

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-23T13:40:21.510
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4066730264362419840
 2Mass ID (if available) : 18114276-2218503

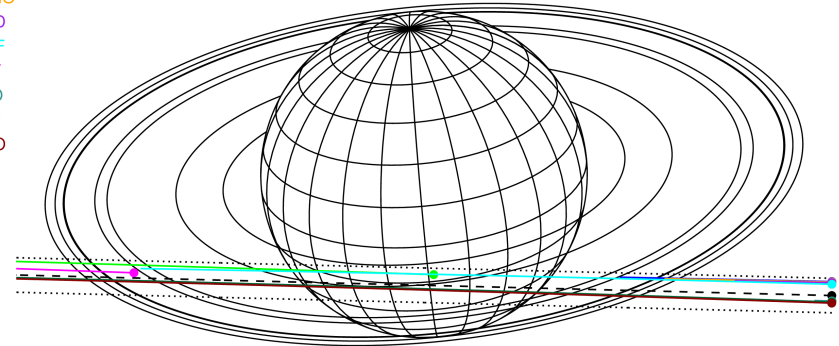
Saturn 2047-05-23T13:40:21 K7.73 G14.64 PgtRgt

ICRS Star Coord at Epoch: 18h 11m 42.76073s -22:18:50.17982s

RUWE (>1.4 is poor) : 1.11
 K magnitude : 7.734
 G magnitude : 14.638
 RP magnitude : 13.098
 BP magnitude : 18.376
 DUPflag : 0
 Distance (au) : 9.165
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -15.94
 Sun-Target sep (deg) : 148.99
 Sun-Moon sep (deg) : 134.57
 B (ring opening deg) : 26.18
 PA of pole (deg) : 5.73
 # a(km) ring



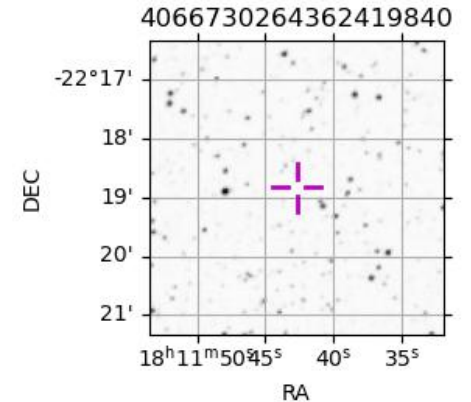
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 KAV
 ESO
 AAT
 MSO



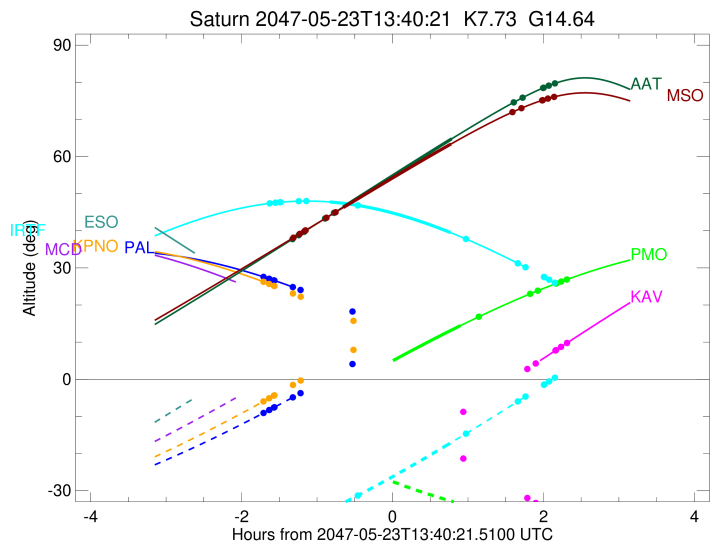
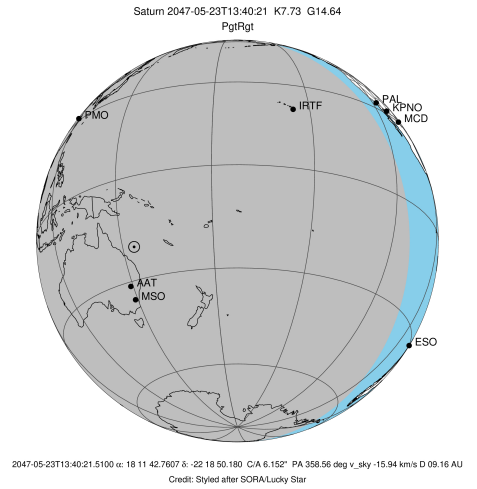
2047-05-23T13:40:21.5100 at: 18 11 42.76073 s: -22 18 50.180 C/A 6.152° PA 358.56 deg v_sky -15.94 km/s D 09.16 AU
 Credit: Styled after SORA/Lucky Star

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

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1	+			MAY 23 11:57 - MAY 23 12:06	PnnRin
PMO	Purple Mtn Obs	32.1	118.8		+	+	MAY 23 14:34 - MAY 23 15:59	PneRne
KPNO	Kitt Peak Natl	32.0	248.4	+			MAY 23 11:57 - MAY 23 12:02	PnnRin
MCD	McDonald Obs.	30.7	256.0					PnnRnn
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+	+	+	MAY 23 12:02 - MAY 23 15:20	PieRie
KAV	Kavalur Observ	12.6	78.8			+	MAY 23 15:50 - MAY 23 15:59	PnnRne
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3					PnnRnn
