

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-05T00:04:28.180
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4090711506330287360
 2Mass ID (if available) : 18152624-2217284

Saturn 2047-05-05T00:04:28 K9.25 G14.23 PgtRgt

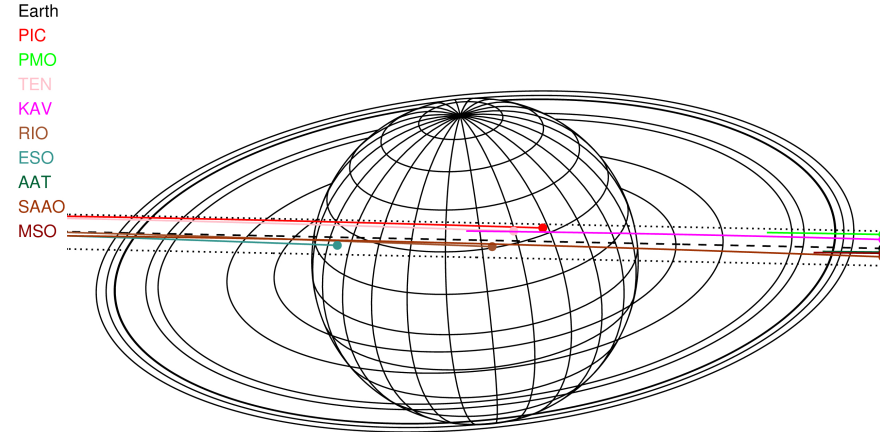
ICRS Star Coord at Epoch: 18h 15m 26.23135s -22:17:28.76777s

RUWE (>1.4 is poor) : 0.91
 K magnitude : 9.251
 G magnitude : 14.231
 RP magnitude : 12.972
 BP magnitude : 15.979
 DUPflag : 0
 Distance (au) : 9.365
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.65
 Sun-Target sep (deg) : 130.22
 Sun-Moon sep (deg) : 116.19
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.80

#	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

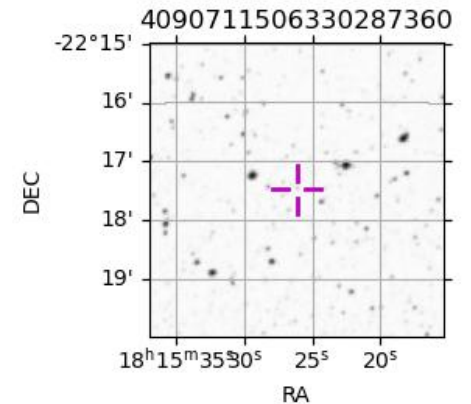


2047-05-05T00:04:28.1800 α: 18 15 26.2313 s δ: -22 17 28.768 C/A 1.164° PA 178.83 deg v_sky - 9.65 km/s D 09.37 AU
 Credit: Styled after SORA/Lucky Star

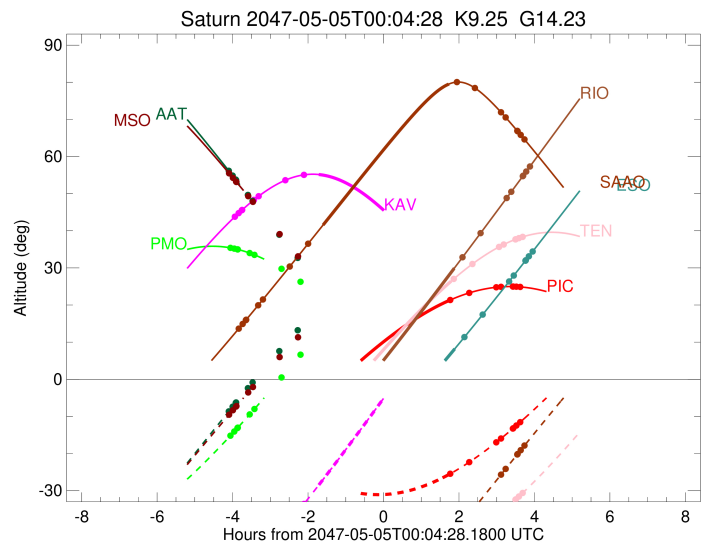
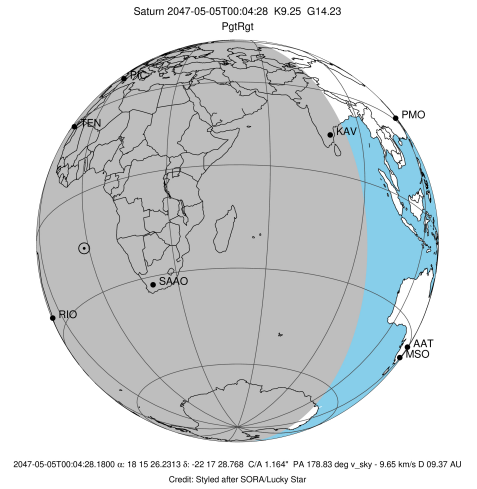


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEncode
PIC	Pic du Midi	42.9	0.1		+	+	MAY 05 01:48 - MAY 05 03:41	PneRne
PAL	Palomar Mt (20	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs	32.1	118.8	+			MAY 04 20:01 - MAY 04 20:39	PnnRin
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		+	+	MAY 05 01:52 - MAY 05 03:45	PneRne
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observ	12.6	78.8	+	+	+	MAY 04 20:08 - MAY 04 22:21	PinRin
RIO	Rio de Janeiro	-22.9	316.8		+	+	MAY 05 01:56 - MAY 05 03:57	PneRne
ESO	European South	-29.3	289.3		+	+	MAY 05 01:57 - MAY 05 04:01	PneRne
AAT	Siding Spring	-31.3	149.1	+			MAY 04 19:58 - MAY 04 20:10	PnnRin
SAAO	So. Afr. Astro	-32.4	20.8	+	+	+	MAY 04 20:14 - MAY 05 03:48	PieRie
MSO	Mt. Stromlo Ob	-35.3	149.0	+			MAY 04 19:59 - MAY 04 20:10	PnnRin



