

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-26T21:19:28.970
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4078542313406616064
 2Mass ID (if available) : 18445697-2231073

Saturn 2048-07-26T21:19:28 K9.38 G12.70 PgtRgt

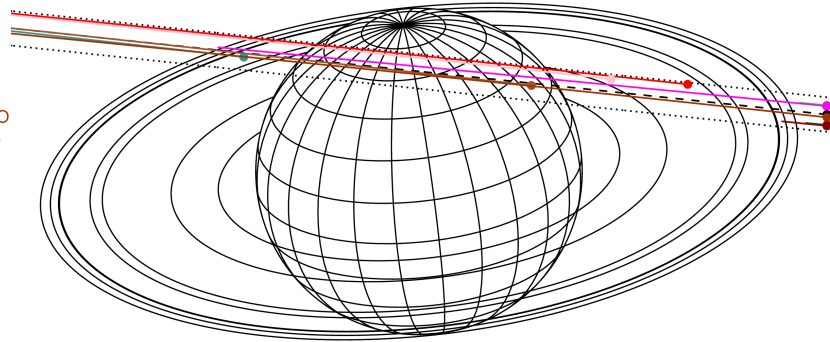
ICRS Star Coord at Epoch: 18h 44m 56.95752s -22:31:07.46523s

RUWE (>1.4 is poor) : 0.94
 K magnitude : 9.378
 G magnitude : 12.696
 RP magnitude : 11.762
 BP magnitude : 13.606
 DUPflag : 0
 Distance (au) : 9.096
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.69
 Sun-Target sep (deg) : 156.49
 Sun-Moon sep (deg) : 43.86
 B (ring opening deg) : 25.58
 PA of pole (deg) : 6.28



2048-07-26T21:19:28.9700 at: 18 44 56.9575 S -22 31 07.465 C/A 5.572° PA 173.97 deg v_sky -17.69 km/s D 09.10 AU
 Credit: Styled after SORA/Lucky Star

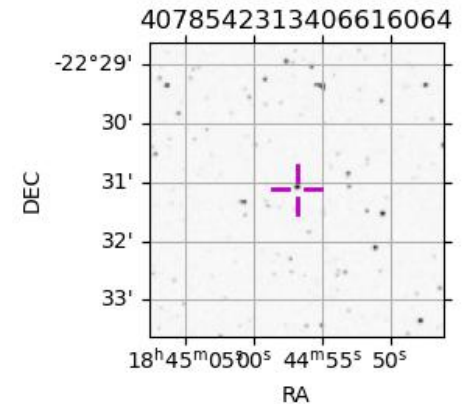
Earth
 PIC
 PMO
 TEN
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



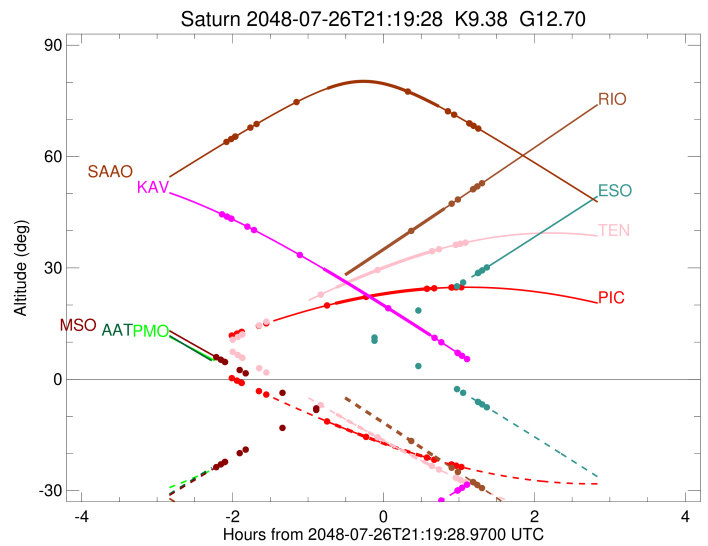
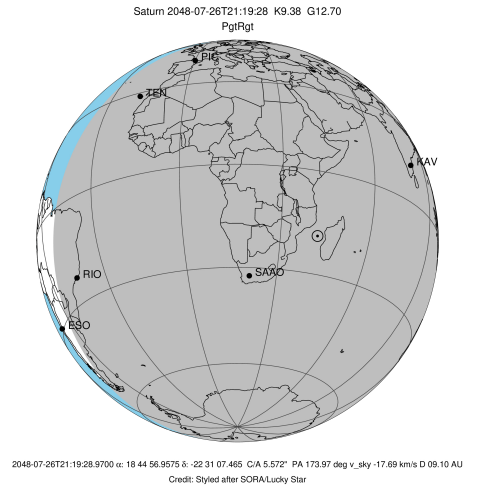
#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring

