

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-25T11:58:21.750
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4090521806211224192
 2Mass ID (if available) : 18163275-2217153

Saturn 2047-04-25T11:58:21 K9.83 G14.18 PgtRgt

ICRS Star Coord at Epoch: 18h 16m 32.75592s -22:17:15.48557s

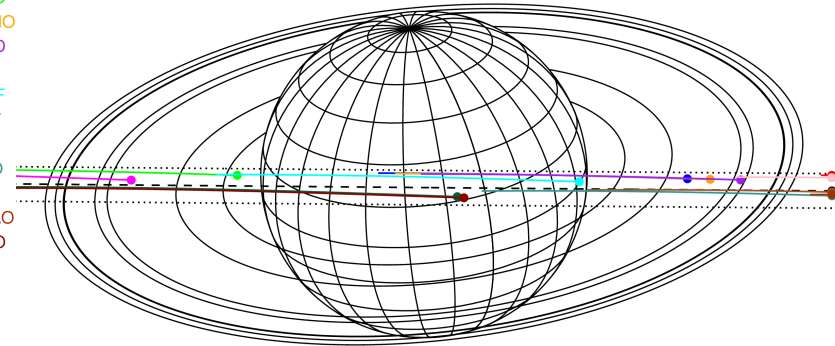
RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.828
 G magnitude : 14.178
 RP magnitude : 13.032
 BP magnitude : 15.562
 DUPflag : 0
 Distance (au) : 9.494
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.64
 Sun-Target sep (deg) : 120.73
 Sun-Moon sep (deg) : 123.81
 B (ring opening deg) : 26.04
 PA of pole (deg) : 5.82

#	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



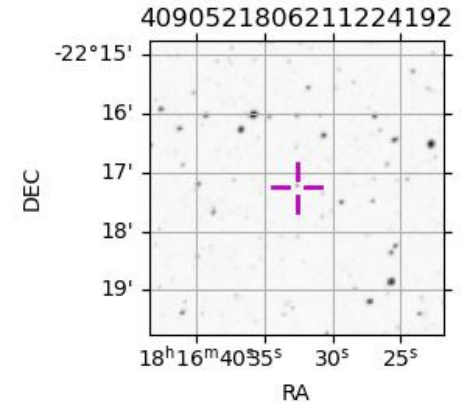
2047-04-25T11:58:21.7500 α: 18 16 32.7559 δ: -22 17 15.486 C/A 0.701° PA 359.51 deg v_sky - 5.64 km/s D 09.49 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PAL
 PMO
 KPNO
 MCD
 TEN
 IRTF
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO

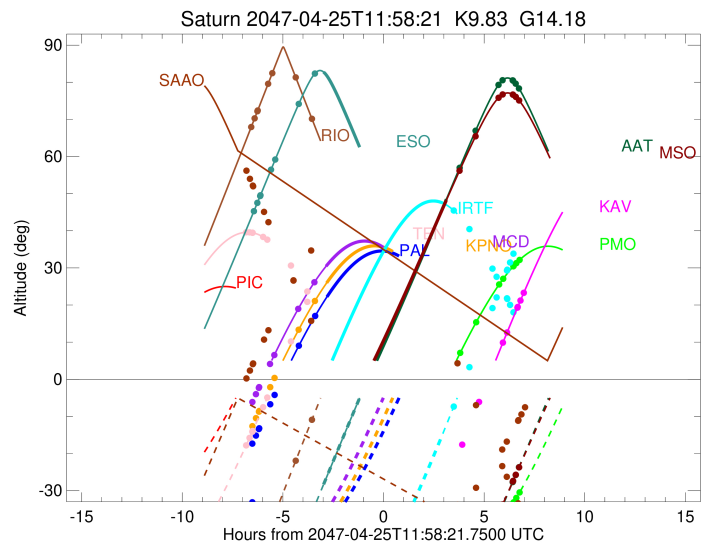
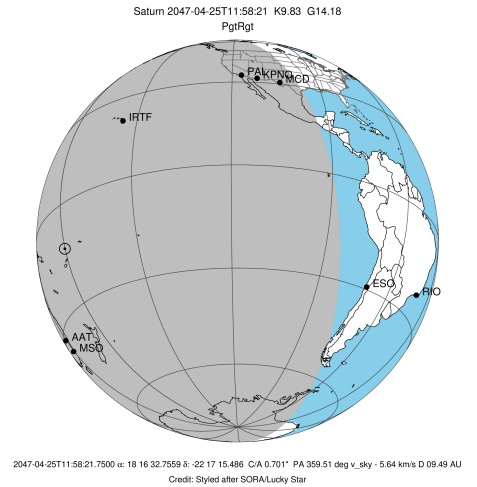


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEncode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1	++	+		APR 25 07:46 - APR 25 09:09	PinRin
PMO	Purple Mtn Obs	32.1	118.8			+++++	APR 25 15:46 - APR 25 18:43	PnnRne
KPNO	Kitt Peak Natl	32.0	248.4	++	+		APR 25 07:45 - APR 25 09:08	PinRin
MCD	McDonald Obs.	30.7	256.0	+++	+		APR 25 06:32 - APR 25 09:07	PinRin
TEN	Teide Obs./Ten	28.3	343.5	+++++			APR 25 05:09 - APR 25 05:59	PnnRin
IRTF	Mauna Kea/IRTF	19.8	204.5		+	+	APR 25 14:53 - APR 25 15:27	PneRne
KAV	Kavalur Observ	12.6	78.8			+++++	APR 25 17:54 - APR 25 18:56	PnnRne
RIO	Rio de Janeiro	-22.9	316.8	+++++			APR 25 05:24 - APR 25 08:25	PnnRin
ESO	European South	-29.3	289.3	+++++	+		APR 25 05:32 - APR 25 08:59	PinRin
AAT	Siding Spring	-31.3	149.1		+	+++++	APR 25 15:06 - APR 25 18:42	PneRne
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0		+	+++++	APR 25 15:05 - APR 25 18:42	PneRne



