

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-09-20T00:01:08.890
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4068922724902655744
 2Mass ID (if available) : 17493350-2233011

Saturn 2047-09-20T00:01:08 K7.43 G14.88 PgtRgt

ICRS Star Coord at Epoch: 17h 49m 33.48982s -22:33:01.52222s

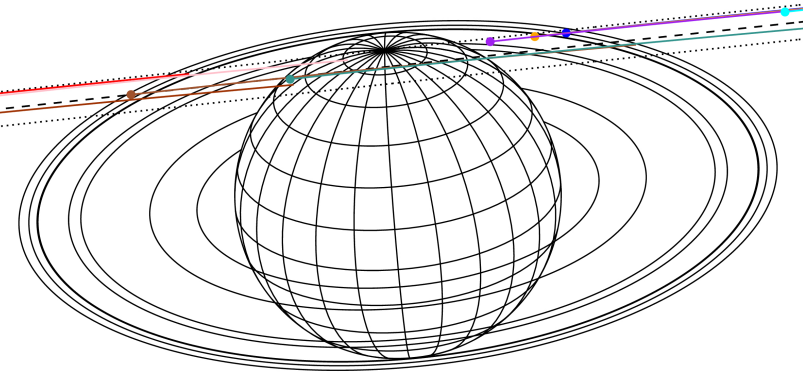
RUWE (>1.4 is poor) : 1.06
 K magnitude : 7.434
 G magnitude : 14.878
 RP magnitude : 13.191
 BP magnitude : 17.902
 DUPflag : 0
 Distance (au) : 9.973
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 8.94
 Sun-Target sep (deg) : 91.27
 Sun-Moon sep (deg) : 88.20
 B (ring opening deg) : 26.91
 PA of pole (deg) : 5.31

#	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



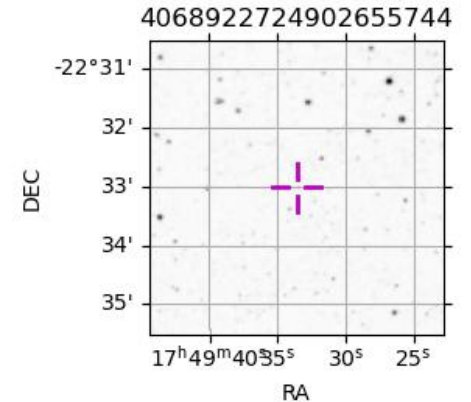
2047-09-20T00:01:08.8900 α: 17 49 33.4898 δ: -22 33 01.522 C/A 6.595° PA 186.20 deg v_sky + 8.94 km/s D 09.97 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 SAAO

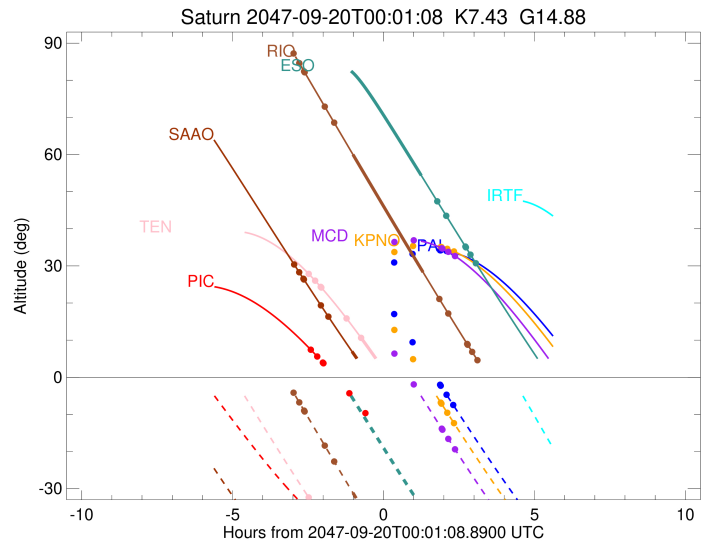
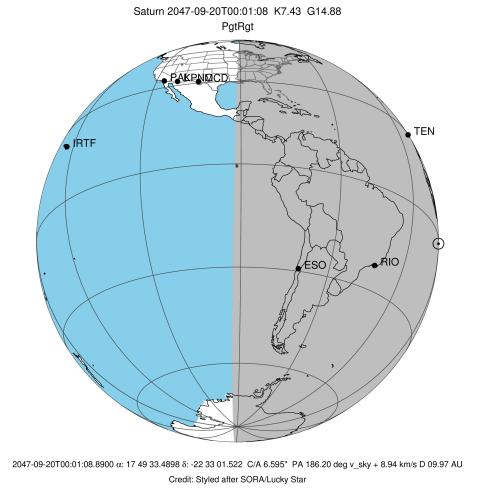