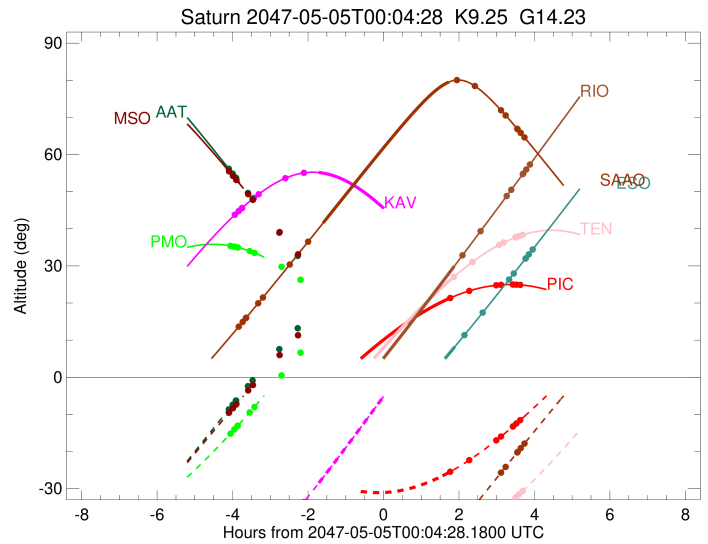
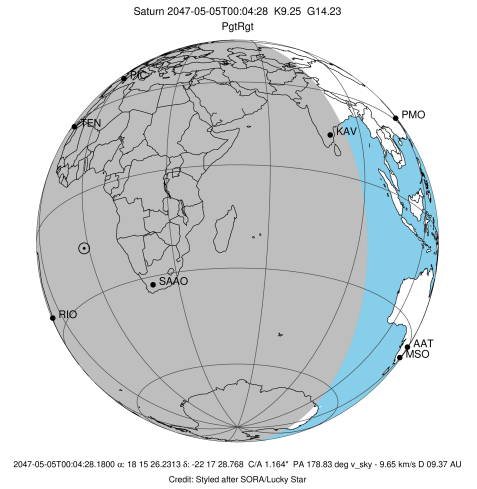
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-05T00:10:08.030
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 4090711506330287360
 2Mass ID (if available) : 18152624-2217284
 ICRS Star Coord at Epoch: 18h 15m 26.23135s -22:17:28.76777s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 9.251
 G magnitude : 14.231
 RP magnitude : 12.972
 BP magnitude : 15.979
 DUPflag : 0
 Distance (au) : 9.365
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.65
 Sun-Target sep (deg) : 130.22
 Sun-Moon sep (deg) : 116.55
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.80
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.937
 C/A sky separation (km) : 13156.7
 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	2047-05-04T20:10:12.472		-28.75x	-11.60	140461.00	-9.61		
A (OER)	I	2047-05-04T20:16:35.921		-27.57x	-12.55	136774.40	-9.61		
Encke (OEG)	I	2047-05-04T20:21:51.065		-26.61x	-13.32	133744.89	-9.61		
Encke (IEG)	I	2047-05-04T20:22:24.519		-26.51x	-13.40	133423.31	-9.61		
A (IER)	I	2047-05-04T20:42:08.385		-22.92x	-16.20	122050.38	-9.60		
B (OER)	I	2047-05-04T20:49:55.235		-21.51x	-17.25	117571.16	-9.59		
B (IER)	I	2047-05-04T21:34:37.360		-13.54x	-22.74	91984.69	-9.46		
C (IER)	I	2047-05-04T22:05:45.590		-8.17x	-25.88	74490.58	-9.23		
Saturn	I	2047-05-04T22:30:05.744		-4.11x	-27.87	60259.35		4.52	5.55
Saturn	E	2047-05-05T01:48:36.604		21.21	-25.64	60137.23		17.88	21.58
C (IER)	E	2047-05-05T01:50:28.122		21.35	-25.47	74490.58	9.47		
B (IER)	E	2047-05-05T02:20:42.823		23.26	-22.34	91984.69	9.78		
B (OER)	E	2047-05-05T03:03:47.455		24.78	-16.99	117571.16	10.00		
A (IER)	E	2047-05-05T03:11:15.046		24.89	-15.97	122050.38	10.02		
Encke (IEG)	E	2047-05-05T03:30:07.251		24.97	-13.29	133423.31	10.07		
Encke (OEG)	E	2047-05-05T03:30:39.189		24.97	-13.21	133744.89	10.07		
A (OER)	E	2047-05-05T03:35:39.895		24.94	-12.48	136774.40	10.08		
F ring	E	2047-05-05T03:41:45.419		24.88	-11.57	140461.00	10.09		