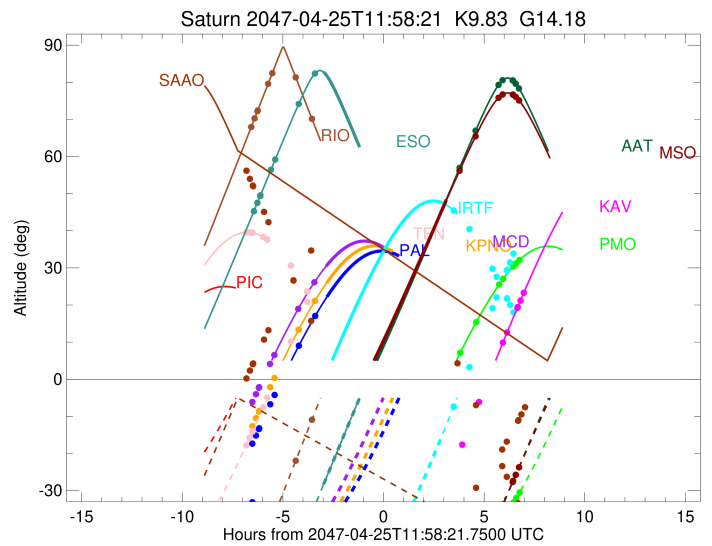
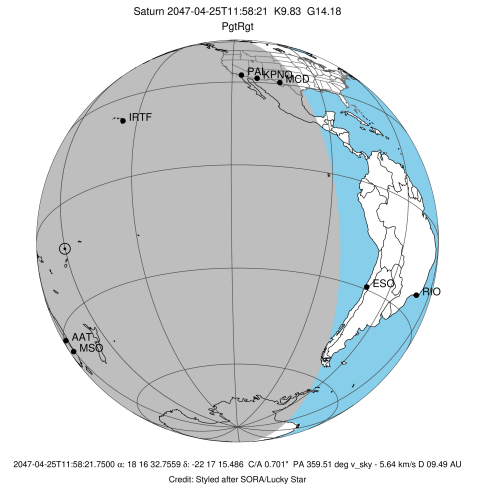
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-25T11:57:49.410
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4090521806211224192
 2Mass ID (if available) : 18163275-2217153
 ICRS Star Coord at Epoch: 18h 16m 32.75592s -22:17:15.48557s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.828
 G magnitude : 14.178
 RP magnitude : 13.032
 BP magnitude : 15.562
 DUPflag : 0
 Distance (au) : 9.494
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.64
 Sun-Target sep (deg) : 120.73
 Sun-Moon sep (deg) : 124.29
 B (ring opening deg) : 26.04
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.060
 C/A sky separation (km) : 416.6
 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	2047-04-25T05:27:23.131		-17.31x	-33.15	140461.00	-5.69		
A (OER)	I	2047-04-25T05:38:10.164		-15.13x	-34.60	136774.40	-5.71		
Encke (OEG)	I	2047-04-25T05:47:00.000		-13.37x	-35.72	133744.89	-5.73		
Encke (IEG)	I	2047-04-25T05:47:56.143		-13.18x	-35.84	133423.31	-5.73		
A (IER)	I	2047-04-25T06:20:49.927		-6.71x	-39.44	122050.38	-5.79		
B (OER)	I	2047-04-25T06:33:41.207		-4.22x	-40.58	117571.16	-5.82		
B (IER)	I	2047-04-25T07:46:07.180		9.06	-43.62	91984.69	-5.95		
C (IER)	I	2047-04-25T08:34:47.988		17.08	-42.13	74490.58	-6.03		
Saturn	I	2047-04-25T09:09:43.930		22.19	-39.42	60254.52		-5.66	-6.94
Saturn	E	2047-04-25T14:44:40.838		21.02	19.54x	60255.27		5.50	6.74
C (IER)	E	2047-04-25T15:19:48.237		15.73	26.89x	74490.58	6.04		
B (IER)	E	2047-04-25T16:08:20.104		7.59	37.01x	91984.69	5.98		
B (OER)	E	2047-04-25T17:20:16.700		-5.75x	51.53x	117571.16	5.88		
A (IER)	E	2047-04-25T17:33:00.033		-8.22x	53.96x	122050.38	5.86		
Encke (IEG)	E	2047-04-25T18:05:28.776		-14.65x	59.84x	133423.31	5.81		
Encke (OEG)	E	2047-04-25T18:06:24.099		-14.84x	60.00x	133744.89	5.81		
A (OER)	E	2047-04-25T18:15:05.891		-16.59x	61.45x	136774.40	5.80		
F ring	E	2047-04-25T18:25:42.308		-18.73x	63.13x	140461.00	5.79		

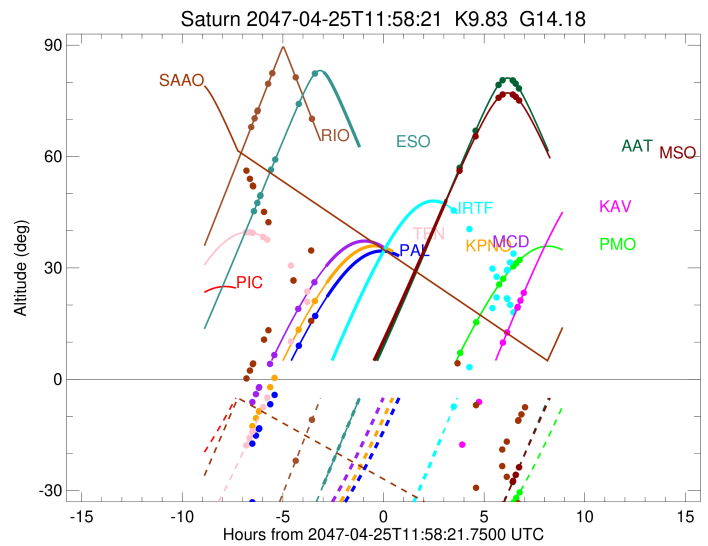
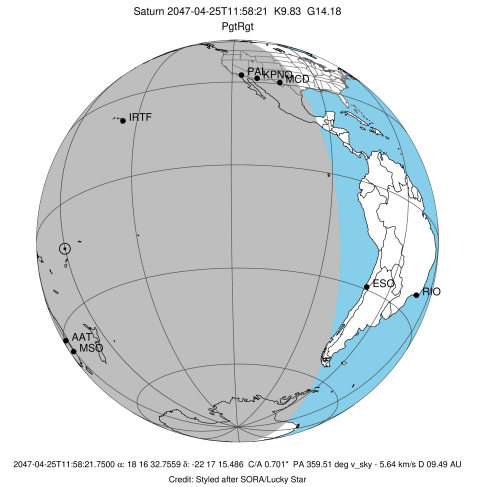
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-25T12:12:22.720
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 4090521806211224192
 2Mass ID (if available) : 18163275-2217153
 ICRS Star Coord at Epoch: 18h 16m 32.75592s -22:17:15.48557s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.828
 G magnitude : 14.178
 RP magnitude : 13.032
 BP magnitude : 15.562
 DUPflag : 0
 Distance (au) : 9.494
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.64
 Sun-Target sep (deg) : 120.73
 Sun-Moon sep (deg) : 123.01
 B (ring opening deg) : 26.04
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.386
 C/A sky separation (km) : 2660.4
 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	2047-04-25T05:01:34.060	-47.00x	66.91x	140461.00	-5.31			
A (OER)	I	2047-04-25T05:13:09.002	-49.46x	65.27x	136774.40	-5.30			
Encke (OEG)	I	2047-04-25T05:22:40.953	-51.49x	63.79x	133744.89	-5.29			
Encke (IEG)	I	2047-04-25T05:23:41.708	-51.71x	63.63x	133423.31	-5.29			
A (IER)	I	2047-04-25T05:59:34.974	-59.29x	57.34x	122050.38	-5.27			
B (OER)	I	2047-04-25T06:13:45.015	-62.24x	54.64x	117571.16	-5.27			
B (IER)	I	2047-04-25T07:34:48.015	-77.46x	38.14x	91984.69	-5.26			
C (IER)	I	2047-04-25T08:30:04.051	-79.47x	26.46x	74490.58	-5.29			
Saturn	I	2047-04-25T09:03:32.003	-74.84x	19.36x	60235.65			-8.79	-10.75
Saturn	E	2047-04-25T15:10:37.656	0.35x	-43.12	60258.67			4.70	5.77
C (IER)	E	2047-04-25T15:46:55.272	7.09	-44.64	74490.58	6.07			
B (IER)	E	2047-04-25T16:34:35.601	15.35	-44.14	91984.69	6.16			
B (OER)	E	2047-04-25T17:43:16.445	25.55	-38.74	117571.16	6.25			
A (IER)	E	2047-04-25T17:55:11.878	27.05	-37.33	122050.38	6.27			
Encke (IEG)	E	2047-04-25T18:25:22.264	30.41	-33.29	133423.31	6.30			
Encke (OEG)	E	2047-04-25T18:26:13.341	30.50	-33.17	133744.89	6.30			
A (OER)	E	2047-04-25T18:34:14.256	31.27	-31.99	136774.40	6.30			
F ring	E	2047-04-25T18:43:58.864	32.13	-30.50	140461.00	6.31			

