.72		
Encke (IEG)	E	2029-01-08T13:50:20.615		-30.06x	-43.08	133423.31	3.45		
Encke (OEG)	E	2029-01-08T13:51:53.603		-30.39x	-42.72	133744.89	3.47		
A (OER)	E	2029-01-08T14:06:08.709		-33.39x	-39.45	136774.40	3.62		
F ring	E	2029-01-08T14:22:44.273		-36.80x	-35.65	140461.00	3.79		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2029-01-08T13:02:14.150
 Event type : XRgt
 : No Saturn occs
 : 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 : 2570406981697389568
 2Mass ID (if available) : 02102830+1031368
 ICRS Star Coord at Epoch: 02h 10m 28.40897s +10:31:35.98603s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 9.885
 G magnitude : 12.129
 RP magnitude : 11.422
 BP magnitude : 12.684
 DUPflag : 0
 Distance (au) : 8.885
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 2.08
 Sun-Target sep (deg) : 105.74
 Sun-Moon sep (deg) : 172.72
 B (ring opening deg) : -16.96
 PA of pole (deg) : 0.94
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 14.350
 C/A sky separation (km) : 92466.7
 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



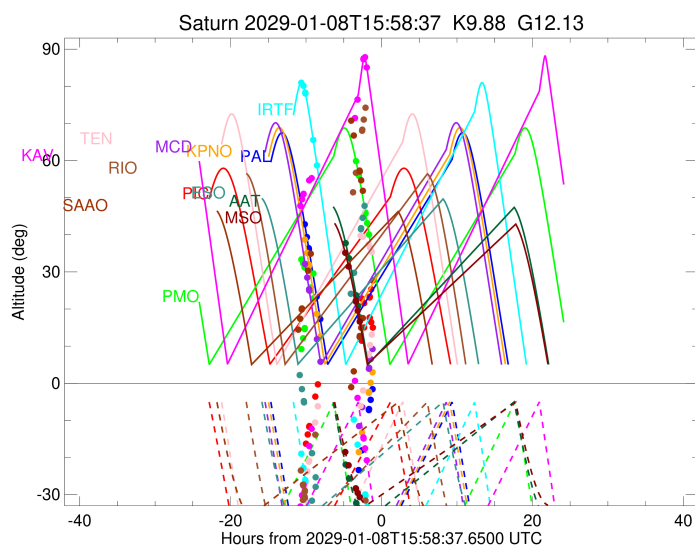
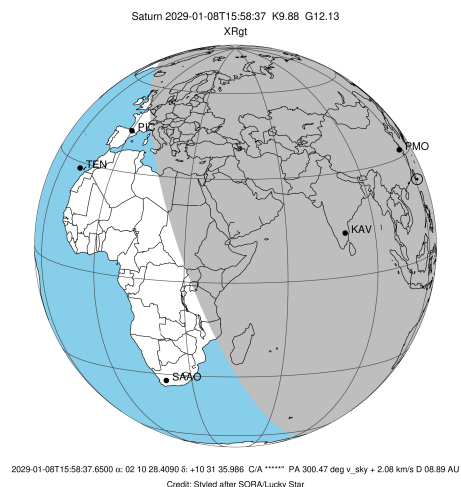
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2029-01-08T05:13:10.951	-33.26x	47.77x	140461.00	-4.68			
A (OER)	I	2029-01-08T05:26:26.831	-30.23x	49.54x	136774.40	-4.58			
Encke (OEG)	I	2029-01-08T05:37:35.701	-27.66x	50.88x	133744.89	-4.48			
Encke (IEG)	I	2029-01-08T05:38:47.580	-27.38x	51.01x	133423.31	-4.47			
A (IER)	I	2029-01-08T06:23:32.268	-16.92x	54.65x	122050.38	-3.98			
B (OER)	I	2029-01-08T06:42:55.805	-12.33x	55.25x	117571.16	-3.72			

No planet occultations

B (OER)	E	2029-01-08T12:28:33.227	71.61	0.50x	117571.16	3.58			
A (IER)	E	2029-01-08T12:48:42.927	76.52	-4.05x	122050.38	3.82			
Encke (IEG)	E	2029-01-08T13:35:27.688	87.38	-14.71	133423.31	4.26			
Encke (OEG)	E	2029-01-08T13:36:43.005	87.59	-15.00	133744.89	4.27			
A (OER)	E	2029-01-08T13:48:24.340	87.75	-17.68	136774.40	4.36			
F ring	E	2029-01-08T14:02:19.851	84.94	-20.89	140461.00	4.46			

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2029-01-08T17:28:09.060
 Event type : XRgt
 : No Saturn occs
 : 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 : 2570406981697389568
 2Mass ID (if available) : 02102830+1031368
 ICRS Star Coord at Epoch: 02h 10m 28.40897s +10:31:35.98601s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 9.885
 G magnitude : 12.129
 RP magnitude : 11.422
 BP magnitude : 12.684
 DUPflag : 0
 Distance (au) : 8.888
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 2.08
 Sun-Target sep (deg) : 105.74
 Sun-Moon sep (deg) : 173.17
 B (ring opening deg) : -16.96
 PA of pole (deg) : 0.94
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 15.040
 C/A sky separation (km) : 96949.1
 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