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	+	++	+++++	JUL 26 20:34 - JUL 26 22:21	PieRie
PAL	Palomar Mt (20	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
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	+	++	+++++	JUL 26 20:29 - JUL 26 22:24	PieRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observ	12.6	78.8	+++++	++	+++++	JUL 26 19:11 - JUL 26 22:25	PieRie
RIO	Rio de Janeiro	-22.9	316.8		+	+++++	JUL 26 22:08 - JUL 26 22:37	PneRne
ESO	European South	-29.3	289.3			++++	JUL 26 22:34 - JUL 26 22:41	PnnRne
AAT	Siding Spring	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro	-32.4	20.8	+++++	++	+++++	JUL 26 19:14 - JUL 26 22:34	PieRie
MSO	Mt. Stromlo Ob	-35.3	149.0	++			JUL 26 19:06 - JUL 26 19:10	PnnRin



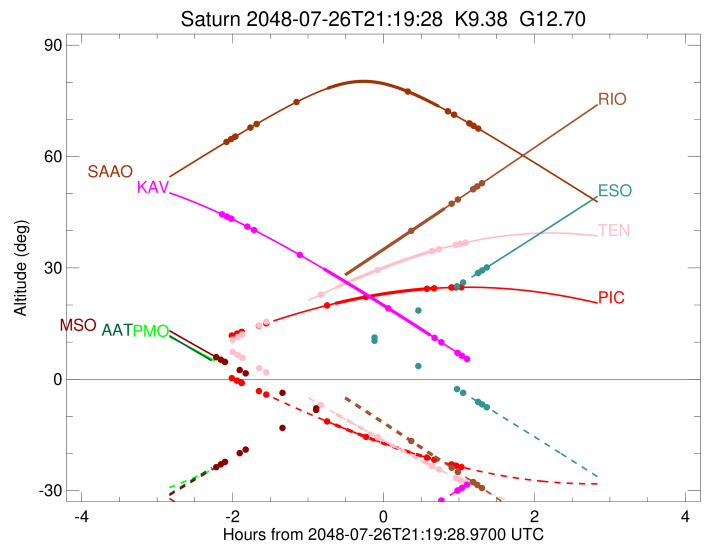
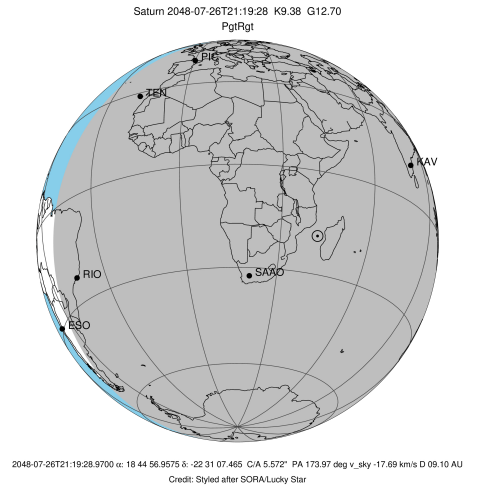
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-26T21:20:08.060
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 4078542313406616064
 2Mass ID (if available) : 18445697-2231073
 ICRS Star Coord at Epoch: 18h 44m 56.95752s -22:31:07.46523s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 9.378
 G magnitude : 12.696
 RP magnitude : 11.762
 BP magnitude : 13.606
 DUPflag : 0
 Distance (au) : 9.096
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.69
 Sun-Target sep (deg) : 156.49
 Sun-Moon sep (deg) : 44.17
 B (ring opening deg) : 25.58
 PA of pole (deg) : 6.28
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.456
 C/A sky separation (km) : 42587.1
 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	2048-07-26T19:18:50.758		11.78	0.31x	140461.00	-15.09		
A (OER)	I	2048-07-26T19:22:57.359		12.29	-0.37x	136774.40	-14.80		
Encke (OEG)	I	2048-07-26T19:26:23.812		12.72	-0.93x	133744.89	-14.54		
Encke (IEG)	I	2048-07-26T19:26:45.947		12.77	-0.99x	133423.31	-14.51		
A (IER)	I	2048-07-26T19:40:22.742		14.40	-3.18x	122050.38	-13.28		
B (OER)	I	2048-07-26T19:46:08.103		15.06	-4.10x	117571.16	-12.65		
B (IER)	I	2048-07-26T20:34:21.956		19.87	-11.32	91984.69	-3.97		
Saturn	I	2048-07-26T20:41:04.493		20.42	-12.26	59950.18		29.38	34.53
Saturn	E	2048-07-26T21:58:35.210		24.48	-21.55	59504.67		49.87	55.22
B (IER)	E	2048-07-26T21:05:39.629	b	22.20	-15.54	91984.69	3.96		
B (OER)	E	2048-07-26T21:54:02.317	b	24.37	-21.10	117571.16	12.61		
A (IER)	E	2048-07-26T21:59:48.573		24.51	-21.67	122050.38	13.25		
Encke (IEG)	E	2048-07-26T22:13:27.037		24.72	-22.95	133423.31	14.49		
Encke (OEG)	E	2048-07-26T22:13:49.210		24.73	-22.98	133744.89	14.52		
A (OER)	E	2048-07-26T22:17:16.005		24.76	-23.28	136774.40	14.78		
F ring	E	2048-07-26T22:21:22.985		24.78	-23.63	140461.00	15.07		