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+			SEP 19 21:36 - SEP 19 21:49	PnnRin
PAL	Palomar Mt (20	33.4	243.1			+	SEP 20 02:20 - SEP 20 02:20	PnnRne
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4			+	SEP 20 01:55 - SEP 20 02:21	PnnRne
MCD	McDonald Obs.	30.7	256.0			+	SEP 20 01:57 - SEP 20 02:23	PnnRne
TEN	Teide Obs./Ten	28.3	343.5	+	+		SEP 19 21:32 - SEP 19 23:15	PinRin
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+	+	+	SEP 19 21:13 - SEP 20 02:57	PieRie
ESO	European South	-29.3	289.3		+	+	SEP 20 01:16 - SEP 20 03:05	PneRne
AAT	Siding Spring	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro	-32.4	20.8	+	+	+	SEP 19 21:03 - SEP 19 22:58	PinRin
MSO	Mt. Stromlo Ob	-35.3	149.0					PnnRnn

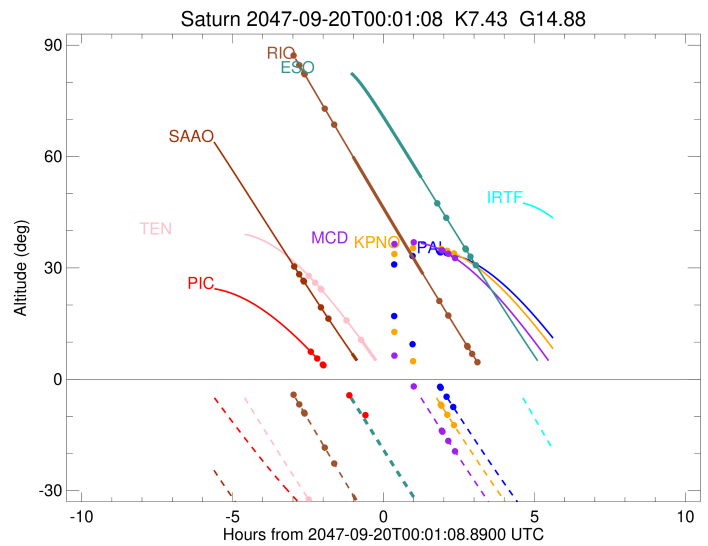
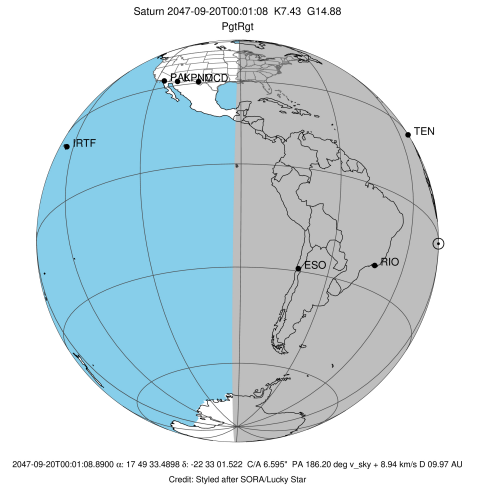


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-09-20T00:10:29.810
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 4068922724902655744
 2Mass ID (if available) : 17493350-2233011
 ICRS Star Coord at Epoch: 17h 49m 33.48982s -22:33:01.52222s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 7.434
 G magnitude : 14.878
 RP magnitude : 13.191
 BP magnitude : 17.902
 DUPflag : 0
 Distance (au) : 9.973
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 8.94
 Sun-Target sep (deg) : 91.27
 Sun-Moon sep (deg) : 87.95
 B (ring opening deg) : 26.91
 PA of pole (deg) : 5.31
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.195
 C/A sky separation (km) : 52041.5
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-09-19T21:36:42.170		7.41	-36.41	140461.00	-4.93		
A (OER)	I	2047-09-19T21:49:30.636		5.58	-38.00	136774.40	-4.66		
Encke (OEG)	I	2047-09-19T22:00:38.797		3.94x	-39.29	133744.89	-4.40		
Encke (IEG)	I	2047-09-19T22:01:52.047		3.76x	-39.42	133423.31	-4.38		
A (IER)	I	2047-09-19T22:53:20.564		-4.33x	-44.04	122050.38	-2.91		
B (OER)	I	2047-09-19T23:24:49.873	b	-9.60x	-45.59	117571.16	-1.80		
Saturn	I	2047-09-19T23:16:56.141		-8.26x	-45.30	59372.94		51.35	56.61
Saturn	E	2047-09-20T01:03:26.378		-27.14x	-43.30	59370.09		51.47	56.72
B (OER)	E	2047-09-20T00:55:04.598	b	-25.62x	-43.90	117571.16	1.84		
A (IER)	E	2047-09-20T01:25:37.688		-31.21x	-41.38	122050.38	3.03		
Encke (IEG)	E	2047-09-20T02:14:36.690		-40.22x	-35.77	133423.31	4.65		
Encke (OEG)	E	2047-09-20T02:15:45.575		-40.43x	-35.62	133744.89	4.69		
A (OER)	E	2047-09-20T02:26:12.264		-42.34x	-34.22	136774.40	4.98		
F ring	E	2047-09-20T02:38:09.415		-44.51x	-32.54	140461.00	5.30		