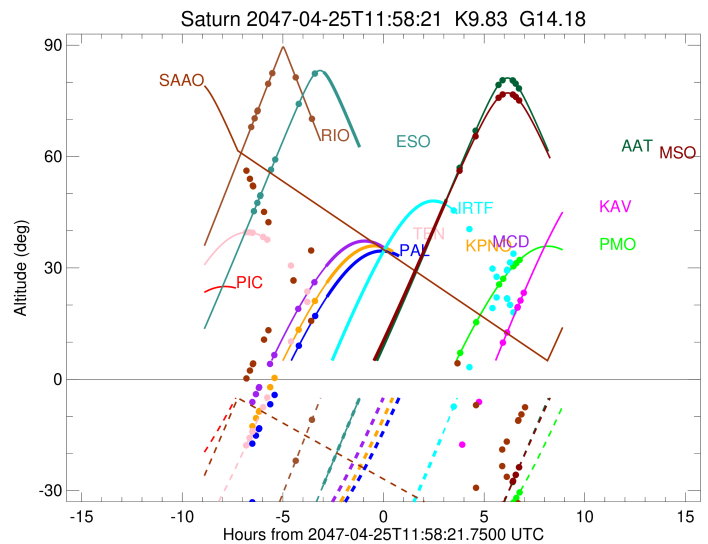
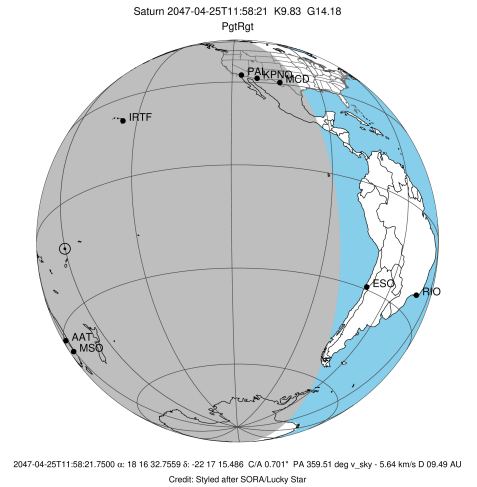
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-25T11:56:27.150
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 4090521806211224192
 2Mass ID (if available) : 18163275-2217153
 ICRS Star Coord at Epoch: 18h 16m 32.75592s -22:17:15.48557s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.828
 G magnitude : 14.178
 RP magnitude : 13.032
 BP magnitude : 15.562
 DUPflag : 0
 Distance (au) : 9.494
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.64
 Sun-Target sep (deg) : 120.73
 Sun-Moon sep (deg) : 124.34
 B (ring opening deg) : 26.04
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.046
 C/A sky separation (km) : 313.7
 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	2047-04-25T05:27:38.322	-12.60x	-37.05	140461.00	-5.72			
A (OER)	I	2047-04-25T05:38:21.057	-10.45x	-38.36	136774.40	-5.75			
Encke (OEG)	I	2047-04-25T05:47:07.400	-8.69x	-39.36	133744.89	-5.76			
Encke (IEG)	I	2047-04-25T05:48:03.174	-8.51x	-39.46	133423.31	-5.77			
A (IER)	I	2047-04-25T06:20:44.239	-2.10x	-42.51	122050.38	-5.83			
B (OER)	I	2047-04-25T06:33:30.704	0.35x	-43.40	117571.16	-5.86			
B (IER)	I	2047-04-25T07:45:31.824	13.37	-44.72	91984.69	-5.98			
C (IER)	I	2047-04-25T08:33:58.695	21.11	-42.00	74490.58	-6.05			
Saturn	I	2047-04-25T09:08:47.113	25.94	-38.50	60254.57		-5.65	-6.93	
Saturn	E	2047-04-25T14:43:33.336	19.06	23.68x	60256.16		5.30	6.50	
C (IER)	E	2047-04-25T15:19:06.026	13.27	31.23x	74490.58	6.01			
B (IER)	E	2047-04-25T16:07:52.714	4.60x	41.52x	91984.69	5.94			
B (OER)	E	2047-04-25T17:20:14.759	-9.35x	56.14x	117571.16	5.84			
A (IER)	E	2047-04-25T17:33:02.884	-11.92x	58.55x	122050.38	5.82			
Encke (IEG)	E	2047-04-25T18:05:44.066	-18.58x	64.23x	133423.31	5.78			
Encke (OEG)	E	2047-04-25T18:06:39.745	-18.77x	64.38x	133744.89	5.77			
A (OER)	E	2047-04-25T18:15:24.895	-20.58x	65.73x	136774.40	5.76			
F ring	E	2047-04-25T18:26:05.408	-22.79x	67.24x	140461.00	5.75			