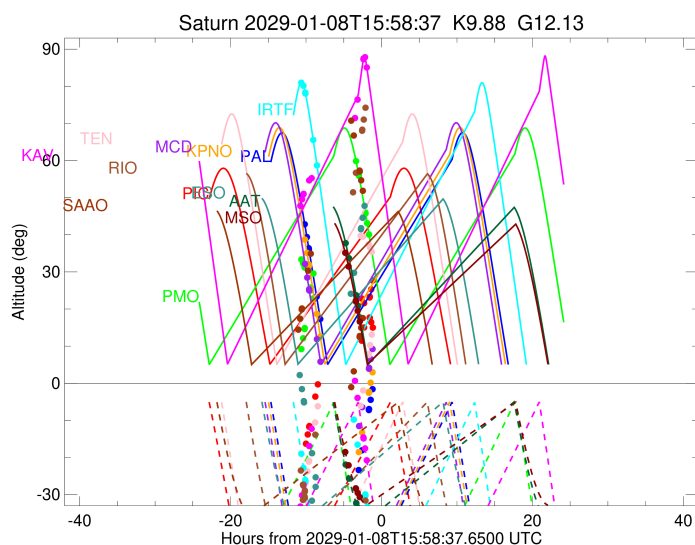
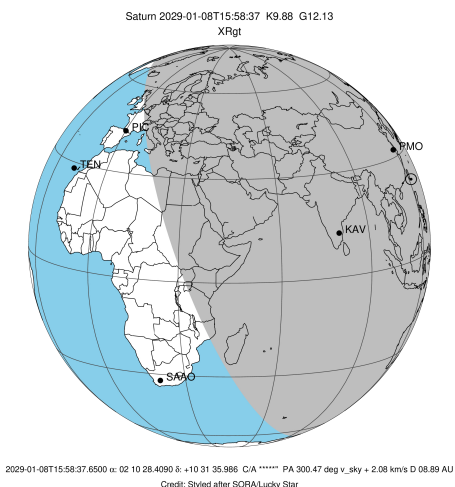


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2029-01-08T04:26:24.125		11.63	58.48x	140461.00	-4.21		
A (OER)	I	2029-01-08T04:41:15.780		14.60	55.32x	136774.40	-4.06		
Encke (OEG)	I	2029-01-08T04:53:54.922		17.09	52.62x	133744.89	-3.92		
Encke (IEG)	I	2029-01-08T04:55:17.088		17.36	52.33x	133423.31	-3.91		
A (IER)	I	2029-01-08T05:48:13.225		27.29	41.01x	122050.38	-3.23		
B (OER)	I	2029-01-08T06:12:44.312		31.54	35.78x	117571.16	-2.86		

No planet occultations

B (OER)	E	2029-01-08T11:14:15.942		37.64	-22.02	117571.16	2.68		
A (IER)	E	2029-01-08T11:40:31.003		33.61	-25.73	122050.38	3.00		
Encke (IEG)	E	2029-01-08T12:37:51.772		23.60	-32.29	133423.31	3.58		
Encke (OEG)	E	2029-01-08T12:39:21.394		23.32	-32.43	133744.89	3.59		
A (OER)	E	2029-01-08T12:53:10.606		20.72	-33.60	136774.40	3.71		
F ring	E	2029-01-08T13:09:26.997		17.58	-34.76	140461.00	3.84		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2029-01-08T17:16:43.710
 Event type : XRgt
 : No Saturn occs
 : 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 : 2570406981697389568
 2Mass ID (if available) : 02102830+1031368
 ICRS Star Coord at Epoch: 02h 10m 28.40897s +10:31:35.98601s
 RUWE (>1.4 is poor) : 1.16
 K magnitude : 9.885
 G magnitude : 12.129
 RP magnitude : 11.422
 BP magnitude : 12.684
 DUPflag : 0
 Distance (au) : 8.887
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 2.08
 Sun-Target sep (deg) : 105.74
 Sun-Moon sep (deg) : 173.20
 B (ring opening deg) : -16.96
 PA of pole (deg) : 0.94
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 15.053
 C/A sky separation (km) : 97028.0
 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	2029-01-08T04:24:18.992		9.77	58.15x	140461.00	-4.19		
A (OER)	I	2029-01-08T04:39:13.983		12.61	55.19x	136774.40	-4.04		
Encke (OEG)	I	2029-01-08T04:51:56.008		14.99	52.63x	133744.89	-3.91		
Encke (IEG)	I	2029-01-08T04:53:18.489		15.24	52.35x	133423.31	-3.89		
A (IER)	I	2029-01-08T05:46:27.745		24.67	41.53x	122050.38	-3.21		
B (OER)	I	2029-01-08T06:11:06.131		28.68	36.50x	117571.16	-2.84		

No planet occultations

B (OER)	E	2029-01-08T11:11:08.192		35.06	-18.62	117571.16	2.68		
A (IER)	E	2029-01-08T11:37:23.997		31.40	-22.14	122050.38	3.00		
Encke (IEG)	E	2029-01-08T12:34:41.020		22.14	-28.34	133423.31	3.59		
Encke (OEG)	E	2029-01-08T12:36:10.478		21.88	-28.47	133744.89	3.60		
A (OER)	E	2029-01-08T12:49:58.056		19.44	-29.59	136774.40	3.72		
F ring	E	2029-01-08T13:06:12.291		16.50	-30.70	140461.00	3.85		