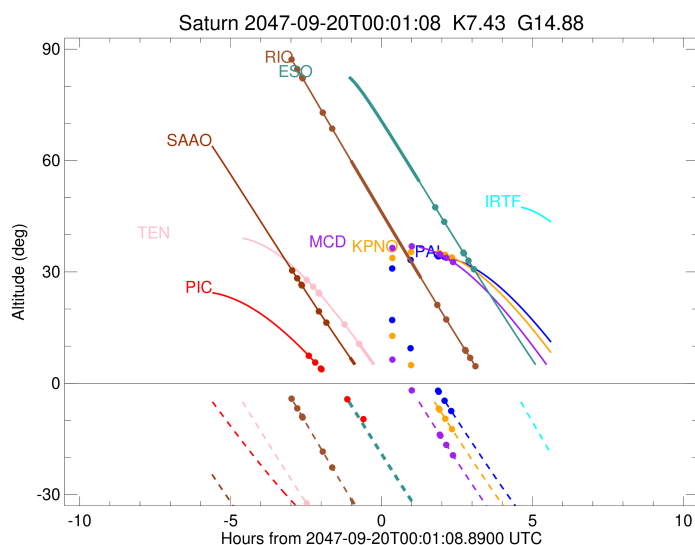
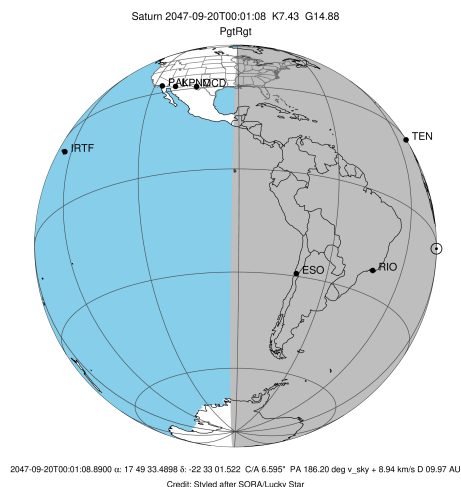
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-09-19T23:54:25.250
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4068922724902655744
 2Mass ID (if available) : 17493350-2233011
 ICRS Star Coord at Epoch: 17h 49m 33.48982s -22:33:01.52222s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 7.434
 G magnitude : 14.878
 RP magnitude : 13.191
 BP magnitude : 17.902
 DUPflag : 0
 Distance (au) : 9.973
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 8.94
 Sun-Target sep (deg) : 91.27
 Sun-Moon sep (deg) : 88.68
 B (ring opening deg) : 26.91
 PA of pole (deg) : 5.31
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.251
 C/A sky separation (km) : 52450.8
 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_itr93_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	2047-09-19T21:08:58.007		3.84x	51.98x	140461.00	-4.94		
A (OER)	I	2047-09-19T21:21:48.429		6.15	50.26x	136774.40	-4.63		
Encke (OEG)	I	2047-09-19T21:33:03.436		8.13	48.64x	133744.89	-4.34		
Encke (IEG)	I	2047-09-19T21:34:17.750		8.34	48.45x	133423.31	-4.31		
A (IER)	I	2047-09-19T22:27:48.155		17.14	39.53x	122050.38	-2.71		
B (OER)	I	2047-09-19T23:03:18.620	b	22.28	32.88x	117571.16	-1.47		
Saturn	I	2047-09-19T23:00:24.291		21.88	33.44x	59386.43		50.80	56.10
Saturn	E	2047-09-20T00:48:24.087		32.68	11.63x	59331.63		53.06	58.20
B (OER)	E	2047-09-20T00:23:09.984	b	30.98	16.86x	117571.16	1.46		
A (IER)	E	2047-09-20T00:59:12.229		33.23	9.38x	122050.38	2.66		
Encke (IEG)	E	2047-09-20T01:53:59.582		34.21	-2.09x	133423.31	4.19		
Encke (OEG)	E	2047-09-20T01:55:16.052		34.19	-2.36x	133744.89	4.22		
A (OER)	E	2047-09-20T02:06:51.361		33.99	-4.78x	136774.40	4.49		
F ring	E	2047-09-20T02:20:06.485		33.60	-7.54	140461.00	4.78		