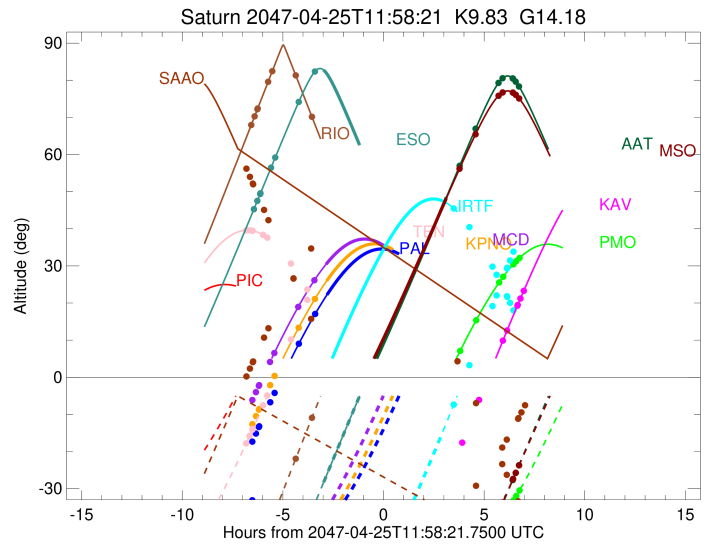
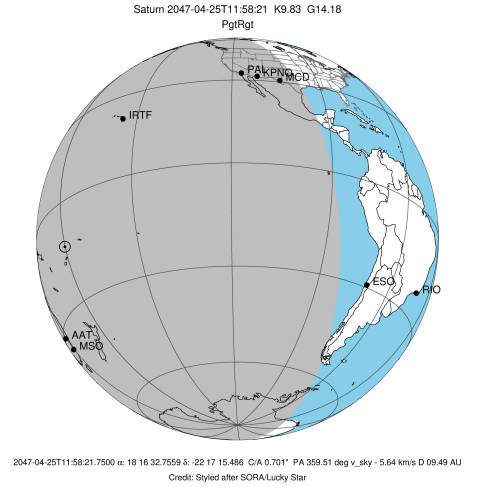
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-25T11:54:27.560
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 4090521806211224192
 2Mass ID (if available) : 18163275-2217153
 ICRS Star Coord at Epoch: 18h 16m 32.75592s -22:17:15.48557s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.828
 G magnitude : 14.178
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 BP magnitude : 15.562
 DUPflag : 0
 Distance (au) : 9.494
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.64
 Sun-Target sep (deg) : 120.73
 Sun-Moon sep (deg) : 124.40
 B (ring opening deg) : 26.04
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.025
 C/A sky separation (km) : 173.4
 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_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	2047-04-25T05:27:31.628	-6.10x	-41.62	140461.00	-5.78			
A (OER)	I	2047-04-25T05:38:08.442	-3.99x	-42.66	136774.40	-5.80			
Encke (OEG)	I	2047-04-25T05:46:50.006	-2.27x	-43.43	133744.89	-5.82			
Encke (IEG)	I	2047-04-25T05:47:45.278	-2.09x	-43.50	133423.31	-5.82			
A (IER)	I	2047-04-25T06:20:09.218	4.15x	-45.56	122050.38	-5.88			
B (OER)	I	2047-04-25T06:32:49.309	6.53	-46.01	117571.16	-5.90			
B (IER)	I	2047-04-25T07:44:18.657	18.99	-44.65	91984.69	-6.02			
C (IER)	I	2047-04-25T08:32:28.815	26.15	-40.28	74490.58	-6.08			
Saturn	I	2047-04-25T09:07:10.859		30.45	-35.80	60254.73		-5.61	-6.88
Saturn	E	2047-04-25T14:42:08.559		15.20	29.87x	60257.30		5.04	6.18
C (IER)	E	2047-04-25T15:18:17.670		8.82	37.64x	74490.58	5.96		
B (IER)	E	2047-04-25T16:07:28.357		-0.46x	48.05x	91984.69	5.89		
B (OER)	E	2047-04-25T17:20:29.600		-15.13x	62.46x	117571.16	5.79		
A (IER)	E	2047-04-25T17:33:24.874		-17.80x	64.72x	122050.38	5.77		
Encke (IEG)	E	2047-04-25T18:06:24.287		-24.72x	69.64x	133423.31	5.72		
Encke (OEG)	E	2047-04-25T18:07:20.481		-24.91x	69.76x	133744.89	5.72		
A (OER)	E	2047-04-25T18:16:10.466		-26.78x	70.76x	136774.40	5.71		
F ring	E	2047-04-25T18:26:56.831		-29.07x	71.75x	140461.00	5.70		

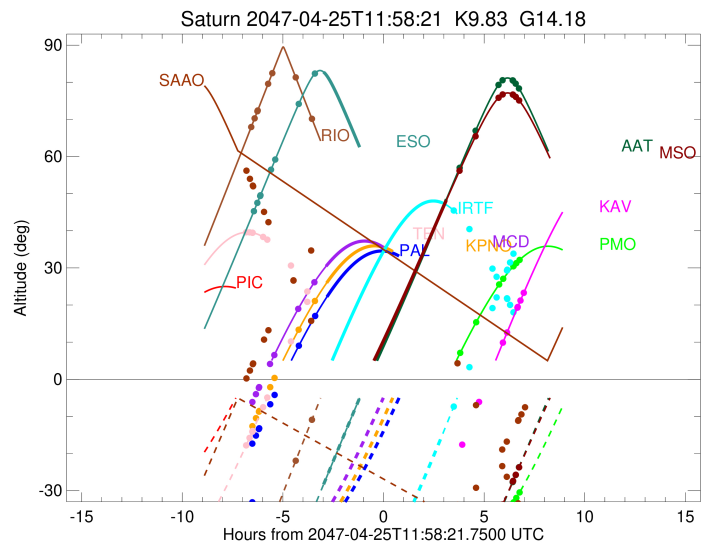
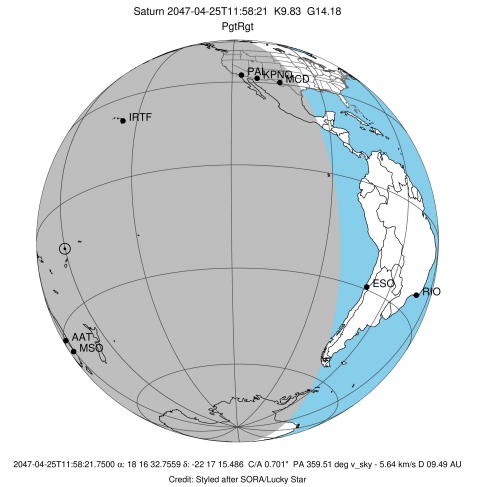
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-25T11:41:35.580
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 4090521806211224192
 2Mass ID (if available) : 18163275-2217153
 ICRS Star Coord at Epoch: 18h 16m 32.75592s -22:17:15.48557s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.828
 G magnitude : 14.178
 RP magnitude : 13.032
 BP magnitude : 15.562
 DUPflag : 0
 Distance (au) : 9.495
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.64
 Sun-Target sep (deg) : 120.73
 Sun-Moon sep (deg) : 124.01
 B (ring opening deg) : 26.04
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.349
 C/A sky separation (km) : 2403.9
 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_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	2047-04-25T05:08:59.889		39.59	-17.78	140461.00	-6.07		
A (OER)	I	2047-04-25T05:19:07.064		39.58	-15.77	136774.40	-6.07		
Encke (OEG)	I	2047-04-25T05:27:26.052		39.47	-14.09	133744.89	-6.07		
Encke (IEG)	I	2047-04-25T05:28:19.022		39.46	-13.92	133423.31	-6.07		
A (IER)	I	2047-04-25T05:59:33.394		38.34	-7.50	122050.38	-6.06		
B (OER)	I	2047-04-25T06:11:52.464		37.60	-4.92x	117571.16	-6.06		
B (IER)	I	2047-04-25T07:22:32.045		30.61	10.21x	91984.69	-6.01		
C (IER)	I	2047-04-25T08:11:17.910		23.62	20.89x	74490.58	-5.95		
Saturn	I	2047-04-25T08:45:53.358		17.90	28.51x	60251.04		-6.35	-7.78
Saturn	E	2047-04-25T14:45:23.223		-56.65x	62.11x	60265.58		2.39	2.94
C (IER)	E	2047-04-25T15:28:08.778		-66.07x	53.34x	74490.58	5.42		
B (IER)	E	2047-04-25T16:21:58.802		-77.51x	41.73x	91984.69	5.42		
B (OER)	E	2047-04-25T17:40:24.828		-81.06x	24.47x	117571.16	5.46		
A (IER)	E	2047-04-25T17:54:03.842		-78.55x	21.47x	122050.38	5.48		
Encke (IEG)	E	2047-04-25T18:28:33.970		-71.41x	13.91x	133423.31	5.51		
Encke (OEG)	E	2047-04-25T18:29:32.286		-71.20x	13.69x	133744.89	5.51		
A (OER)	E	2047-04-25T18:38:41.039		-69.23x	11.70x	136774.40	5.53		
F ring	E	2047-04-25T18:49:47.205		-66.81x	9.29x	140461.00	5.54		