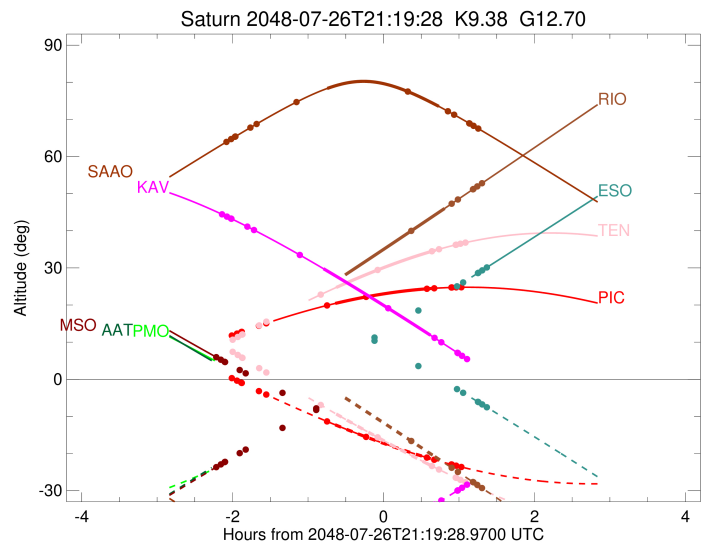
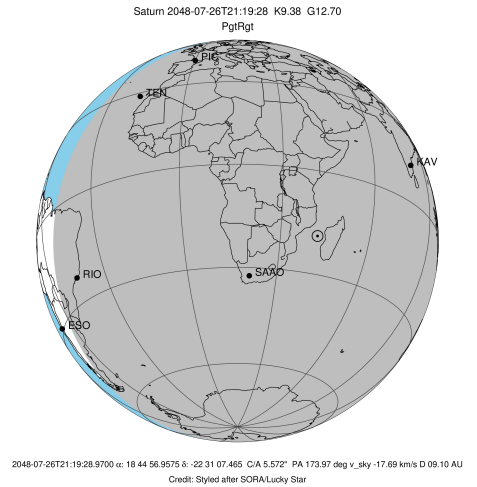
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-26T21:21:45.280
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 4078542313406616064
 2Mass ID (if available) : 18445697-2231073
 ICRS Star Coord at Epoch: 18h 44m 56.95752s -22:31:07.46523s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 9.378
 G magnitude : 12.696
 RP magnitude : 11.762
 BP magnitude : 13.606
 DUPflag : 0
 Distance (au) : 9.096
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.69
 Sun-Target sep (deg) : 156.49
 Sun-Moon sep (deg) : 44.46
 B (ring opening deg) : 25.58
 PA of pole (deg) : 6.28
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.315
 C/A sky separation (km) : 41657.3
 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	2048-07-26T19:19:32.012		10.65	7.40x	140461.00	-15.33		
A (OER)	I	2048-07-26T19:23:34.545		11.40	6.55x	136774.40	-15.06		
Encke (OEG)	I	2048-07-26T19:26:57.267		12.02	5.85x	133744.89	-14.82		
Encke (IEG)	I	2048-07-26T19:27:18.983		12.09	5.77x	133423.31	-14.79		
A (IER)	I	2048-07-26T19:40:37.173		14.50	3.00x	122050.38	-13.65		
B (OER)	I	2048-07-26T19:46:12.312		15.49	1.85x	117571.16	-13.07		
B (IER)	I	2048-07-26T20:29:24.114		22.78	-6.89	91984.69	-5.77		
Saturn	I	2048-07-26T20:41:50.256		24.72	-9.34	59974.05		28.14	33.18
Saturn	E	2048-07-26T22:01:01.534		34.79	-23.88	59523.65		49.01	54.41
B (IER)	E	2048-07-26T21:14:46.793	b	29.44	-15.63	91984.69	5.77		
B (OER)	E	2048-07-26T21:58:01.541	b	34.49	-23.37	117571.16	13.08		
A (IER)	E	2048-07-26T22:03:36.369		35.03	-24.31	122050.38	13.67		
Encke (IEG)	E	2048-07-26T22:16:53.051		36.21	-26.50	133423.31	14.83		
Encke (OEG)	E	2048-07-26T22:17:14.713		36.24	-26.56	133744.89	14.86		
A (OER)	E	2048-07-26T22:20:36.897		36.51	-27.10	136774.40	15.11		
F ring	E	2048-07-26T22:24:38.717		36.81	-27.74	140461.00	15.38		