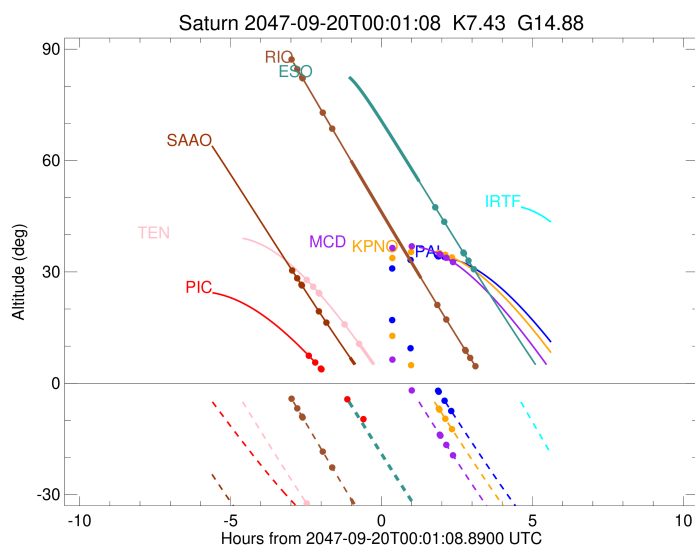
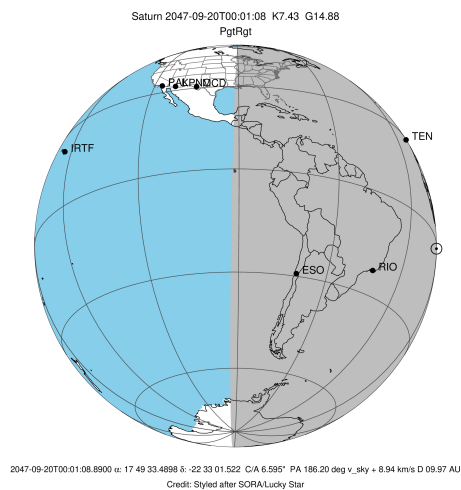
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-09-19T23:55:20.040
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 4068922724902655744
 2Mass ID (if available) : 17493350-2233011
 ICRS Star Coord at Epoch: 17h 49m 33.48982s -22:33:01.52222s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 7.434
 G magnitude : 14.878
 RP magnitude : 13.191
 BP magnitude : 17.902
 DUPflag : 0
 Distance (au) : 9.973
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 8.94
 Sun-Target sep (deg) : 91.27
 Sun-Moon sep (deg) : 88.73
 B (ring opening deg) : 26.91
 PA of pole (deg) : 5.31
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.256
 C/A sky separation (km) : 52486.9
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itr93_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