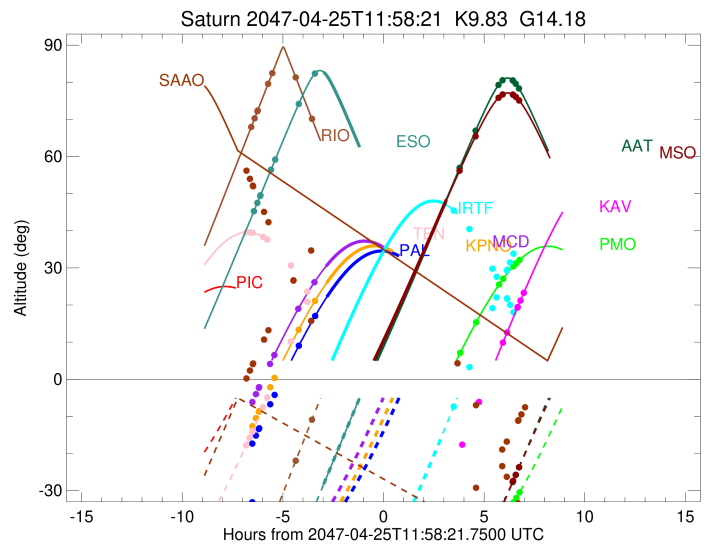
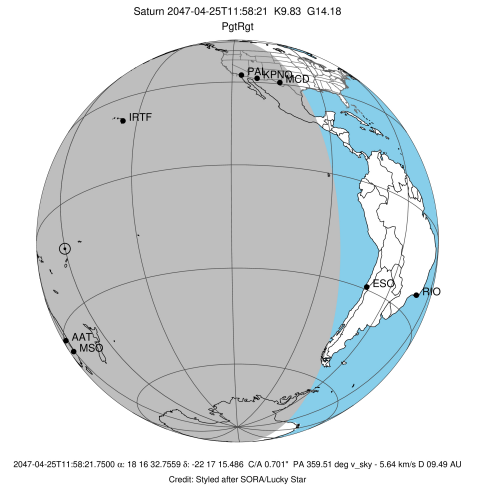
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-25T12:08:21.740
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 4090521806211224192
 2Mass ID (if available) : 18163275-2217153
 ICRS Star Coord at Epoch: 18h 16m 32.75592s -22:17:15.48557s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.828
 G magnitude : 14.178
 RP magnitude : 13.032
 BP magnitude : 15.562
 DUPflag : 0
 Distance (au) : 9.494
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.64
 Sun-Target sep (deg) : 120.73
 Sun-Moon sep (deg) : 123.99
 B (ring opening deg) : 26.04
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.134
 C/A sky separation (km) : 924.7
 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_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	2047-04-25T05:28:36.193		-48.04x	-11.20	140461.00	-5.40		
A (OER)	I	2047-04-25T05:39:57.082		-45.42x	-13.72	136774.40	-5.43		
Encke (OEG)	I	2047-04-25T05:49:14.440		-43.28x	-15.77	133744.89	-5.45		
Encke (IEG)	I	2047-04-25T05:50:13.487		-43.05x	-15.99	133423.31	-5.45		
A (IER)	I	2047-04-25T06:24:47.311		-35.11x	-23.49	122050.38	-5.52		
B (OER)	I	2047-04-25T06:38:16.345		-32.02x	-26.35	117571.16	-5.55		
B (IER)	I	2047-04-25T07:53:54.945		-14.91x	-41.30	91984.69	-5.72		
C (IER)	I	2047-04-25T08:44:20.971		-3.76x	-49.56	74490.58	-5.84		
Saturn	I	2047-04-25T09:17:03.422		3.31x	-53.63	60243.89		-7.58	-9.28
Saturn	E	2047-04-25T14:53:19.947		47.54	-15.06	60256.85		5.14	6.31
C (IER)	E	2047-04-25T15:27:45.563		45.47	-7.38	74490.58	6.26		
B (IER)	E	2047-04-25T16:14:27.532		40.46	3.24x	91984.69	6.23		
B (OER)	E	2047-04-25T17:23:18.754		29.79	19.18x	117571.16	6.16		
A (IER)	E	2047-04-25T17:35:27.398		27.63	22.02x	122050.38	6.14		
Encke (IEG)	E	2047-04-25T18:06:26.163		21.83	29.28x	133423.31	6.10		
Encke (OEG)	E	2047-04-25T18:07:18.913		21.66	29.48x	133744.89	6.10		
A (OER)	E	2047-04-25T18:15:36.403		20.05	31.43x	136774.40	6.08		
F ring	E	2047-04-25T18:25:43.148		18.06	33.81x	140461.00	6.07		