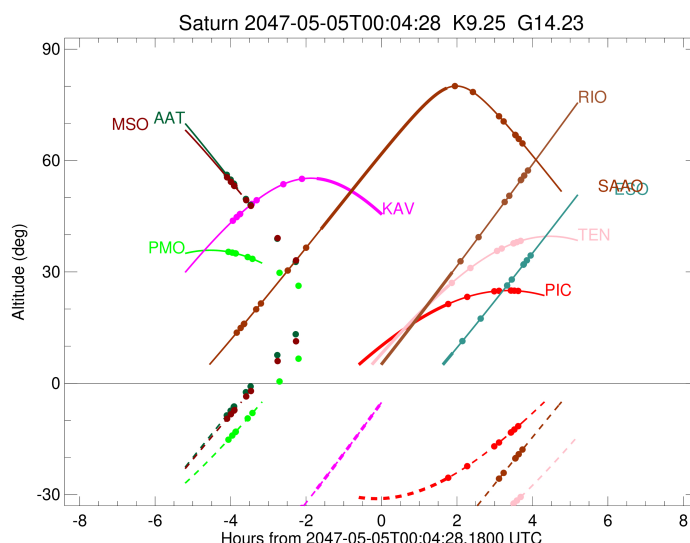
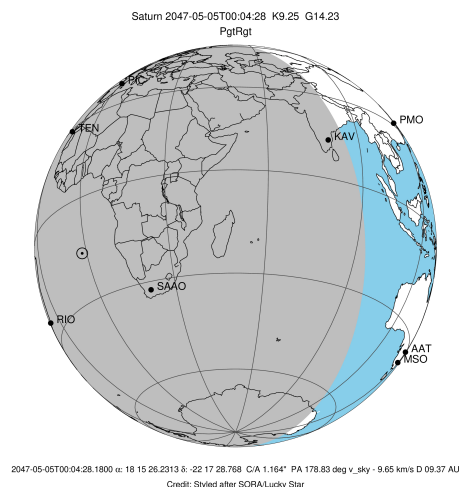
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-04T23:56:02.700
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 4090711506330287360
 2Mass ID (if available) : 18152624-2217284
 ICRS Star Coord at Epoch: 18h 15m 26.23135s -22:17:28.76777s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 9.251
 G magnitude : 14.231
 RP magnitude : 12.972
 BP magnitude : 15.979
 DUPflag : 0
 Distance (au) : 9.365
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.65
 Sun-Target sep (deg) : 130.22
 Sun-Moon sep (deg) : 115.90
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.80
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.726
 C/A sky separation (km) : 11724.8
 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	2047-05-04T20:01:07.416		35.40	-15.19	140461.00	-10.06		
A (OER)	I	2047-05-04T20:07:14.190		35.19	-14.06	136774.40	-10.05		
Encke (OEG)	I	2047-05-04T20:12:15.914		35.00	-13.13	133744.89	-10.04		
Encke (IEG)	I	2047-05-04T20:12:47.960		34.98	-13.03	133423.31	-10.03		
A (IER)	I	2047-05-04T20:31:43.835		34.00	-9.46	122050.38	-9.99		
B (OER)	I	2047-05-04T20:39:12.761		33.51	-8.02	117571.16	-9.97		
B (IER)	I	2047-05-04T21:22:22.062		29.76	0.49x	91984.69	-9.77		
C (IER)	I	2047-05-04T21:52:32.833		26.26	6.63x	74490.58	-9.52		
Saturn	I	2047-05-04T22:16:07.946		23.10	11.50x	60259.45		4.50	5.52
Saturn	E	2047-05-05T01:37:06.854		-12.69x	53.74x	60168.76		15.51	18.80
C (IER)	E	2047-05-05T01:44:20.126		-14.16x	55.20x	74490.58	9.24		
B (IER)	E	2047-05-05T02:15:32.360		-20.54x	61.32x	91984.69	9.42		
B (OER)	E	2047-05-05T03:00:29.597		-29.91x	69.09x	117571.16	9.53		
A (IER)	E	2047-05-05T03:08:19.382		-31.56x	70.22x	122050.38	9.54		
Encke (IEG)	E	2047-05-05T03:28:10.502		-35.76x	72.60x	133423.31	9.56		
Encke (OEG)	E	2047-05-05T03:28:44.154		-35.88x	72.66x	133744.89	9.56		
A (OER)	E	2047-05-05T03:34:01.127		-36.99x	73.13x	136774.40	9.56		
F ring	E	2047-05-05T03:40:26.723		-38.36x	73.62x	140461.00	9.56		