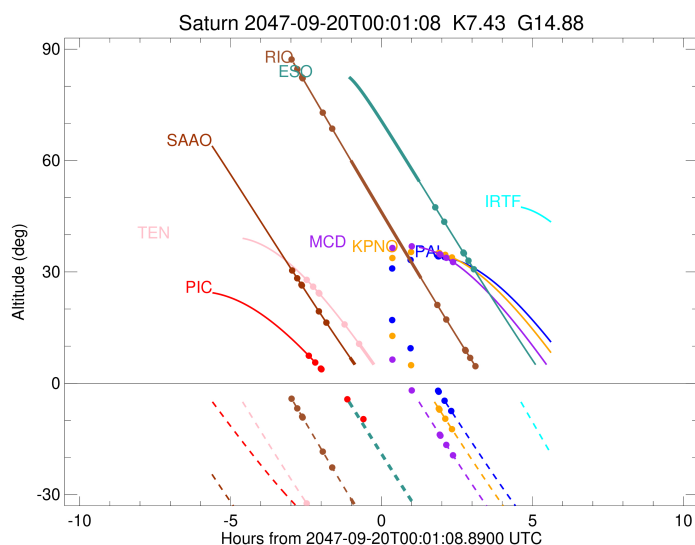
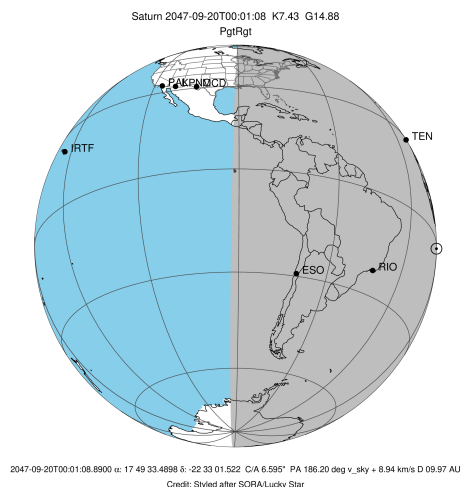
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-09-19T21:09:39.670		8.47	49.97x	140461.00	-4.90		
A (OER)	I	2047-09-19T21:22:36.235		10.75	47.93x	136774.40	-4.59		
Encke (OEG)	I	2047-09-19T21:33:56.853		12.70	46.06x	133744.89	-4.31		
Encke (IEG)	I	2047-09-19T21:35:11.800		12.91	45.84x	133423.31	-4.27		
A (IER)	I	2047-09-19T22:29:15.009		21.48	35.96x	122050.38	-2.68		
B (OER)	I	2047-09-19T23:05:27.694	b	26.39	28.79x	117571.16	-1.43		
Saturn	I	2047-09-19T23:01:16.794		25.86	29.64x	59384.16		50.89	56.18
Saturn	E	2047-09-20T00:49:18.814		35.04	7.12x	59331.60		53.06	58.20
B (OER)	E	2047-09-20T00:23:33.845	b	33.79	12.58x	117571.16	1.41		
A (IER)	E	2047-09-20T01:00:14.063		35.37	4.80x	122050.38	2.64		
Encke (IEG)	E	2047-09-20T01:55:23.063		35.10	-6.91	133423.31	4.17		
Encke (OEG)	E	2047-09-20T01:56:39.843		35.06	-7.18	133744.89	4.20		
A (OER)	E	2047-09-20T02:08:17.698		34.58	-9.64	136774.40	4.48		
F ring	E	2047-09-20T02:21:35.192		33.87	-12.44	140461.00	4.77		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-09-19T23:56:48.940
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 4068922724902655744
 2Mass ID (if available) : 17493350-2233011
 ICRS Star Coord at Epoch: 17h 49m 33.48982s -22:33:01.52222s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 7.434
 G magnitude : 14.878
 RP magnitude : 13.191
 BP magnitude : 17.902
 DUPflag : 0
 Distance (au) : 9.973
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 8.94
 Sun-Target sep (deg) : 91.27
 Sun-Moon sep (deg) : 88.78
 B (ring opening deg) : 26.91
 PA of pole (deg) : 5.31
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.267
 C/A sky separation (km) : 52561.5
 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_itr93_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	2047-09-19T21:11:15.288		14.77	45.49x	140461.00	-4.84		
A (OER)	I	2047-09-19T21:24:21.527		16.97	43.11x	136774.40	-4.53		
Encke (OEG)	I	2047-09-19T21:35:51.045		18.83	40.96x	133744.89	-4.25		
Encke (IEG)	I	2047-09-19T21:37:07.001		19.04	40.72x	133423.31	-4.22		
A (IER)	I	2047-09-19T22:32:04.982		27.03	29.82x	122050.38	-2.62		
B (OER)	I	2047-09-19T23:09:39.897	b	31.40	22.00x	117571.16	-1.34		
Saturn	I	2047-09-19T23:02:50.865		30.68	23.43x	59379.68		51.08	56.35
Saturn	E	2047-09-20T00:50:38.795		36.93	0.37x	59331.09		53.08	58.22
B (OER)	E	2047-09-20T00:23:41.861	b	36.47	6.18x	117571.16	1.33		
A (IER)	E	2047-09-20T01:01:36.559		36.89	-1.99x	122050.38	2.59		
Encke (IEG)	E	2047-09-20T01:57:20.155		34.72	-13.93	133423.31	4.15		
Encke (OEG)	E	2047-09-20T01:58:37.363		34.63	-14.20	133744.89	4.18		
A (OER)	E	2047-09-20T02:10:18.617		33.77	-16.67	136774.40	4.46		
F ring	E	2047-09-20T02:23:39.027		32.62	-19.48	140461.00	4.75		