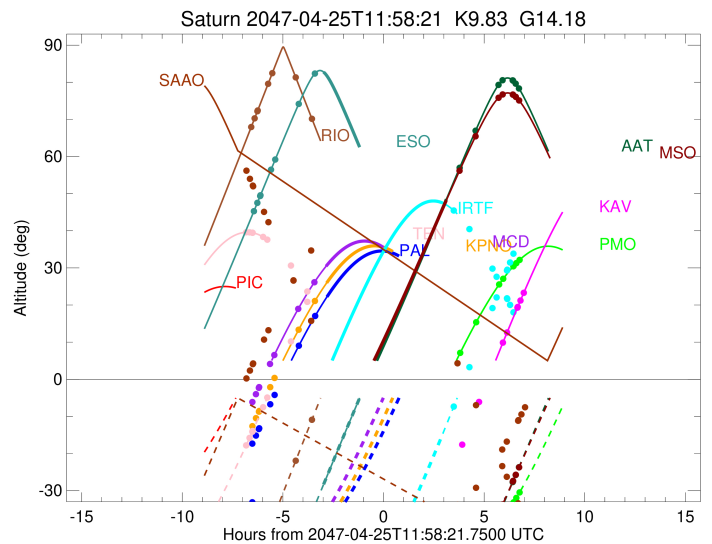
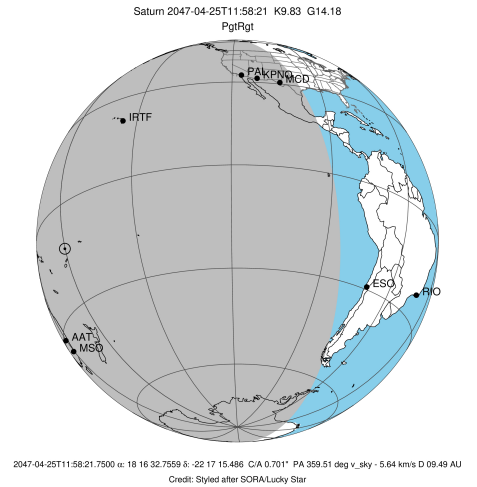
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-25T12:04:27.110
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 4090521806211224192
 2Mass ID (if available) : 18163275-2217153
 ICRS Star Coord at Epoch: 18h 16m 32.75592s -22:17:15.48557s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.828
 G magnitude : 14.178
 RP magnitude : 13.032
 BP magnitude : 15.562
 DUPflag : 0
 Distance (au) : 9.494
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.64
 Sun-Target sep (deg) : 120.73
 Sun-Moon sep (deg) : 122.94
 B (ring opening deg) : 26.04
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.837
 C/A sky separation (km) : 5764.2
 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	2047-04-25T04:55:41.882	-5.67x	63.94x	140461.00	-5.53			
A (OER)	I	2047-04-25T05:06:49.923	-8.21x	66.65x	136774.40	-5.51			
Encke (OEG)	I	2047-04-25T05:16:00.822	-10.31x	68.89x	133744.89	-5.49			
Encke (IEG)	I	2047-04-25T05:16:59.401	-10.54x	69.12x	133423.31	-5.49			
A (IER)	I	2047-04-25T05:51:43.790	-18.52x	77.58x	122050.38	-5.42			
B (OER)	I	2047-04-25T06:05:31.473	-21.70x	80.94x	117571.16	-5.40			
B (IER)	I	2047-04-25T07:25:30.462	-40.24x	79.52x	91984.69	-5.27			
C (IER)	I	2047-04-25T08:21:17.280	-53.12x	65.94x	74490.58	-5.19			
Saturn	I	2047-04-25T08:51:09.485	-59.91x	58.67x	60222.40			-10.45	-12.76
Saturn	E	2047-04-25T15:11:37.970	-27.18x	-31.71	60266.57			1.84	2.26
C (IER)	E	2047-04-25T15:52:55.325	-17.64x	-40.67	74490.58	5.73			
B (IER)	E	2047-04-25T16:43:07.506	-6.13x	-50.73	91984.69	5.88			
B (OER)	E	2047-04-25T17:54:26.348	9.88	-61.55	117571.16	6.07			
A (IER)	E	2047-04-25T18:06:42.279	12.58	-62.68	122050.38	6.10			
Encke (IEG)	E	2047-04-25T18:37:35.645	19.26	-64.13	133423.31	6.17			
Encke (OEG)	E	2047-04-25T18:38:27.751	19.45	-64.14	133744.89	6.17			
A (OER)	E	2047-04-25T18:46:37.874	21.18	-64.13	136774.40	6.19			
F ring	E	2047-04-25T18:56:32.496	23.27	-63.92	140461.00	6.21			

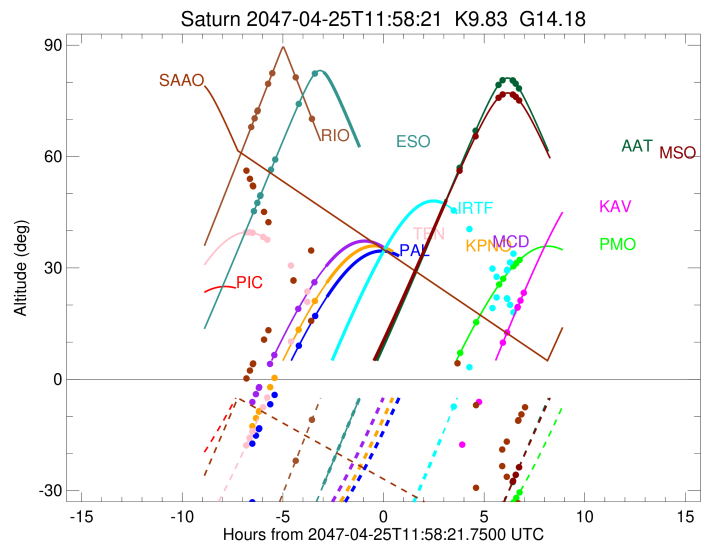
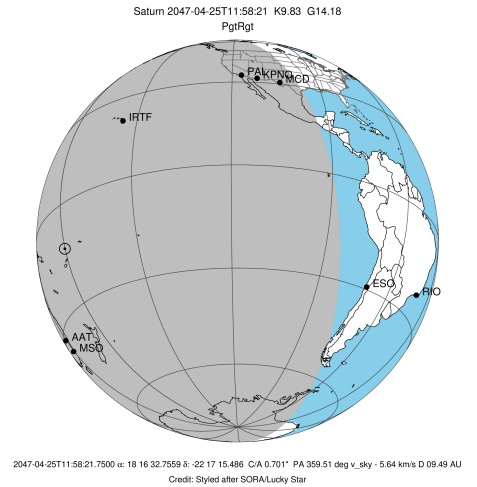
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-25T11:41:30.580
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 4090521806211224192
 2Mass ID (if available) : 18163275-2217153
 ICRS Star Coord at Epoch: 18h 16m 32.75592s -22:17:15.48557s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.828
 G magnitude : 14.178
 RP magnitude : 13.032
 BP magnitude : 15.562
 DUPflag : 0
 Distance (au) : 9.495
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.64
 Sun-Target sep (deg) : 120.73
 Sun-Moon sep (deg) : 124.51
 B (ring opening deg) : 26.04
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.938
 C/A sky separation (km) : 6455.9
 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_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	2047-04-25T05:24:09.071		67.99	-52.42	140461.00	-6.08		
A (OER)	I	2047-04-25T05:34:15.310		70.32	-50.11	136774.40	-6.08		
Encke (OEG)	I	2047-04-25T05:42:33.102		72.23	-48.21	133744.89	-6.09		
Encke (IEG)	I	2047-04-25T05:43:25.923		72.44	-48.01	133423.31	-6.09		
A (IER)	I	2047-04-25T06:14:32.433		79.63	-40.86	122050.38	-6.10		
B (OER)	I	2047-04-25T06:26:47.118		82.46	-38.03	117571.16	-6.10		
B (IER)	I	2047-04-25T07:36:51.339		81.29	-21.91	91984.69	-6.06		
C (IER)	I	2047-04-25T08:25:10.015		70.12	-10.88	74490.58	-6.00		
Saturn	I	2047-04-25T08:51:58.005		63.94	-4.82x	60225.68		-10.06	-12.29
Saturn	E	2047-04-25T14:38:29.627		-12.46x	53.82x	60267.26		-1.32	-1.62
C (IER)	E	2047-04-25T15:21:52.398		-20.79x	53.14x	74490.58	5.42		
B (IER)	E	2047-04-25T16:15:45.767		-30.16x	48.35x	91984.69	5.40		
B (OER)	E	2047-04-25T17:34:50.471		-40.68x	35.99x	117571.16	5.39		
A (IER)	E	2047-04-25T17:48:41.643		-41.96x	33.42x	122050.38	5.39		
Encke (IEG)	E	2047-04-25T18:23:50.135		-44.24x	26.56x	133423.31	5.40		
Encke (OEG)	E	2047-04-25T18:24:49.689		-44.28x	26.36x	133744.89	5.40		
A (OER)	E	2047-04-25T18:34:10.507		-44.62x	24.47x	136774.40	5.40		
F ring	E	2047-04-25T18:45:32.315		-44.88x	22.13x	140461.00	5.41		