AAT	Siding Spring	-31.3	149.1	+	+	+	MAY 23 12:20 - MAY 23 15:49	PieRie
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0	+	+	+	MAY 23 12:21 - MAY 23 15:48	PieRie



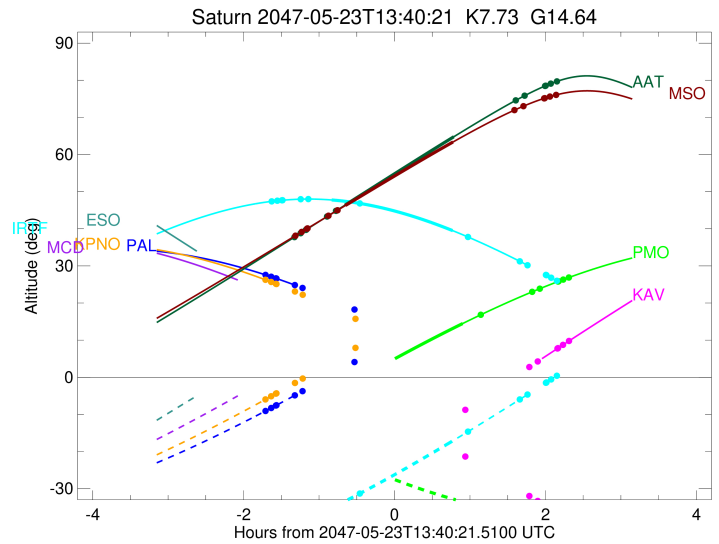
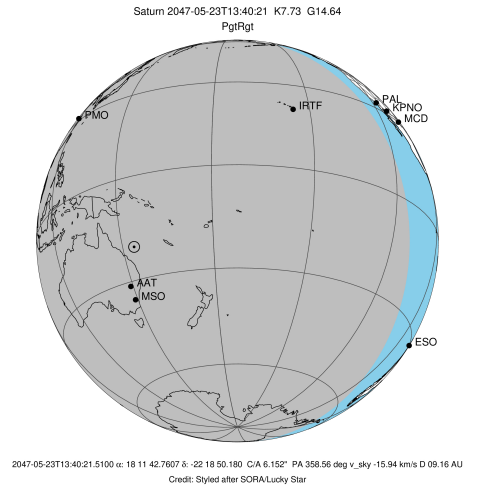
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-23T13:35:22.860
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4066730264362419840
 2Mass ID (if available) : 18114276-2218503
 ICRS Star Coord at Epoch: 18h 11m 42.76073s -22:18:50.17982s
 RUWE (>1.4 is poor) : 1.11
 K magnitude : 7.734
 G magnitude : 14.638
 RP magnitude : 13.098
 BP magnitude : 18.376
 DUPflag : 0
 Distance (au) : 9.165
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -15.94
 Sun-Target sep (deg) : 148.99
 Sun-Moon sep (deg) : 135.22
 B (ring opening deg) : 26.18
 PA of pole (deg) : 5.73
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.510
 C/A sky separation (km) : 36623.8
 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	2047-05-23T11:57:51.436		27.57	-9.08	140461.00	-13.71		
A (OER)	I	2047-05-23T12:02:22.132		27.07	-8.27	136774.40	-13.52		
Encke (OEG)	I	2047-05-23T12:06:07.584		26.64	-7.60	133744.89	-13.35		
Encke (IEG)	I	2047-05-23T12:06:31.687		26.60	-7.53	133423.31	-13.33		
A (IER)	I	2047-05-23T12:21:09.679		24.83	-4.86x	122050.38	-12.54		
B (OER)	I	2047-05-23T12:27:12.463		24.06	-3.75x	117571.16	-12.15		
B (IER)	I	2047-05-23T13:08:39.603	b	18.23	4.12x	91984.69	-7.92		
Saturn	I	2047-05-23T12:46:49.995		21.42	-0.07x	59718.30		-39.03	-44.64
Saturn	E	2047-05-23T14:24:26.394		5.62	19.26x	59970.36		-27.51	-32.49