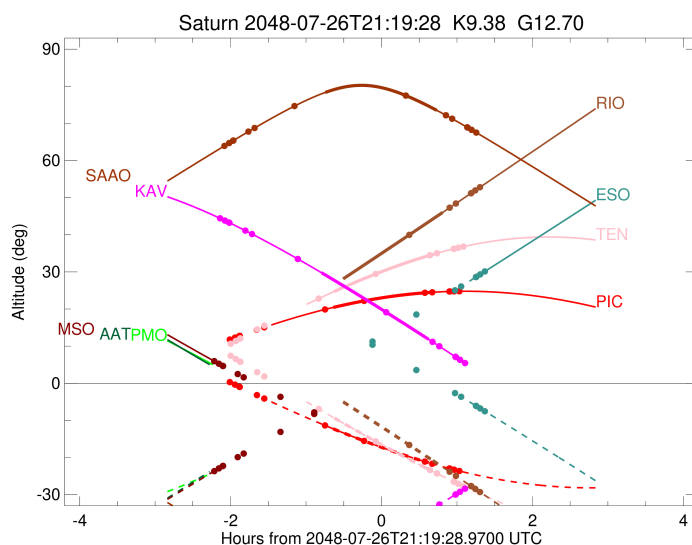
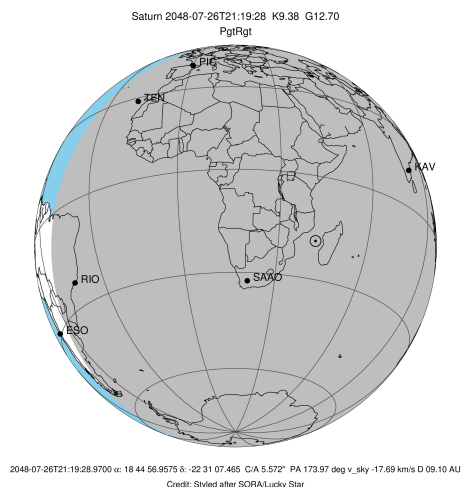
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-26T21:14:29.910
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 4078542313406616064
 2Mass ID (if available) : 18445697-2231073
 ICRS Star Coord at Epoch: 18h 44m 56.95752s -22:31:07.46523s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 9.378
 G magnitude : 12.696
 RP magnitude : 11.762
 BP magnitude : 13.606
 DUPflag : 0
 Distance (au) : 9.096
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.69
 Sun-Target sep (deg) : 156.49
 Sun-Moon sep (deg) : 43.44
 B (ring opening deg) : 25.58
 PA of pole (deg) : 6.28
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.850
 C/A sky separation (km) : 38591.2
 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	2048-07-26T19:11:05.841		44.44	-57.99	140461.00	-15.94		
A (OER)	I	2048-07-26T19:14:58.752		43.82	-57.83	136774.40	-15.71		
Encke (OEG)	I	2048-07-26T19:18:12.871		43.30	-57.68	133744.89	-15.50		
Encke (IEG)	I	2048-07-26T19:18:33.633		43.24	-57.66	133423.31	-15.48		
A (IER)	I	2048-07-26T19:31:11.156		41.13	-56.87	122050.38	-14.51		
B (OER)	I	2048-07-26T19:36:25.044		40.22	-56.47	117571.16	-14.02		
B (IER)	I	2048-07-26T20:12:51.161		33.50	-52.52	91984.69	-8.75		
Saturn	I	2048-07-26T20:31:46.083		29.79	-49.83	60026.47		25.29	30.04
Saturn	E	2048-07-26T21:56:54.194		11.84	-34.40	59605.40		45.35	50.90
B (IER)	E	2048-07-26T21:23:08.213	b	19.15	-41.01	91984.69	8.65		
B (OER)	E	2048-07-26T22:00:05.551		11.15	-33.75	117571.16	13.80		
A (IER)	E	2048-07-26T22:05:24.711		9.98	-32.66	122050.38	14.26		
Encke (IEG)	E	2048-07-26T22:18:15.955		7.13	-30.00	133423.31	15.19		
Encke (OEG)	E	2048-07-26T22:18:37.114		7.06	-29.93	133744.89	15.21		
A (OER)	E	2048-07-26T22:21:55.005		6.32	-29.23	136774.40	15.41		
F ring	E	2048-07-26T22:25:52.579		5.44	-28.40	140461.00	15.63		