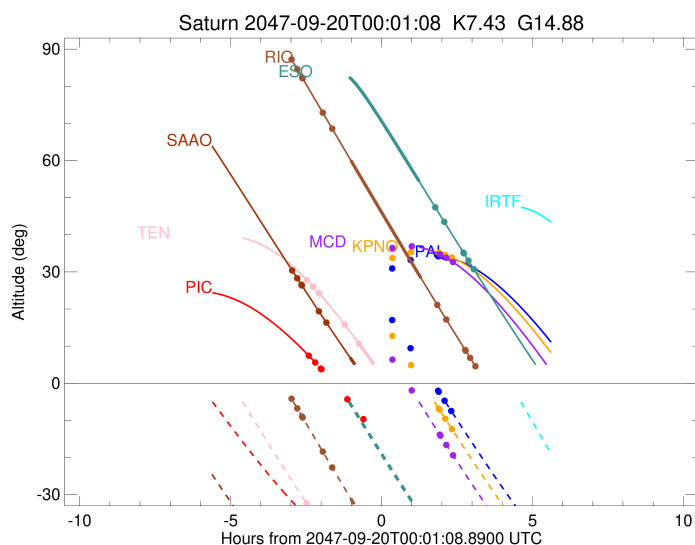
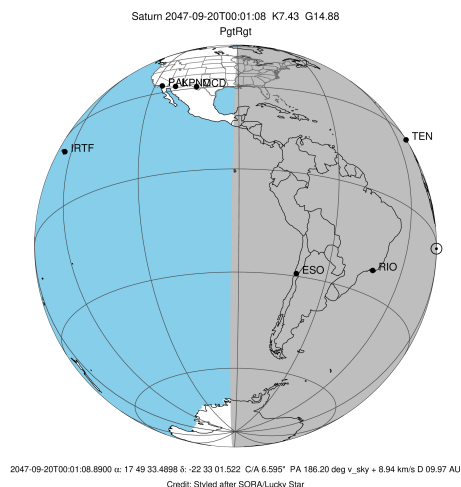
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-09-20T00:12:15.320
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 4068922724902655744
 2Mass ID (if available) : 17493350-2233011
 ICRS Star Coord at Epoch: 17h 49m 33.48982s -22:33:01.52222s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 7.434
 G magnitude : 14.878
 RP magnitude : 13.191
 BP magnitude : 17.902
 DUPflag : 0
 Distance (au) : 9.973
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 8.94
 Sun-Target sep (deg) : 91.27
 Sun-Moon sep (deg) : 88.27
 B (ring opening deg) : 26.91
 PA of pole (deg) : 5.31
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.119
 C/A sky separation (km) : 51496.5
 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	2047-09-19T21:32:32.543		27.85	-32.39	140461.00	-4.93		
A (OER)	I	2047-09-19T21:45:20.300		26.01	-34.99	136774.40	-4.67		
Encke (OEG)	I	2047-09-19T21:56:25.292		24.34	-37.21	133744.89	-4.44		
Encke (IEG)	I	2047-09-19T21:57:38.021		24.15	-37.45	133423.31	-4.41		
A (IER)	I	2047-09-19T22:47:49.064		15.83	-46.89	122050.38	-3.08		
B (OER)	I	2047-09-19T23:16:18.626	b	10.67	-51.61	117571.16	-2.14		
Saturn	I	2047-09-19T23:15:58.878		10.73	-51.56	59391.03		50.61	55.92
Saturn	E	2047-09-20T01:07:45.717		-11.44x	-60.62	59391.02		50.61	55.92
B (OER)	E	2047-09-20T01:07:50.594		-11.46x	-60.62	117571.16	2.21		
A (IER)	E	2047-09-20T01:35:13.127		-17.20x	-59.47	122050.38	3.23		
Encke (IEG)	E	2047-09-20T02:22:26.945		-27.30x	-54.59	133423.31	4.74		
Encke (OEG)	E	2047-09-20T02:23:34.521		-27.55x	-54.44	133744.89	4.77		
A (OER)	E	2047-09-20T02:33:50.602		-29.77x	-52.99	136774.40	5.06		
F ring	E	2047-09-20T02:45:37.974		-32.33x	-51.20	140461.00	5.36		