B (IER)	E	2047-05-23T14:36:44.266		3.39x	21.78x	91984.69	7.89		
B (OER)	E	2047-05-23T15:18:36.542		-4.46x	30.44x	117571.17	11.96		
A (IER)	E	2047-05-23T15:24:45.144		-5.64x	31.72x	122050.38	12.33		
Encke (IEG)	E	2047-05-23T15:39:39.073		-8.54x	34.83x	133423.31	13.08		
Encke (OEG)	E	2047-05-23T15:40:03.649		-8.62x	34.91x	133744.89	13.09		
A (OER)	E	2047-05-23T15:43:53.615		-9.37x	35.71x	136774.40	13.25		
F ring	E	2047-05-23T15:48:29.940		-10.28x	36.68x	140461.00	13.43		

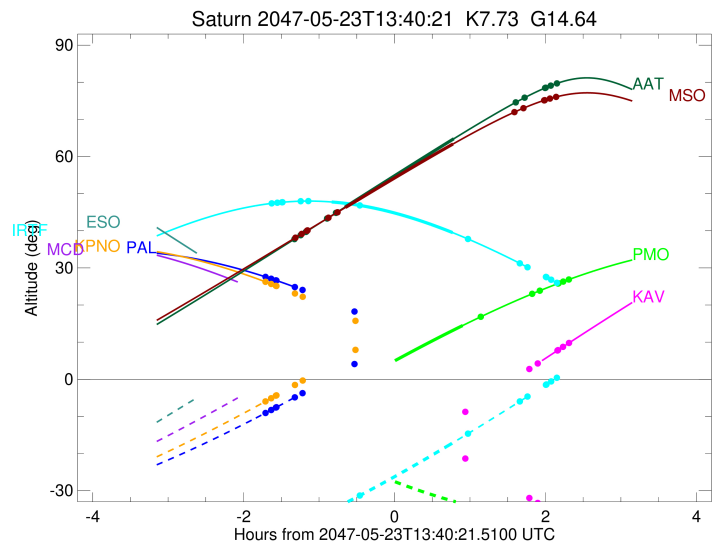
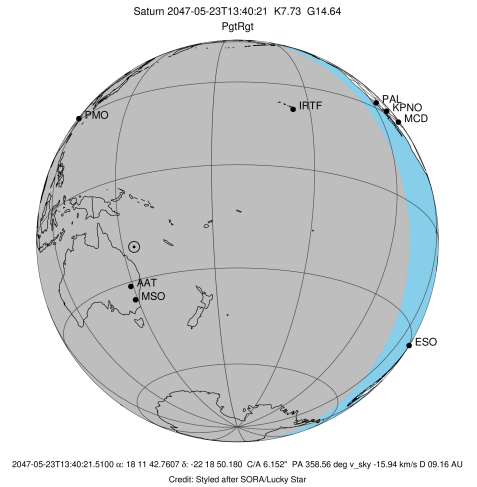
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-23T13:45:46.180
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 4066730264362419840
 2Mass ID (if available) : 18114276-2218503
 ICRS Star Coord at Epoch: 18h 11m 42.76073s -22:18:50.17982s
 RUWE (>1.4 is poor) : 1.11
 K magnitude : 7.734
 G magnitude : 14.638
 RP magnitude : 13.098
 BP magnitude : 18.376
 DUPflag : 0
 Distance (au) : 9.165
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -15.94
 Sun-Target sep (deg) : 148.99
 Sun-Moon sep (deg) : 134.19
 B (ring opening deg) : 26.18
 PA of pole (deg) : 5.73
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.542
 C/A sky separation (km) : 36836.4
 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	2047-05-23T12:09:49.877		-12.61x	-13.67	140461.00	-13.52		
A (OER)	I	2047-05-23T12:14:24.384		-11.69x	-14.45	136774.40	-13.34		
Encke (OEG)	I	2047-05-23T12:18:12.809		-10.92x	-15.10	133744.89	-13.18		
Encke (IEG)	I	2047-05-23T12:18:37.219		-10.84x	-15.17	133423.31	-13.16		
A (IER)	I	2047-05-23T12:33:24.934		-7.89x	-17.65	122050.38	-12.42		