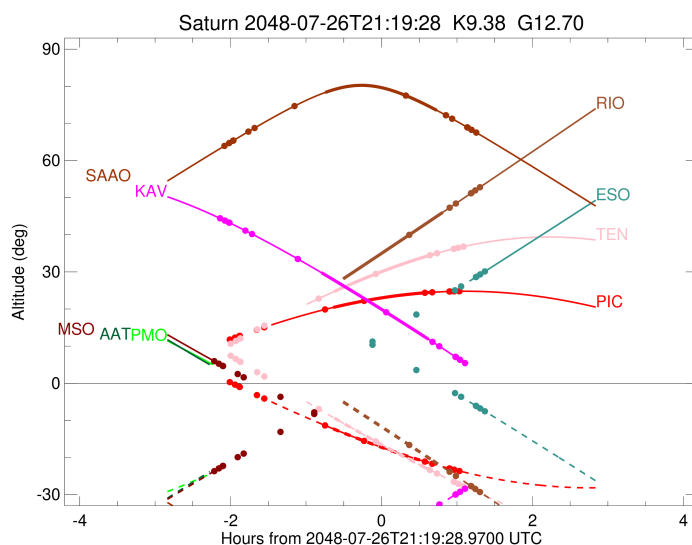
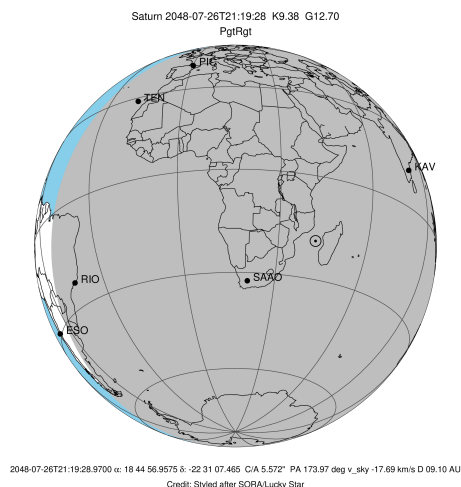
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-26T21:24:05.560
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 4078542313406616064
 2Mass ID (if available) : 18445697-2231073
 ICRS Star Coord at Epoch: 18h 44m 56.95752s -22:31:07.46523s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 9.378
 G magnitude : 12.696
 RP magnitude : 11.762
 BP magnitude : 13.606
 DUPflag : 0
 Distance (au) : 9.096
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.69
 Sun-Target sep (deg) : 156.49
 Sun-Moon sep (deg) : 44.84
 B (ring opening deg) : 25.58
 PA of pole (deg) : 6.28
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.489
 C/A sky separation (km) : 36208.6
 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