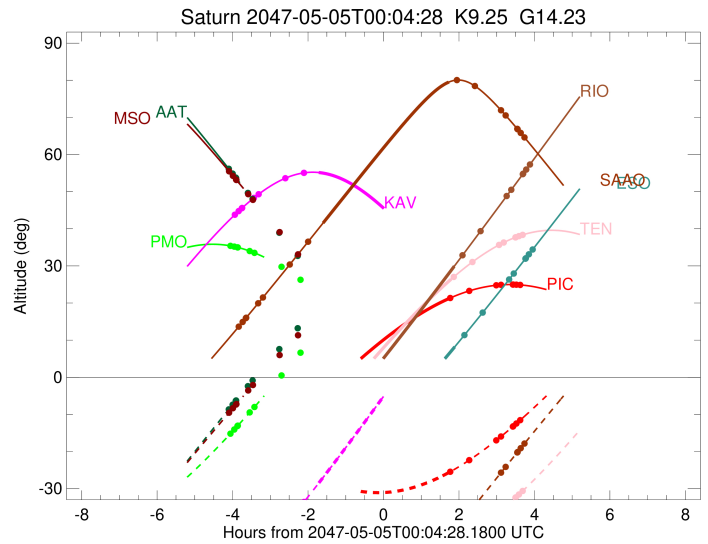
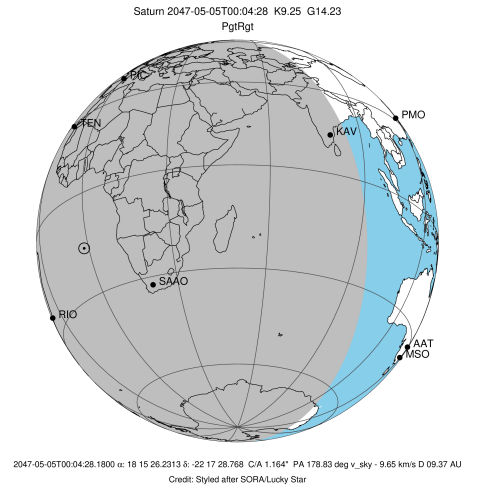
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-05T00:12:49.630
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 4090711506330287360
 2Mass ID (if available) : 18152624-2217284
 ICRS Star Coord at Epoch: 18h 15m 26.23135s -22:17:28.76777s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 9.251
 G magnitude : 14.231
 RP magnitude : 12.972
 BP magnitude : 15.979
 DUPflag : 0
 Distance (au) : 9.365
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.65
 Sun-Target sep (deg) : 130.22
 Sun-Moon sep (deg) : 116.64
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.80
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.725
 C/A sky separation (km) : 11715.5
 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	2047-05-04T20:10:55.497	-40.89x	-6.75	140461.00	-9.54			
A (OER)	I	2047-05-04T20:17:21.732	-39.48x	-8.06	136774.40	-9.55			
Encke (OEG)	I	2047-05-04T20:22:39.045	-38.32x	-9.13	133744.89	-9.55			
Encke (IEG)	I	2047-05-04T20:23:12.724	-38.19x	-9.24	133423.31	-9.55			
A (IER)	I	2047-05-04T20:43:03.583	-33.85x	-13.20	122050.38	-9.55			
B (OER)	I	2047-05-04T20:50:52.637	-32.15x	-14.73	117571.16	-9.55			
B (IER)	I	2047-05-04T21:35:39.039	-22.47x	-23.16	91984.69	-9.48			
C (IER)	I	2047-05-04T22:06:37.057	-15.87x	-28.56	74490.58	-9.33			
Saturn	I	2047-05-04T22:31:31.659	-10.65x	-32.56	60264.06			3.05	3.75
Saturn	E	2047-05-05T01:52:02.894	26.43	-44.09	60151.12			16.87	20.40
C (IER)	E	2047-05-05T01:56:04.447	27.01	-43.83	74490.58	9.68			
B (IER)	E	2047-05-05T02:25:45.553	31.04	-41.32	91984.69	9.94			
B (OER)	E	2047-05-05T03:08:12.839	35.65	-36.25	117571.16	10.13			
A (IER)	E	2047-05-05T03:15:34.510	36.29	-35.22	122050.38	10.15			
Encke (IEG)	E	2047-05-05T03:34:12.054	37.68	-32.46	133423.31	10.20			
Encke (OEG)	E	2047-05-05T03:34:43.583	37.71	-32.38	133744.89	10.20			
A (OER)	E	2047-05-05T03:39:40.444	38.02	-31.60	136774.40	10.21			
F ring	E	2047-05-05T03:45:41.310	38.35	-30.65	140461.00	10.22			

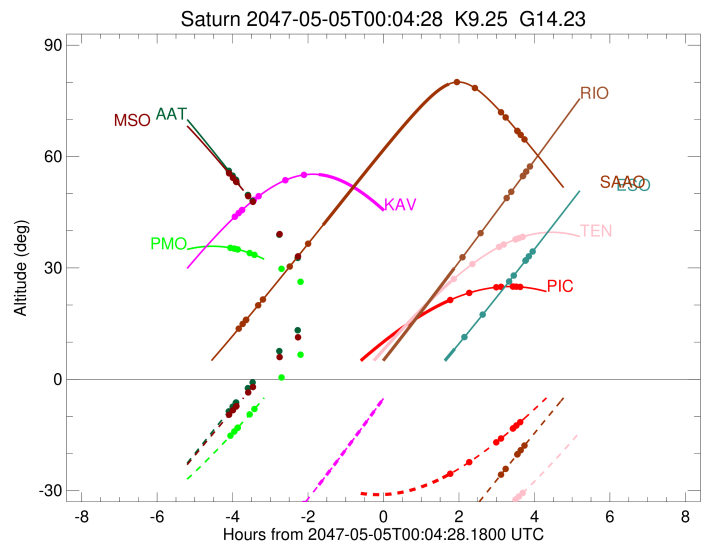
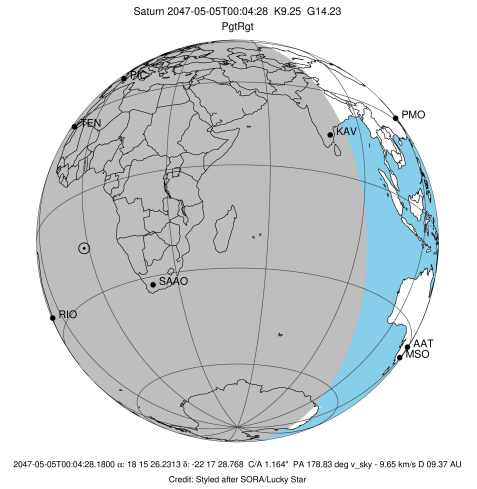
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-04T23:59:36.690
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 4090711506330287360
 2Mass ID (if available) : 18152624-2217284
 ICRS Star Coord at Epoch: 18h 15m 26.23135s -22:17:28.76777s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 9.251
 G magnitude : 14.231
 RP magnitude : 12.972
 BP magnitude : 15.979
 DUPflag : 0
 Distance (au) : 9.365
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.65
 Sun-Target sep (deg) : 130.22
 Sun-Moon sep (deg) : 116.59
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.80
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.651
 C/A sky separation (km) : 11211.1
 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