B (OER)	I	2047-05-23T12:39:30.879		-6.69x	-18.64	117571.16	-12.05		
B (IER)	I	2047-05-23T13:21:03.516	b	1.34x	-24.95	91984.69	-7.97		
Saturn	I	2047-05-23T12:57:00.549		-3.26x	-21.40	59695.40		-40.01	-45.62
Saturn	E	2047-05-23T14:34:38.535		14.49	-33.51	59981.83		-26.93	-31.85
B (IER)	E	2047-05-23T14:49:03.661		16.85	-34.68	91984.69	8.08		
B (OER)	E	2047-05-23T15:29:57.895		23.03	-36.92	117571.16	12.27		
A (IER)	E	2047-05-23T15:35:57.106		23.87	-37.11	122050.38	12.66		
Encke (IEG)	E	2047-05-23T15:50:26.996		25.80	-37.39	133423.31	13.45		
Encke (OEG)	E	2047-05-23T15:50:50.885		25.85	-37.40	133744.89	13.47		
A (OER)	E	2047-05-23T15:54:34.357		26.32	-37.43	136774.40	13.64		
F ring	E	2047-05-23T15:59:02.718		26.88	-37.45	140461.00	13.83		

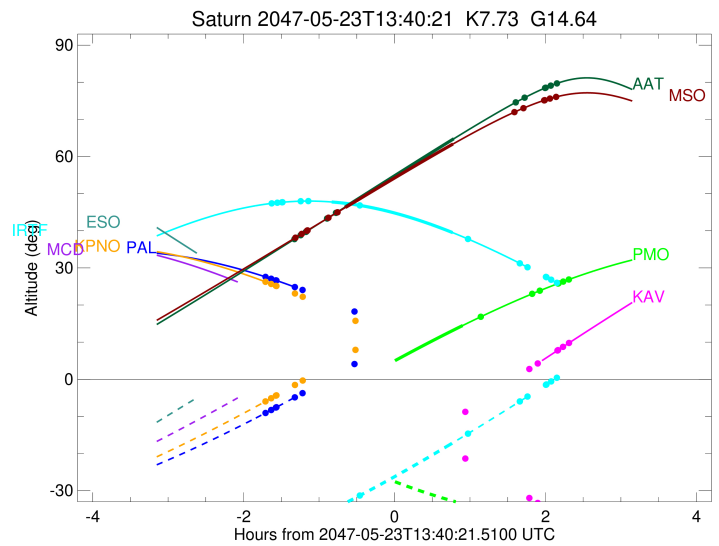
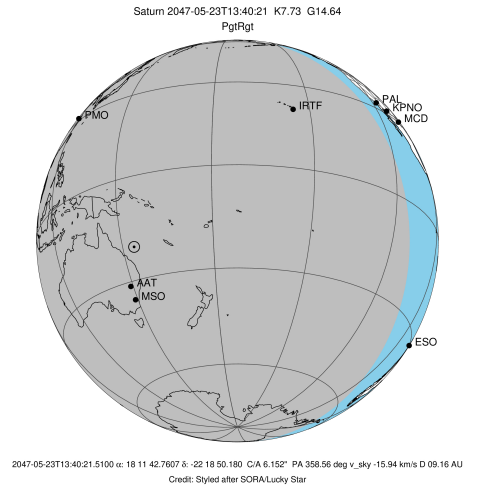
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-23T13:35:01.020
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 4066730264362419840
 2Mass ID (if available) : 18114276-2218503
 ICRS Star Coord at Epoch: 18h 11m 42.76073s -22:18:50.17982s
 RUWE (>1.4 is poor) : 1.11
 K magnitude : 7.734
 G magnitude : 14.638
 RP magnitude : 13.098
 BP magnitude : 18.376
 DUPflag : 0
 Distance (au) : 9.165
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -15.94
 Sun-Target sep (deg) : 148.99
 Sun-Moon sep (deg) : 135.22
 B (ring opening deg) : 26.18
 PA of pole (deg) : 5.73
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.550
 C/A sky separation (km) : 36891.3
 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	2047-05-23T11:57:48.272		26.25	-5.96	140461.00	-13.64		