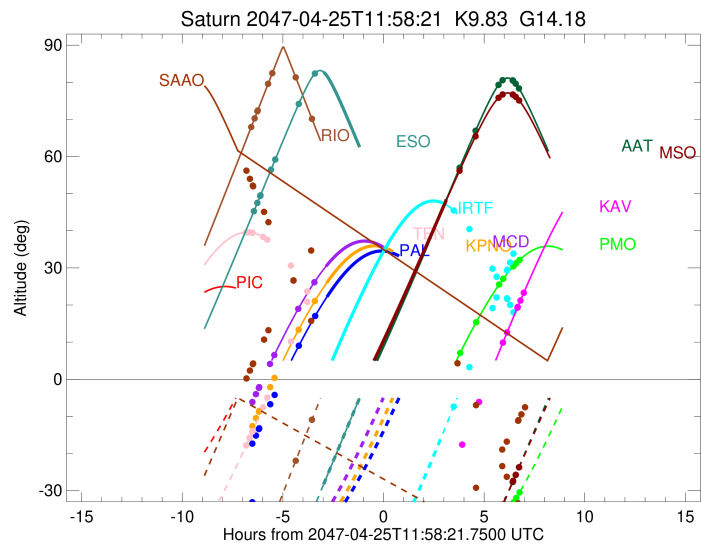
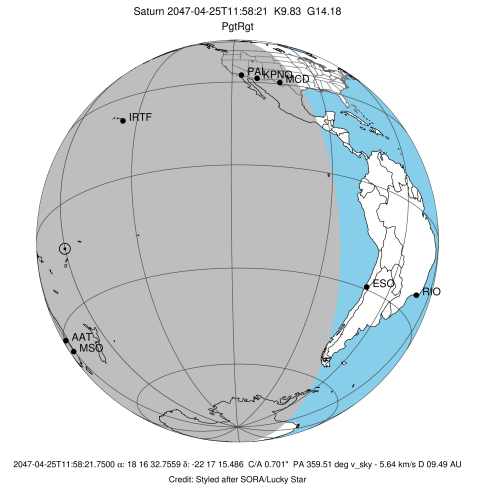
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-25T11:46:31.830
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4090521806211224192
 2Mass ID (if available) : 18163275-2217153
 ICRS Star Coord at Epoch: 18h 16m 32.75592s -22:17:15.48557s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.828
 G magnitude : 14.178
 RP magnitude : 13.032
 BP magnitude : 15.562
 DUPflag : 0
 Distance (au) : 9.495
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.64
 Sun-Target sep (deg) : 120.73
 Sun-Moon sep (deg) : 124.65
 B (ring opening deg) : 26.04
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.907
 C/A sky separation (km) : 6248.1
 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_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	2047-04-25T05:32:06.771		45.31	-70.13	140461.00	-5.98		
A (OER)	I	2047-04-25T05:42:22.745		47.56	-68.62	136774.40	-5.99		
Encke (OEG)	I	2047-04-25T05:50:47.943		49.40	-67.27	133744.89	-6.00		
Encke (IEG)	I	2047-04-25T05:51:41.519		49.60	-67.12	133423.31	-6.00		
A (IER)	I	2047-04-25T06:23:10.764		56.49	-61.44	122050.38	-6.04		
B (OER)	I	2047-04-25T06:35:32.273		59.19	-59.03	117571.16	-6.05		
B (IER)	I	2047-04-25T07:45:51.807		74.20	-44.37	91984.69	-6.07		
C (IER)	I	2047-04-25T08:33:56.929		82.37	-33.95	74490.58	-6.05		
Saturn	I	2047-04-25T08:59:37.856		82.76	-28.35	60222.74		-10.41	-12.71
Saturn	E	2047-04-25T14:37:56.378		12.70	38.26x	60267.63		-0.93	-1.15
C (IER)	E	2047-04-25T15:19:46.526		4.14x	43.30x	74490.58	5.63		
B (IER)	E	2047-04-25T16:11:44.717		-6.05x	47.01x	91984.69	5.59		
B (OER)	E	2047-04-25T17:28:29.962		-19.76x	46.03x	117571.16	5.52		
A (IER)	E	2047-04-25T17:42:01.598		-21.94x	45.06x	122050.38	5.51		
Encke (IEG)	E	2047-04-25T18:16:28.434		-27.08x	41.67x	133423.31	5.49		
Encke (OEG)	E	2047-04-25T18:17:26.986		-27.21x	41.56x	133744.89	5.49		
A (OER)	E	2047-04-25T18:26:38.854		-28.46x	40.45x	136774.40	5.49		
F ring	E	2047-04-25T18:37:50.996		-29.91x	39.00x	140461.00	5.48		