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	2047-05-04T20:08:08.213		43.79	-54.23	140461.00	-10.12		
A (OER)	I	2047-05-04T20:14:12.486		44.76	-53.31	136774.40	-10.12		
Encke (OEG)	I	2047-05-04T20:19:11.938		45.54	-52.53	133744.89	-10.11		
Encke (IEG)	I	2047-05-04T20:19:43.730		45.62	-52.44	133423.31	-10.11		
A (IER)	I	2047-05-04T20:38:29.219		48.33	-49.28	122050.38	-10.09		
B (OER)	I	2047-05-04T20:45:53.268		49.30	-47.96	117571.16	-10.08		
B (IER)	I	2047-05-04T21:28:25.507		53.62	-39.74	91984.69	-9.95		
C (IER)	I	2047-05-04T21:58:00.276		55.06	-33.58	74490.58	-9.74		
Saturn	I	2047-05-04T22:21:32.429		55.15	-28.50	60262.29		3.67	4.51
Saturn	E	2047-05-05T01:38:07.945		28.56	16.87x	60172.08		15.24	18.48
C (IER)	E	2047-05-05T01:45:39.689		27.03	18.66x	74490.58	9.56		
B (IER)	E	2047-05-05T02:15:51.189		20.73	25.85x	91984.69	9.73		
B (OER)	E	2047-05-05T02:59:28.158		11.30	36.28x	117571.16	9.81		
A (IER)	E	2047-05-05T03:07:04.765		9.63	38.11x	122050.38	9.81		
Encke (IEG)	E	2047-05-05T03:26:23.599		5.34	42.74x	133423.31	9.81		
Encke (OEG)	E	2047-05-05T03:26:56.363		5.22	42.87x	133744.89	9.81		
A (OER)	E	2047-05-05T03:32:05.042		4.07x	44.11x	136774.40	9.81		
F ring	E	2047-05-05T03:38:20.716		2.66x	45.61x	140461.00	9.81		

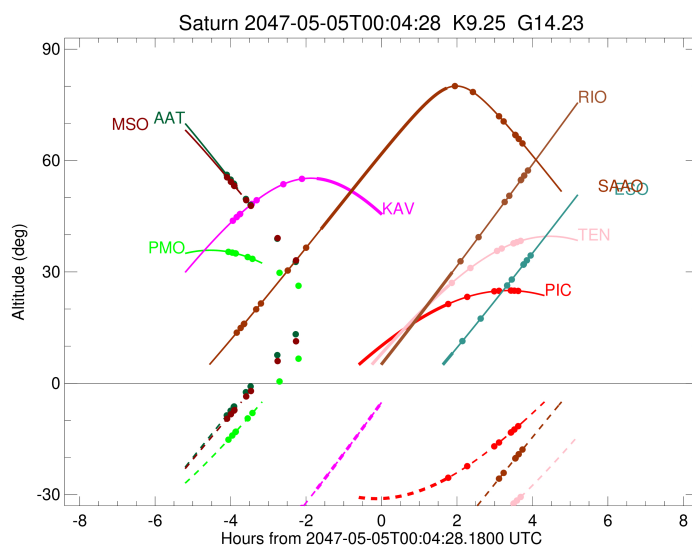
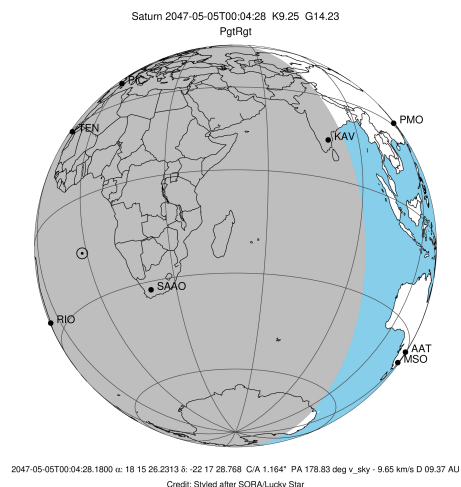
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-05T00:14:33.200
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 4090711506330287360
 2Mass ID (if available) : 18152624-2217284
 ICRS Star Coord at Epoch: 18h 15m 26.23135s -22:17:28.76777s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 9.251
 G magnitude : 14.231
 RP magnitude : 12.972
 BP magnitude : 15.979
 DUPflag : 0
 Distance (au) : 9.365
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.65
 Sun-Target sep (deg) : 130.22
 Sun-Moon sep (deg) : 116.69
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.80
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.842
 C/A sky separation (km) : 5722.1
 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



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	2047-05-04T20:10:29.533	-37.62x	2.46x	140461.00	-9.50			
A (OER)	I	2047-05-04T20:16:57.442	-36.79x	1.04x	136774.40	-9.51			
Encke (OEG)	I	2047-05-04T20:22:15.980	-36.09x	-0.12x	133744.89	-9.51			
Encke (IEG)	I	2047-05-04T20:22:49.780	-36.02x	-0.25x	133423.31	-9.51			
A (IER)	I	2047-05-04T20:42:43.635	-33.20x	-4.65x	122050.38	-9.54			
B (OER)	I	2047-05-04T20:50:33.026	-32.01x	-6.39	117571.16	-9.55			
B (IER)	I	2047-05-04T21:35:06.295	-24.62x	-16.40	91984.69	-9.59			
C (IER)	I	2047-05-04T22:05:28.599	-19.07x	-23.31	74490.58	-9.60			
Saturn	I	2047-05-04T22:29:42.316	-14.41x	-28.85	60265.95			-2.20	-2.70
Saturn	E	2047-05-05T01:56:58.001	29.90	-75.99	60208.53			11.94	14.55
C (IER)	E	2047-05-05T02:10:00.497	32.84	-78.61	74490.58	10.10			
B (IER)	E	2047-05-05T02:38:43.852	39.34	-82.97	91984.69	10.20			
B (OER)	E	2047-05-05T03:20:20.025	48.83	-80.24	117571.16	10.30			
A (IER)	E	2047-05-05T03:27:34.778	50.48	-78.91	122050.38	10.31			
Encke (IEG)	E	2047-05-05T03:45:56.230	54.69	-75.20	133423.31	10.34			
Encke (OEG)	E	2047-05-05T03:46:27.328	54.81	-75.09	133744.89	10.34			
A (OER)	E	2047-05-05T03:51:20.180	55.93	-74.06	136774.40	10.35			
F ring	E	2047-05-05T03:57:16.276	57.30	-72.77	140461.00	10.36			