A (OER)	I	2047-05-23T12:02:20.418		25.66	-5.11	136774.40	-13.45		
Encke (OEG)	I	2047-05-23T12:06:07.156		25.17	-4.40x	133744.89	-13.27		
Encke (IEG)	I	2047-05-23T12:06:31.401		25.12	-4.32x	133423.31	-13.25		
A (IER)	I	2047-05-23T12:21:15.276		23.10	-1.52x	122050.38	-12.45		
B (OER)	I	2047-05-23T12:27:20.985		22.23	-0.35x	117571.16	-12.04		
B (IER)	I	2047-05-23T13:09:26.608	b	15.72	7.94x	91984.69	-7.70		
Saturn	I	2047-05-23T12:46:37.067		19.35	3.41x	59712.62		-39.27	-44.88
Saturn	E	2047-05-23T14:23:56.627		2.54x	23.22x	59964.25		-27.82	-32.82
B (IER)	E	2047-05-23T14:35:25.225		0.38x	25.63x	91984.69	7.67		
B (OER)	E	2047-05-23T15:17:57.576		-7.90x	34.60x	117571.16	11.85		
A (IER)	E	2047-05-23T15:24:09.466		-9.13x	35.91x	122050.38	12.23		
Encke (IEG)	E	2047-05-23T15:39:10.264		-12.15x	39.10x	133423.31	12.99		
Encke (OEG)	E	2047-05-23T15:39:35.012		-12.23x	39.19x	133744.89	13.00		
A (OER)	E	2047-05-23T15:43:26.541		-13.01x	40.01x	136774.40	13.16		
F ring	E	2047-05-23T15:48:04.662		-13.95x	40.99x	140461.00	13.34		

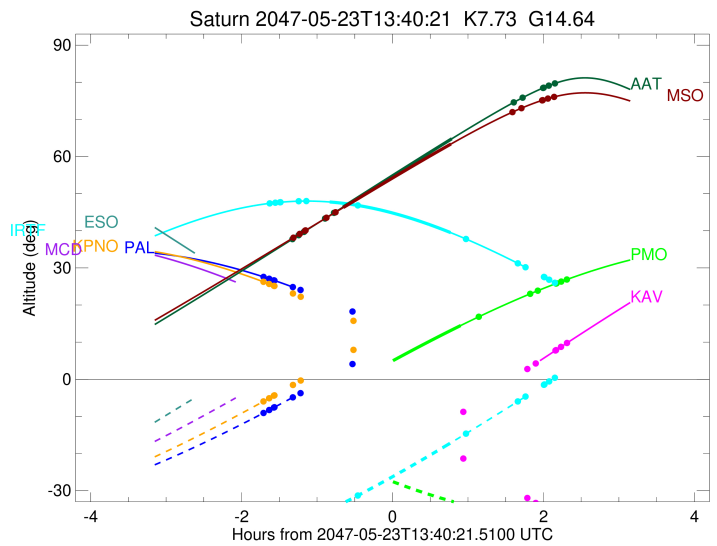
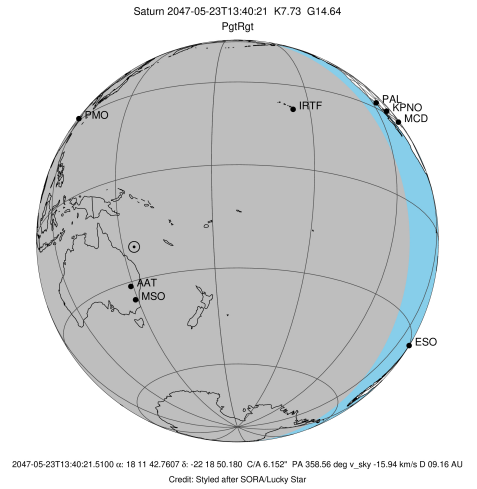
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-23T13:38:17.590
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 4066730264362419840
 2Mass ID (if available) : 18114276-2218503
 ICRS Star Coord at Epoch: 18h 11m 42.76073s -22:18:50.17982s
 RUWE (>1.4 is poor) : 1.11
 K magnitude : 7.734
 G magnitude : 14.638
 RP magnitude : 13.098
 BP magnitude : 18.376
 DUPflag : 0
 Distance (au) : 9.165