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

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2048-07-26T19:17:38.108		7.98	14.32x	140461.00	-16.40		
A (OER)	I	2048-07-26T19:21:24.181		8.80	13.55x	136774.40	-16.21		
Encke (OEG)	I	2048-07-26T19:24:31.963		9.48	12.91x	133744.89	-16.05		
Encke (IEG)	I	2048-07-26T19:24:52.009		9.55	12.84x	133423.31	-16.03		
A (IER)	I	2048-07-26T19:36:57.845		12.18	10.35x	122050.38	-15.27		
B (OER)	I	2048-07-26T19:41:54.776		13.26	9.33x	117571.17	-14.89		
B (IER)	I	2048-07-26T20:14:16.577		20.38	2.50x	91984.69	-10.97		
Saturn	I	2048-07-26T20:39:24.826		25.97	-2.92x	60084.38		21.86	26.16
Saturn	E	2048-07-26T22:08:06.196		46.02	-22.59	59642.50		43.70	49.29
B (IER)	E	2048-07-26T21:41:28.034	b	39.96	-16.61	91984.69	10.98		
B (OER)	E	2048-07-26T22:13:41.935		47.30	-23.85	117571.16	15.00		
A (IER)	E	2048-07-26T22:18:36.604		48.42	-24.96	122050.38	15.39		
Encke (IEG)	E	2048-07-26T22:30:35.979		51.16	-27.67	133423.31	16.19		
Encke (OEG)	E	2048-07-26T22:30:55.831		51.24	-27.75	133744.89	16.21		
A (OER)	E	2048-07-26T22:34:01.735		51.95	-28.45	136774.40	16.38		
F ring	E	2048-07-26T22:37:45.449		52.80	-29.30	140461.00	16.57		

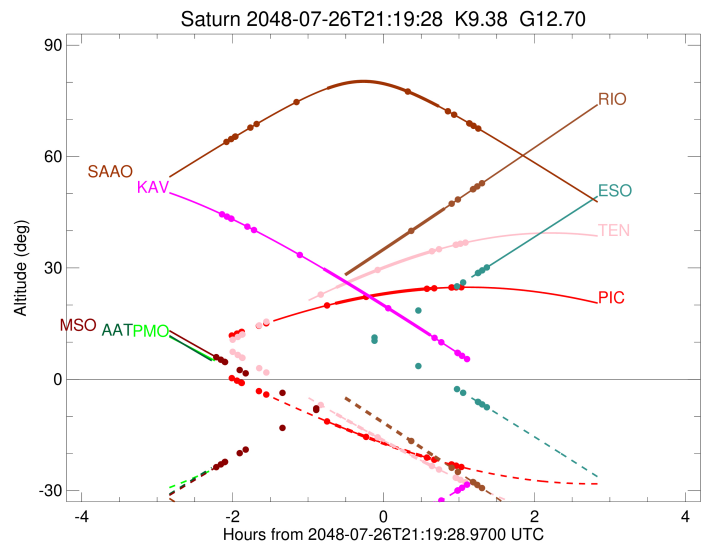
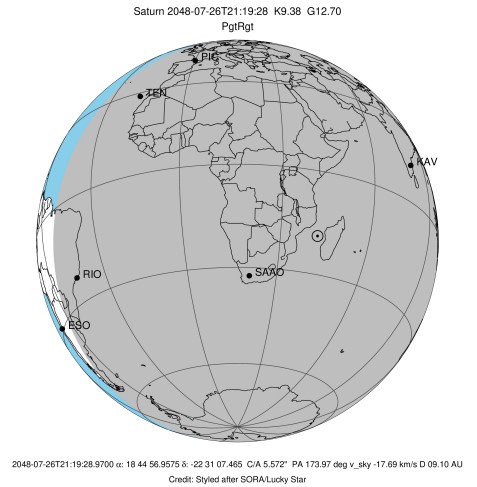
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-26T21:24:41.540
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4078542313406616064
 2Mass ID (if available) : 18445697-2231073
 ICRS Star Coord at Epoch: 18h 44m 56.95752s -22:31:07.46523s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 9.378
 G magnitude : 12.696
 RP magnitude : 11.762
 BP magnitude : 13.606
 DUPflag : 0
 Distance (au) : 9.096
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.69
 Sun-Target sep (deg) : 156.49
 Sun-Moon sep (deg) : 44.67
 B (ring opening deg) : 25.58
 PA of pole (deg) : 6.28
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.255
 C/A sky separation (km) : 34669.3
 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	2048-07-26T19:16:14.450		-11.48x	30.16x	140461.00	-16.53		
A (OER)	I	2048-07-26T19:19:58.624		-10.80x	29.62x	136774.40	-16.36		
Encke (OEG)	I	2048-07-26T19:23:04.582		-10.23x	29.17x	133744.89	-16.22		
Encke (IEG)	I	2048-07-26T19:23:24.421		-10.17x	29.12x	133423.31	-16.20		
A (IER)	I	2048-07-26T19:35:20.516		-7.95x	27.32x	122050.38	-15.53		
B (OER)	I	2048-07-26T19:40:11.974		-7.04x	26.57x	117571.16	-15.20		
B (IER)	I	2048-07-26T20:11:15.201		-1.07x	21.48x	91984.69	-11.85		
C (IER)	I	2048-07-26T20:46:13.024	b	5.90	15.27x	74490.58	-3.99		
Saturn	I	2048-07-26T20:38:26.463		4.33x	16.69x	60110.81		20.14	24.20
Saturn	E	2048-07-26T22:10:15.102		23.40	-1.08x	59673.72		42.31	47.92
C (IER)	E	2048-07-26T21:12:11.585	b	11.22	10.40x	74490.58	3.99		
B (IER)	E	2048-07-26T21:47:08.015	b	18.50	3.57x	91984.69	11.89		
B (OER)	E	2048-07-26T22:17:57.863		25.05	-2.65x	117571.16	15.36		
A (IER)	E	2048-07-26T22:22:46.074		26.07	-3.64x	122050.38	15.71		
Encke (IEG)	E	2048-07-26T22:34:33.119		28.60	-6.07	133423.31	16.43		
Encke (OEG)	E	2048-07-26T22:34:52.686		28.67	-6.14	133744.89	16.44		
A (OER)	E	2048-07-26T22:37:56.050		29.33	-6.77	136774.40	16.60		
F ring	E	2048-07-26T22:41:36.977		30.12	-7.54	140461.00	16.77		