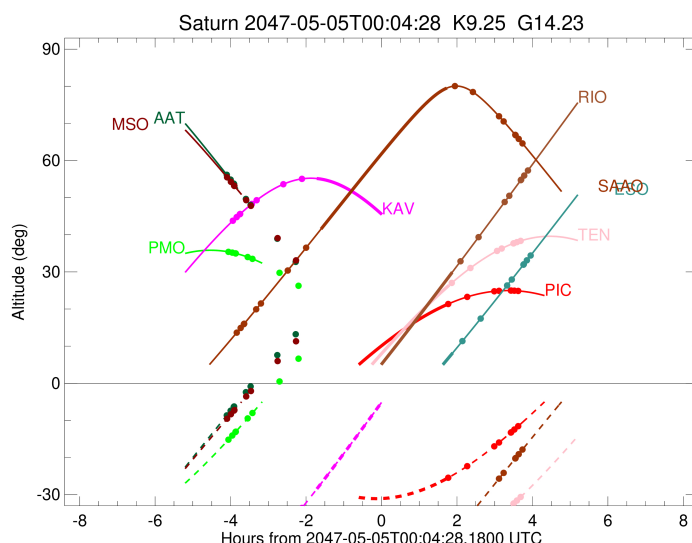
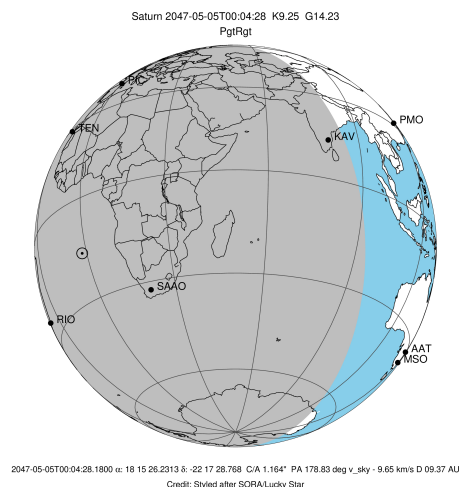
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-05T00:12:55.790
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4090711506330287360
 2Mass ID (if available) : 18152624-2217284
 ICRS Star Coord at Epoch: 18h 15m 26.23135s -22:17:28.76777s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 9.251
 G magnitude : 14.231
 RP magnitude : 12.972
 BP magnitude : 15.979
 DUPflag : 0
 Distance (au) : 9.365
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.65
 Sun-Target sep (deg) : 130.22
 Sun-Moon sep (deg) : 116.33
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.80
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.608
 C/A sky separation (km) : 4129.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



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

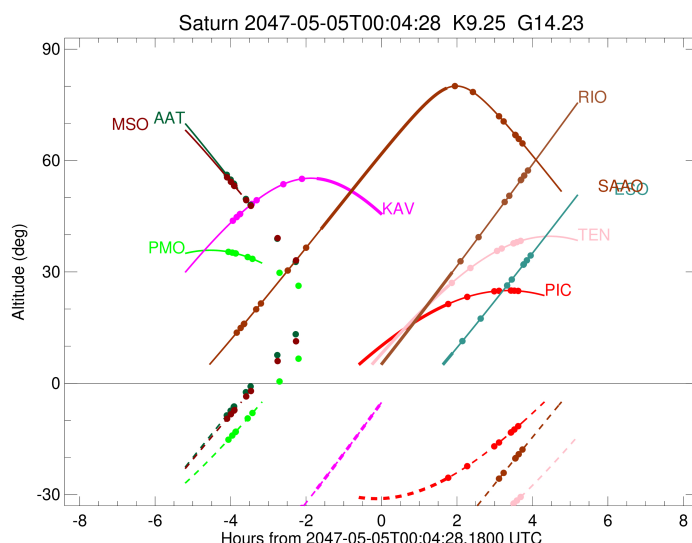
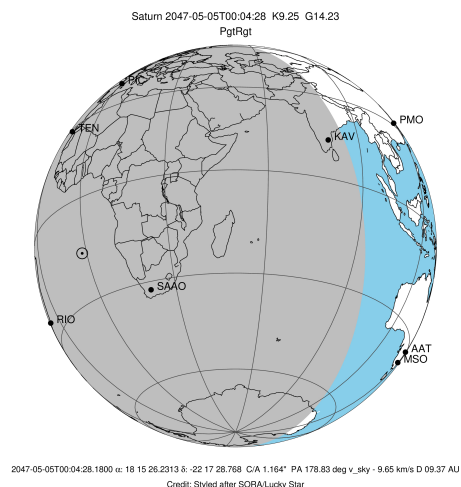
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-05-04T20:06:07.119	-38.62x	22.71x	140461.00	-9.45			
A (OER)	I	2047-05-04T20:12:37.228	-38.63x	21.54x	136774.40	-9.45			
Encke (OEG)	I	2047-05-04T20:17:57.714	-38.60x	20.57x	133744.89	-9.45			
Encke (IEG)	I	2047-05-04T20:18:31.727	-38.59x	20.46x	133423.31	-9.45			
A (IER)	I	2047-05-04T20:38:33.975	-38.19x	16.73x	122050.38	-9.47			
B (OER)	I	2047-05-04T20:46:27.082	-37.90x	15.23x	117571.16	-9.47			
B (IER)	I	2047-05-04T21:31:24.776	-35.05x	6.36x	91984.69	-9.50			
C (IER)	I	2047-05-04T22:02:04.819	-32.00x	0.09x	74490.58	-9.51			
Saturn	I	2047-05-04T22:25:58.583	-29.11x	-4.90x	60263.22			-3.36	-4.13
Saturn	E	2047-05-05T01:57:41.332	8.18	-50.71	60221.30			10.56	12.90
C (IER)	E	2047-05-05T02:13:02.613	11.34	-54.00	74490.58	9.99			
B (IER)	E	2047-05-05T02:42:06.259	17.40	-60.10	91984.69	10.07			
B (OER)	E	2047-05-05T03:24:12.967	26.35	-68.41	117571.16	10.17			
A (IER)	E	2047-05-05T03:31:32.850	27.92	-69.74	122050.38	10.19			
Encke (IEG)	E	2047-05-05T03:50:06.814	31.92	-72.82	133423.31	10.23			
Encke (OEG)	E	2047-05-05T03:50:38.253	32.03	-72.90	133744.89	10.23			
A (OER)	E	2047-05-05T03:55:34.288	33.10	-73.62	136774.40	10.24			
F ring	E	2047-05-05T04:01:34.167	34.40	-74.44	140461.00	10.25			