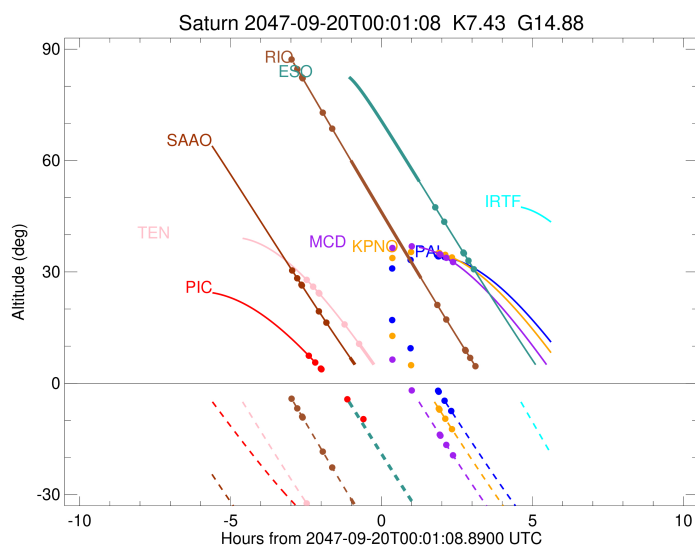
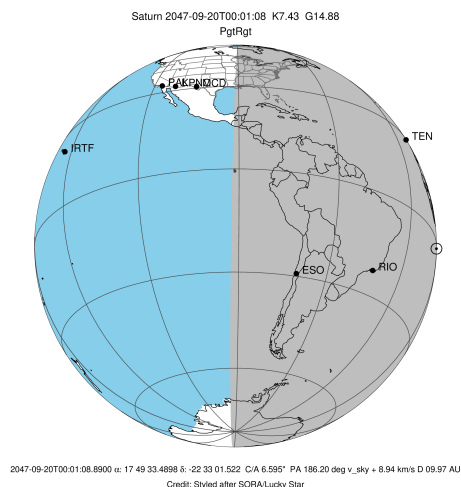
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-09-20T00:10:40.610
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 4068922724902655744
 2Mass ID (if available) : 17493350-2233011
 ICRS Star Coord at Epoch: 17h 49m 33.48982s -22:33:01.52222s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 7.434
 G magnitude : 14.878
 RP magnitude : 13.191
 BP magnitude : 17.902
 DUPflag : 0
 Distance (au) : 9.973
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 8.94
 Sun-Target sep (deg) : 91.27
 Sun-Moon sep (deg) : 88.94
 B (ring opening deg) : 26.91
 PA of pole (deg) : 5.31
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.544
 C/A sky separation (km) : 47331.4
 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	2047-09-19T21:02:30.704		87.20	-4.18x	140461.00	-5.53		
A (OER)	I	2047-09-19T21:13:49.310		84.59	-6.79	136774.40	-5.34		
Encke (OEG)	I	2047-09-19T21:23:26.190		82.37	-9.00	133744.89	-5.16		
Encke (IEG)	I	2047-09-19T21:24:28.576		82.13	-9.24	133423.31	-5.14		
A (IER)	I	2047-09-19T22:04:31.383		72.88	-18.44	122050.38	-4.28		
B (OER)	I	2047-09-19T22:22:58.568		68.62	-22.66	117571.16	-3.80		
Saturn	I	2047-09-19T23:00:26.718		59.99	-31.14	59535.65		44.83	50.39
Saturn	E	2047-09-20T01:19:51.652		28.29	-59.88	59524.23		45.28	50.83
B (OER)	E	2047-09-20T01:52:39.946		20.98	-64.77	117571.16	3.99		
A (IER)	E	2047-09-20T02:10:10.924		17.11	-66.68	122050.38	4.53		
Encke (IEG)	E	2047-09-20T02:47:45.859		8.91	-68.39	133423.31	5.52		
Encke (OEG)	E	2047-09-20T02:48:43.967		8.70	-68.39	133744.89	5.55		
A (OER)	E	2047-09-20T02:57:40.298		6.78	-68.22	136774.40	5.75		
F ring	E	2047-09-20T03:08:09.005		4.53x	-67.75	140461.00	5.98		