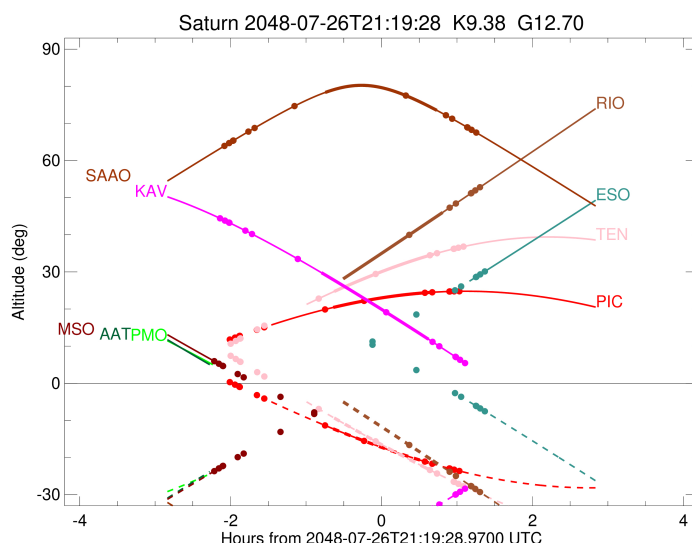
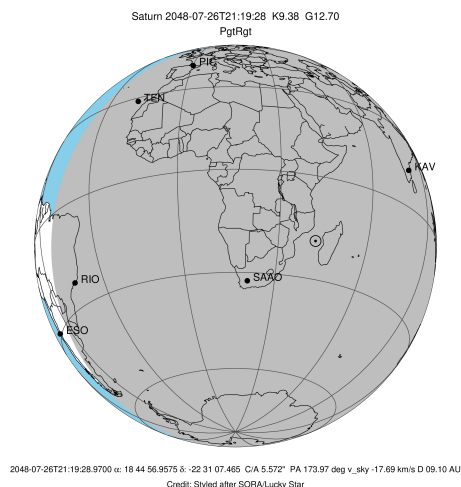
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-26T21:19:20.810
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : SAAO
 Location : So. Afr. Astro. Obs. (Sutherland)
 Latitude (deg) : -32.37953
 E. Longitude (deg) : 20.81070
 Altitude (km) : 1.768
 Gaia source ID : 4078542313406616064
 2Mass ID (if available) : 18445697-2231073
 ICRS Star Coord at Epoch: 18h 44m 56.95752s -22:31:07.46523s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 9.378
 G magnitude : 12.696
 RP magnitude : 11.762
 BP magnitude : 13.606
 DUPflag : 0
 Distance (au) : 9.096
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.69
 Sun-Target sep (deg) : 156.49
 Sun-Moon sep (deg) : 44.53
 B (ring opening deg) : 25.58
 PA of pole (deg) : 6.28
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.404
 C/A sky separation (km) : 35647.6
 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