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-04T23:55:21.840
 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 : 4090711506330287360
 2Mass ID (if available) : 18152624-2217284
 ICRS Star Coord at Epoch: 18h 15m 26.23135s -22:17:28.76777s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 9.251
 G magnitude : 14.231
 RP magnitude : 12.972
 BP magnitude : 15.979
 DUPflag : 0
 Distance (au) : 9.365
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.65
 Sun-Target sep (deg) : 130.22
 Sun-Moon sep (deg) : 115.92
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.80
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.662
 C/A sky separation (km) : 4498.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-05-04T19:58:32.282		56.14	-8.65	140461.00	-10.12		
A (OER)	I	2047-05-04T20:04:36.705		54.84	-7.39	136774.40	-10.11		
Encke (OEG)	I	2047-05-04T20:09:36.384		53.77	-6.35	133744.89	-10.11		
Encke (IEG)	I	2047-05-04T20:10:08.206		53.66	-6.24	133423.31	-10.11		
A (IER)	I	2047-05-04T20:28:55.105		49.63	-2.38x	122050.38	-10.08		
B (OER)	I	2047-05-04T20:36:19.776		48.04	-0.88x	117571.16	-10.07		
B (IER)	I	2047-05-04T21:18:50.648		38.93	7.60x	91984.69	-9.99		
C (IER)	I	2047-05-04T21:48:07.967		32.68	13.22x	74490.58	-9.92		
Saturn	I	2047-05-04T22:11:51.028		27.65	17.60x	60266.92		-1.59	-1.96
Saturn	E	2047-05-05T01:40:25.971		-13.29x	42.45x	60231.44		9.33	11.41
C (IER)	E	2047-05-05T01:58:13.959		-16.30x	42.69x	74490.58	9.58		
B (IER)	E	2047-05-05T02:28:38.502		-21.12x	42.20x	91984.69	9.59		
B (OER)	E	2047-05-05T03:13:06.767		-27.32x	39.56x	117571.16	9.59		
A (IER)	E	2047-05-05T03:20:53.982		-28.28x	38.88x	122050.38	9.59		
Encke (IEG)	E	2047-05-05T03:40:40.353		-30.52x	36.90x	133423.31	9.59		
Encke (OEG)	E	2047-05-05T03:41:13.899		-30.58x	36.84x	133744.89	9.59		
A (OER)	E	2047-05-05T03:46:29.929		-31.13x	36.25x	136774.40	9.59		
F ring	E	2047-05-05T03:52:54.496		-31.76x	35.50x	140461.00	9.59		

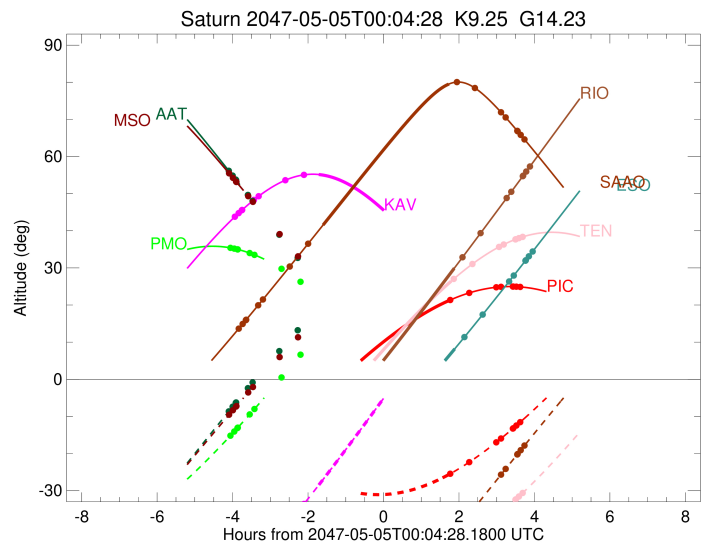
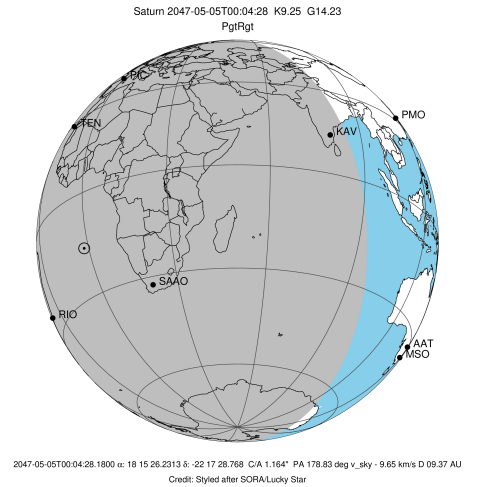
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-05T00:08:55.770
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : SAAO
 Location : So. Afr. Astro. Obs. (Sutherland)
 Latitude (deg) : -32.37953
 E. Longitude (deg) : 20.81070
 Altitude (km) : 1.768
 Gaia source ID : 4090711506330287360
 2Mass ID (if available) : 18152624-2217284
 ICRS Star Coord at Epoch: 18h 15m 26.23135s -22:17:28.76777s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 9.251
 G magnitude : 14.231
 RP magnitude : 12.972
 BP magnitude : 15.979
 DUPflag : 0
 Distance (au) : 9.365
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.65
 Sun-Target sep (deg) : 130.22
 Sun-Moon sep (deg) : 117.16
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.80
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.975
 C/A sky separation (km) : 6620.1
 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