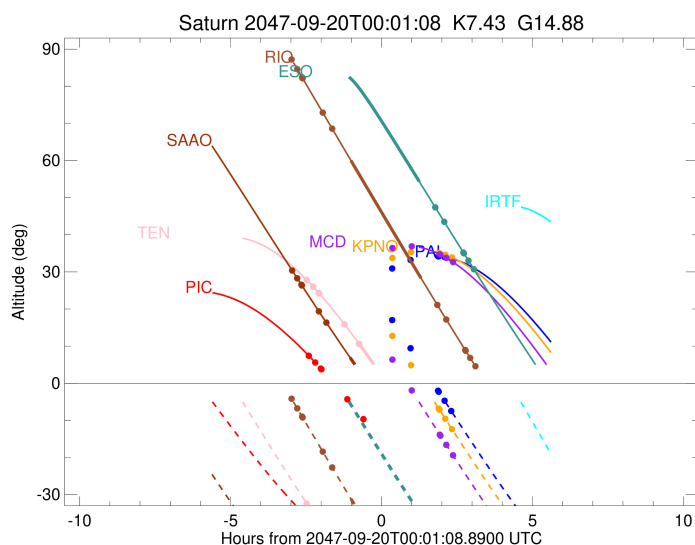
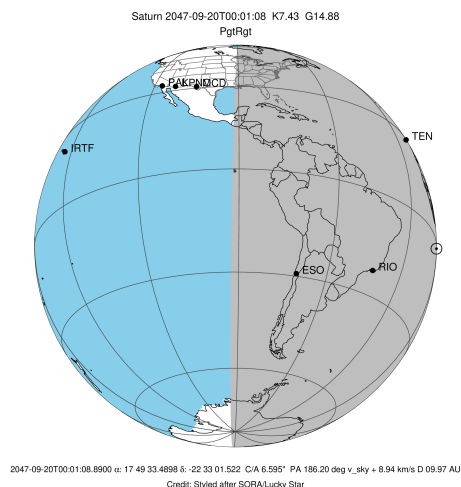
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-09-20T00:05:15.050
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4068922724902655744
 2Mass ID (if available) : 17493350-2233011
 ICRS Star Coord at Epoch: 17h 49m 33.48982s -22:33:01.52222s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 7.434
 G magnitude : 14.878
 RP magnitude : 13.191
 BP magnitude : 17.902
 DUPflag : 0
 Distance (au) : 9.973
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 8.94
 Sun-Target sep (deg) : 91.27
 Sun-Moon sep (deg) : 89.15
 B (ring opening deg) : 26.91
 PA of pole (deg) : 5.31
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.502
 C/A sky separation (km) : 47033.4
 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	2047-09-19T20:51:53.820		64.77	21.99x	140461.00	-5.64		
A (OER)	I	2047-09-19T21:02:58.692		67.16	19.64x	136774.40	-5.45		
Encke (OEG)	I	2047-09-19T21:12:24.116		69.18	17.63x	133744.89	-5.27		
Encke (IEG)	I	2047-09-19T21:13:25.272		69.40	17.41x	133423.31	-5.25		
A (IER)	I	2047-09-19T21:52:39.866		77.45	8.95x	122050.38	-4.38		
B (OER)	I	2047-09-19T22:10:41.567		80.68	5.03x	117571.16	-3.90		
Saturn	I	2047-09-19T22:53:35.670		82.80	-4.33x	59556.12		44.02	49.60
Saturn	E	2047-09-20T01:16:14.642		54.36	-34.82	59523.84		45.30	50.85
B (OER)	E	2047-09-20T01:48:32.348		47.28	-41.26	117571.16	3.99		
A (IER)	E	2047-09-20T02:06:08.158		43.44	-44.61	122050.38	4.49		
Encke (IEG)	E	2047-09-20T02:44:14.151		35.15	-51.34	133423.31	5.42		
Encke (OEG)	E	2047-09-20T02:45:13.316		34.93	-51.50	133744.89	5.45		
A (OER)	E	2047-09-20T02:54:19.860		32.96	-52.96	136774.40	5.64		
F ring	E	2047-09-20T03:05:01.470		30.66	-54.57	140461.00	5.85		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-09-20T00:12:23.870
 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 : 4068922724902655744
 2Mass ID (if available) : 17493350-2233011
 ICRS Star Coord at Epoch: 17h 49m 33.48982s -22:33:01.52222s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 7.434
 G magnitude : 14.878
 RP magnitude : 13.191
 BP magnitude : 17.902
 DUPflag : 0
 Distance (au) : 9.973
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 8.94
 Sun-Target sep (deg) : 91.27
 Sun-Moon sep (deg) : 88.14
 B (ring opening deg) : 26.91
 PA of pole (deg) : 5.31
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.114
 C/A sky separation (km) : 44224.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-09-19T21:03:41.137		30.36	-52.92	140461.00	-6.22		
A (OER)	I	2047-09-19T21:13:40.868		28.27	-54.16	136774.40	-6.07		
Encke (OEG)	I	2047-09-19T21:22:05.211		26.52	-55.11	133744.89	-5.94		
Encke (IEG)	I	2047-09-19T21:22:59.427		26.33	-55.21	133423.31	-5.92		
A (IER)	I	2047-09-19T21:56:47.324		19.35	-58.04	122050.38	-5.26		
B (OER)	I	2047-09-19T22:11:28.887		16.35	-58.71	117571.16	-4.90		
Saturn	I	2047-09-19T22:58:31.652		6.95	-58.30	59620.55		41.46	47.08
Saturn	E	2047-09-20T01:25:05.473		-19.10x	-38.50	59621.81		41.41	47.03
B (OER)	E	2047-09-20T02:10:35.663		-25.46x	-29.67	117571.16	5.19		
A (IER)	E	2047-09-20T02:24:24.172		-27.15x	-26.90	122050.38	5.61		
Encke (IEG)	E	2047-09-20T02:55:50.232		-30.48x	-20.45	133423.31	6.41		
Encke (OEG)	E	2047-09-20T02:56:40.293		-30.56x	-20.28	133744.89	6.43		
A (OER)	E	2047-09-20T03:04:25.115		-31.25x	-18.67	136774.40	6.60		
F ring	E	2047-09-20T03:13:35.844		-32.01x	-16.76	140461.00	6.79		