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

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2048-07-26T19:14:36.858		63.94	-41.70	140461.00	-16.65		
A (OER)	I	2048-07-26T19:18:19.451		64.70	-42.48	136774.40	-16.47		
Encke (OEG)	I	2048-07-26T19:21:24.341		65.33	-43.13	133744.89	-16.30		
Encke (IEG)	I	2048-07-26T19:21:44.080		65.39	-43.20	133423.31	-16.28		
A (IER)	I	2048-07-26T19:33:38.652		67.79	-45.71	122050.38	-15.51		
B (OER)	I	2048-07-26T19:38:30.875		68.75	-46.74	117571.16	-15.13		
B (IER)	I	2048-07-26T20:10:15.741		74.66	-53.37	91984.69	-11.26		
Saturn	I	2048-07-26T20:34:44.867		78.34	-58.39	60086.34		21.73	26.02
Saturn	E	2048-07-26T22:03:29.753		73.51	-74.16	59664.80		42.71	48.32
B (IER)	E	2048-07-26T21:38:45.610	b	77.51	-70.49	91984.69	11.17		
B (OER)	E	2048-07-26T22:10:43.373		72.19	-75.01	117571.16	15.04		
A (IER)	E	2048-07-26T22:15:37.488		71.27	-75.51	122050.38	15.41		
Encke (IEG)	E	2048-07-26T22:27:36.830		68.96	-76.44	133423.31	16.17		
Encke (OEG)	E	2048-07-26T22:27:56.704		68.89	-76.46	133744.89	16.19		
A (OER)	E	2048-07-26T22:31:02.878		68.28	-76.62	136774.40	16.35		
F ring	E	2048-07-26T22:34:47.047		67.54	-76.76	140461.00	16.54		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2048-07-26T21:16:27.050
 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 : 4078542313406616064
 2Mass ID (if available) : 18445697-2231073
 ICRS Star Coord at Epoch: 18h 44m 56.95752s -22:31:07.46523s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 9.378
 G magnitude : 12.696
 RP magnitude : 11.762
 BP magnitude : 13.606
 DUPflag : 0
 Distance (au) : 9.096
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.69
 Sun-Target sep (deg) : 156.49
 Sun-Moon sep (deg) : 43.34
 B (ring opening deg) : 25.58
 PA of pole (deg) : 6.28
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.799
 C/A sky separation (km) : 31657.5
 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	2048-07-26T19:06:31.383		5.95	-23.67	140461.00	-16.87		
A (OER)	I	2048-07-26T19:10:10.764		5.27	-22.93	136774.40	-16.73		
Encke (OEG)	I	2048-07-26T19:13:12.503		4.70x	-22.31	133744.89	-16.61		
Encke (IEG)	I	2048-07-26T19:13:31.877		4.64x	-22.25	133423.31	-16.59		
A (IER)	I	2048-07-26T19:25:08.910		2.48x	-19.90	122050.38	-16.02		
B (OER)	I	2048-07-26T19:29:50.991		1.62x	-18.96	117571.16	-15.74		
B (IER)	I	2048-07-26T19:59:08.476		-3.65x	-13.11	91984.69	-13.06		
C (IER)	I	2048-07-26T20:25:55.582		-8.26x	-7.84	74490.58	-8.21		
Saturn	I	2048-07-26T20:27:40.466		-8.55x	-7.50	60144.28		17.78	21.46
Saturn	E	2048-07-26T22:04:57.748		-22.84x	10.47x	59751.01		38.85	44.45
C (IER)	E	2048-07-26T21:21:41.233	b	-17.03x	2.74x	74490.58	8.13		
B (IER)	E	2048-07-26T21:48:44.053	b	-20.78x	7.63x	91984.69	12.94		
B (OER)	E	2048-07-26T22:18:18.461		-24.42x	12.75x	117571.16	15.58		
A (IER)	E	2048-07-26T22:23:03.482		-24.95x	13.54x	122050.38	15.85		
Encke (IEG)	E	2048-07-26T22:34:48.218		-26.20x	15.47x	133423.31	16.40		
Encke (OEG)	E	2048-07-26T22:35:07.816		-26.23x	15.52x	133744.89	16.42		
A (OER)	E	2048-07-26T22:38:11.678		-26.54x	16.02x	136774.40	16.54		
F ring	E	2048-07-26T22:41:53.688		-26.90x	16.61x	140461.00	16.67		