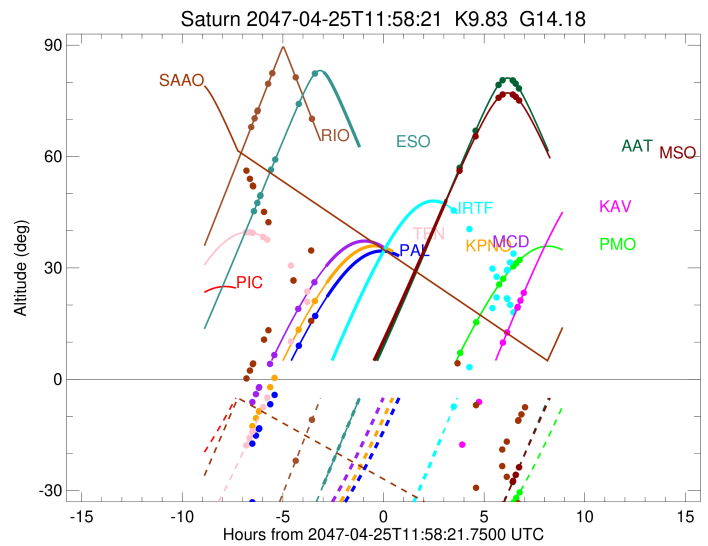
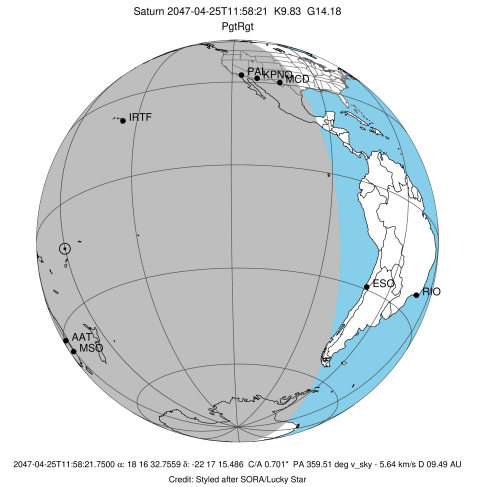
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-25T12:15:11.920
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 4090521806211224192
 2Mass ID (if available) : 18163275-2217153
 ICRS Star Coord at Epoch: 18h 16m 32.75592s -22:17:15.48557s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.828
 G magnitude : 14.178
 RP magnitude : 13.032
 BP magnitude : 15.562
 DUPflag : 0
 Distance (au) : 9.494
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.64
 Sun-Target sep (deg) : 120.73
 Sun-Moon sep (deg) : 123.47
 B (ring opening deg) : 26.04
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.126
 C/A sky separation (km) : 7752.6
 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	2047-04-25T05:24:03.839	-35.48x	24.29x	140461.00	-5.17			
A (OER)	I	2047-04-25T05:35:56.487	-35.99x	22.17x	136774.40	-5.17			
Encke (OEG)	I	2047-04-25T05:45:41.837	-36.30x	20.38x	133744.89	-5.18			
Encke (IEG)	I	2047-04-25T05:46:43.953	-36.33x	20.19x	133423.31	-5.18			
A (IER)	I	2047-04-25T06:23:17.652	-36.53x	13.24x	122050.38	-5.19			
B (OER)	I	2047-04-25T06:37:39.527	-36.22x	10.42x	117571.16	-5.20			
B (IER)	I	2047-04-25T07:59:10.214	-30.55x	-6.26	91984.69	-5.27			
C (IER)	I	2047-04-25T08:54:19.042	-23.65x	-17.94	74490.58	-5.31			
Saturn	I	2047-04-25T09:13:42.364	-20.78x	-22.09	60191.88			-13.56	-16.48
Saturn	E	2047-04-25T15:06:03.387	48.54	-66.84	60267.99			0.19	0.23
C (IER)	E	2047-04-25T15:45:20.395	56.95	-60.26	74490.58	6.08			
B (IER)	E	2047-04-25T16:32:51.555	66.94	-51.01	91984.69	6.18			
B (OER)	E	2047-04-25T17:41:20.966	79.31	-36.71	117571.16	6.26			
A (IER)	E	2047-04-25T17:53:16.220	80.55	-34.17	122050.38	6.27			
Encke (IEG)	E	2047-04-25T18:23:29.563	80.53	-27.72	133423.31	6.28			
Encke (OEG)	E	2047-04-25T18:24:20.800	80.46	-27.53	133744.89	6.28			
A (OER)	E	2047-04-25T18:32:23.436	79.64	-25.81	136774.40	6.28			
F ring	E	2047-04-25T18:42:10.676	78.35	-23.72	140461.00	6.28			

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-04-25T12:14:29.240
 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 : 4090521806211224192
 2Mass ID (if available) : 18163275-2217153
 ICRS Star Coord at Epoch: 18h 16m 32.75592s -22:17:15.48557s
 RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.828
 G magnitude : 14.178
 RP magnitude : 13.032
 BP magnitude : 15.562
 DUPflag : 0
 Distance (au) : 9.494
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.64
 Sun-Target sep (deg) : 120.73
 Sun-Moon sep (deg) : 123.50
 B (ring opening deg) : 26.04
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.178
 C/A sky separation (km) : 8113.0
 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
F ring	I	2047-04-25T05:24:51.961	-31.58x	21.88x	140461.00	-5.19			
A (OER)	I	2047-04-25T05:36:42.505	-32.03x	19.89x	136774.40	-5.19			
Encke (OEG)	I	2047-04-25T05:46:26.153	-32.31x	18.21x	133744.89	-5.19			
Encke (IEG)	I	2047-04-25T05:47:28.089	-32.33x	18.03x	133423.31	-5.19			
A (IER)	I	2047-04-25T06:23:55.744	-32.51x	11.46x	122050.38	-5.21			
B (OER)	I	2047-04-25T06:38:15.437	-32.22x	8.79x	117571.16	-5.21			
B (IER)	I	2047-04-25T07:59:37.110	-27.00x	-7.10	91984.69	-5.27			
C (IER)	I	2047-04-25T08:54:44.862	-20.58x	-18.28	74490.58	-5.30			
Saturn	I	2047-04-25T09:13:18.205	-18.01x	-22.07	60189.12			-13.80	-16.78
Saturn	E	2047-04-25T15:05:27.659	48.15	-63.87	60267.99			-0.17	-0.21
C (IER)	E	2047-04-25T15:44:59.264	56.15	-58.11	74490.58	6.05			
B (IER)	E	2047-04-25T16:32:44.694	65.43	-49.64	91984.69	6.15			
B (OER)	E	2047-04-25T17:41:31.560	75.84	-36.16	117571.16	6.23			
A (IER)	E	2047-04-25T17:53:29.589	76.72	-33.74	122050.38	6.24			
Encke (IEG)	E	2047-04-25T18:23:49.667	76.70	-27.57	133423.31	6.25			
Encke (OEG)	E	2047-04-25T18:24:41.087	76.65	-27.40	133744.89	6.25			
A (OER)	E	2047-04-25T18:32:45.441	76.07	-25.75	136774.40	6.26			
F ring	E	2047-04-25T18:42:34.730	75.12	-23.74	140461.00	6.26			