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -15.94
 Sun-Target sep (deg) : 148.99
 Sun-Moon sep (deg) : 135.26
 B (ring opening deg) : 26.18
 PA of pole (deg) : 5.73
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.532
 C/A sky separation (km) : 36772.6
 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	2047-05-23T12:02:45.374		47.39	-42.30	140461.00	-13.84		
A (OER)	I	2047-05-23T12:07:13.613		47.56	-41.70	136774.40	-13.65		
Encke (OEG)	I	2047-05-23T12:10:56.977		47.68	-41.19	133744.89	-13.48		
Encke (IEG)	I	2047-05-23T12:11:20.855		47.69	-41.14	133423.31	-13.46		
A (IER)	I	2047-05-23T12:25:50.417		47.97	-39.05	122050.38	-12.66		
B (OER)	I	2047-05-23T12:31:49.618		48.00	-38.14	117571.17	-12.27		
B (IER)	I	2047-05-23T13:12:53.822	b	46.83	-31.30	91984.69	-7.98		
Saturn	I	2047-05-23T12:50:24.554		47.76	-35.17	59709.60		-39.40	-45.01
Saturn	E	2047-05-23T14:26:34.246		39.51	-17.15	59970.88		-27.48	-32.46
B (IER)	E	2047-05-23T14:38:53.165		37.77	-14.63	91984.69	7.98		
B (OER)	E	2047-05-23T15:20:08.581		31.21	-5.94	117571.17	12.17		
A (IER)	E	2047-05-23T15:26:10.864		30.16	-4.64x	122050.38	12.55		
Encke (IEG)	E	2047-05-23T15:40:49.016		27.56	-1.47x	133423.31	13.31		
Encke (OEG)	E	2047-05-23T15:41:13.151		27.49	-1.39x	133744.89	13.33		
A (OER)	E	2047-05-23T15:44:58.973		26.80	-0.57x	136774.40	13.50		
F ring	E	2047-05-23T15:49:30.286		25.97	0.42x	140461.00	13.68		

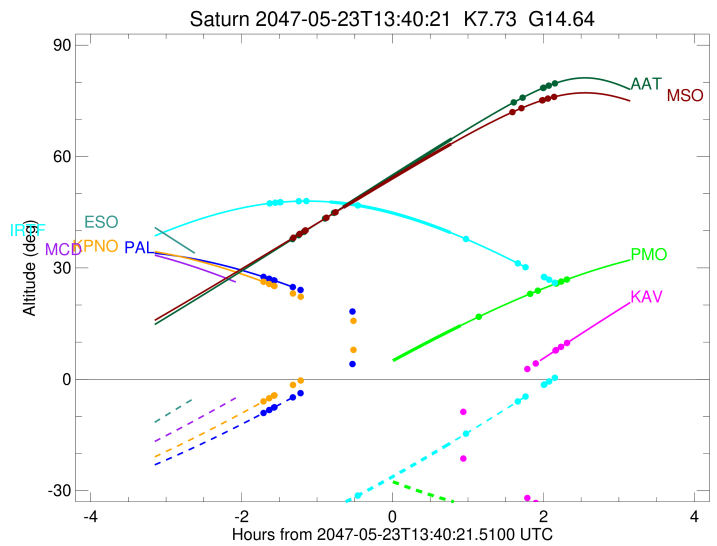
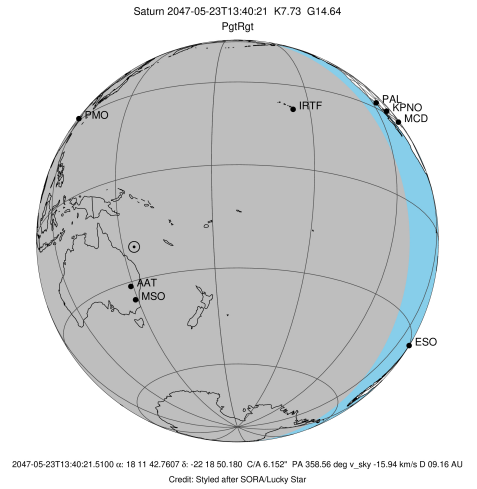
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-23T13:47:00.880
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 4066730264362419840