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	2047-05-04T20:14:21.776		13.65	-54.66	140461.00	-9.91		
A (OER)	I	2047-05-04T20:20:33.453		14.91	-55.90	136774.40	-9.92		
Encke (OEG)	I	2047-05-04T20:25:38.635		15.94	-56.91	133744.89	-9.93		
Encke (IEG)	I	2047-05-04T20:26:11.016		16.05	-57.01	133423.31	-9.93		
A (IER)	I	2047-05-04T20:45:14.751		19.95	-60.69	122050.38	-9.96		
B (OER)	I	2047-05-04T20:52:44.488		21.49	-62.09	117571.16	-9.96		
B (IER)	I	2047-05-04T21:35:28.285		30.38	-69.25	91984.69	-9.99		
C (IER)	I	2047-05-04T22:04:40.931		36.53	-72.67	74490.58	-9.97		
Saturn	I	2047-05-04T22:28:22.711		41.55	-73.91	60267.55		-1.04	-1.28
Saturn	E	2047-05-05T01:48:19.176		79.52	-43.21	60207.42		12.05	14.69
C (IER)	E	2047-05-05T02:01:06.182		80.05	-40.53	74490.58	10.15		
B (IER)	E	2047-05-05T02:29:43.139		78.47	-34.50	91984.69	10.22		
B (OER)	E	2047-05-05T03:11:21.649		71.92	-25.70	117571.16	10.25		
A (IER)	E	2047-05-05T03:18:38.414		70.55	-24.16	122050.38	10.26		
Encke (IEG)	E	2047-05-05T03:37:07.214		66.94	-20.27	133423.31	10.26		
Encke (OEG)	E	2047-05-05T03:37:38.567		66.83	-20.16	133744.89	10.26		
A (OER)	E	2047-05-05T03:42:33.946		65.84	-19.13	136774.40	10.26		
F ring	E	2047-05-05T03:48:33.430		64.63	-17.88	140461.00	10.25		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-04T23:55:47.340
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MSO
 Location : Mt. Stromlo Observatory
 Latitude (deg) : -35.32000
 E. Longitude (deg) : 149.00833
 Altitude (km) : 0.770
 Gaia source ID : 4090711506330287360
 2Mass ID (if available) : 18152624-2217284
 ICRS Star Coord at Epoch: 18h 15m 26.23135s -22:17:28.76777s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 9.251
 G magnitude : 14.231
 RP magnitude : 12.972
 BP magnitude : 15.979
 DUPflag : 0
 Distance (au) : 9.365
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.65
 Sun-Target sep (deg) : 130.22
 Sun-Moon sep (deg) : 115.96
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.80
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.613
 C/A sky separation (km) : 4166.2
 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	2047-05-04T19:58:59.883		55.47	-9.53	140461.00	-10.11		
A (OER)	I	2047-05-04T20:05:04.602		54.24	-8.32	136774.40	-10.10		
Encke (OEG)	I	2047-05-04T20:10:04.509		53.23	-7.33	133744.89	-10.10		
Encke (IEG)	I	2047-05-04T20:10:36.354		53.13	-7.23	133423.31	-10.10		
A (IER)	I	2047-05-04T20:29:23.980		49.31	-3.54x	122050.38	-10.07		
B (OER)	I	2047-05-04T20:36:48.879		47.80	-2.10x	117571.16	-10.06		
B (IER)	I	2047-05-04T21:19:20.240		39.09	5.99x	91984.69	-9.99		
C (IER)	I	2047-05-04T21:48:36.787		33.10	11.32x	74490.58	-9.92		
Saturn	I	2047-05-04T22:12:12.695		28.30	15.45x	60266.45		-1.91	-2.35
Saturn	E	2047-05-05T01:40:50.413		-10.89x	38.45x	60233.35		9.08	11.11
C (IER)	E	2047-05-05T01:58:56.298		-13.78x	38.66x	74490.58	9.61		
B (IER)	E	2047-05-05T02:29:16.397		-18.30x	38.21x	91984.69	9.61		
B (OER)	E	2047-05-05T03:13:38.706		-24.07x	35.80x	117571.16	9.61		
A (IER)	E	2047-05-05T03:21:24.906		-24.96x	35.19x	122050.38	9.61		
Encke (IEG)	E	2047-05-05T03:41:08.715		-27.02x	33.38x	133423.31	9.61		
Encke (OEG)	E	2047-05-05T03:41:42.189		-27.08x	33.32x	133744.89	9.61		
A (OER)	E	2047-05-05T03:46:57.540		-27.58x	32.78x	136774.40	9.61		
F ring	E	2047-05-05T03:53:21.284		-28.16x	32.10x	140461.00	9.61		