 2Mass ID (if available) : 18114276-2218503
 ICRS Star Coord at Epoch: 18h 11m 42.76073s -22:18:50.17982s
 RUWE (>1.4 is poor) : 1.11
 K magnitude : 7.734
 G magnitude : 14.638
 RP magnitude : 13.098
 BP magnitude : 18.376
 DUPflag : 0
 Distance (au) : 9.165
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -15.94
 Sun-Target sep (deg) : 148.99
 Sun-Moon sep (deg) : 133.77
 B (ring opening deg) : 26.18
 PA of pole (deg) : 5.73
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.037
 C/A sky separation (km) : 40127.0
 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	2047-05-23T12:16:44.396		-41.10x	10.03x	140461.00	-12.63		
A (OER)	I	2047-05-23T12:21:38.793		-39.96x	8.90x	136774.40	-12.41		
Encke (OEG)	I	2047-05-23T12:25:44.747		-39.01x	7.96x	133744.89	-12.22		
Encke (IEG)	I	2047-05-23T12:26:11.088		-38.91x	7.86x	133423.31	-12.20		
A (IER)	I	2047-05-23T12:42:18.343		-35.17x	4.16x	122050.38	-11.28		
B (OER)	I	2047-05-23T12:49:03.914		-33.60x	2.61x	117571.16	-10.80		
B (IER)	I	2047-05-23T13:40:59.854	b	-21.57x	-9.14	91984.69	-4.88		
Saturn	I	2047-05-23T13:00:23.541		-30.98x	0.03x	59613.45		-43.48	-49.07
Saturn	E	2047-05-23T14:33:46.090		-9.44x	-20.74	59911.89		-30.37	-35.60
B (IER)	E	2047-05-23T14:36:49.122		-8.74x	-21.39	91984.69	4.95		
B (OER)	E	2047-05-23T15:27:44.951		2.80x	-32.02	117571.16	11.08		
A (IER)	E	2047-05-23T15:34:20.268		4.27x	-33.34	122050.38	11.58		
Encke (IEG)	E	2047-05-23T15:50:00.485		7.77	-36.41	133423.31	12.57		
Encke (OEG)	E	2047-05-23T15:50:26.038		7.86	-36.49	133744.89	12.60		
A (OER)	E	2047-05-23T15:54:24.496		8.74	-37.26	136774.40	12.81		
F ring	E	2047-05-23T15:59:09.601		9.79	-38.16	140461.00	13.05		

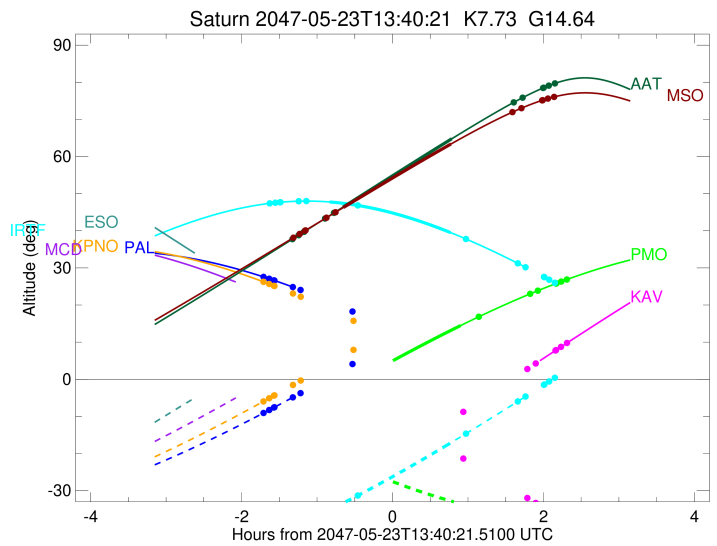
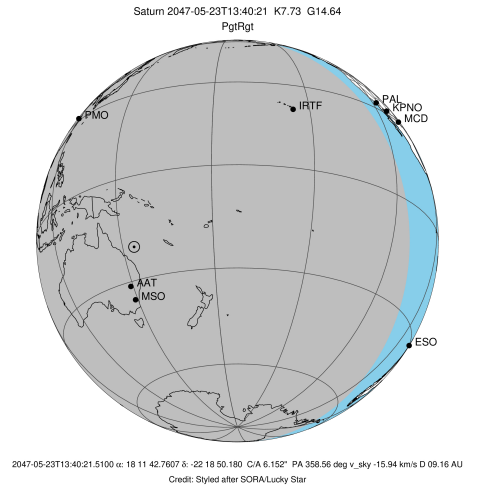
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-23T13:44:05.540
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 4066730264362419840
 2Mass ID (if available) : 18114276-2218503
 ICRS Star Coord at Epoch: 18h 11m 42.76073s -22:18:50.17982s
 RUWE (>1.4 is poor) : 1.11
 K magnitude : 7.734
 G magnitude : 14.638
 RP magnitude : 13.098
 BP magnitude : 18.376
 DUPflag : 0
 Distance (au) : 9.165
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -15.94
 Sun-Target sep (deg) : 148.99
 Sun-Moon sep (deg) : 134.74
 B (ring opening deg) : 26.18
 PA of pole (deg) : 5.73
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.348
 C/A sky separation (km) : 42194.9
 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	2047-05-23T12:20:51.171		37.76	-65.35	140461.00	-12.60		
A (OER)	I	2047-05-23T12:25:46.732		38.81	-66.34	136774.40	-12.34		
Encke (OEG)	I	2047-05-23T12:29:54.584		39.70	-67.16	133744.89	-12.10		
Encke (IEG)	I	2047-05-23T12:30:21.183		39.79	-67.25	133423.31	-12.08		
A (IER)	I	2047-05-23T12:46:47.162		43.32	-70.44	122050.38	-10.94		
B (OER)	I	2047-05-23T12:53:47.674		44.82	-71.75	117571.16	-10.35		
Saturn	I	2047-05-23T13:00:56.578		46.35	-73.03	59566.31		-45.47	-51.01
Saturn	E	2047-05-23T14:27:30.955		64.79	-77.90	59853.90		-33.07	-38.47
B (OER)	E	2047-05-23T15:16:58.452		74.63	-69.91	117571.16	10.45		
A (IER)	E	2047-05-23T15:23:54.971		75.87	-68.57	122050.38	11.05		
Encke (IEG)	E	2047-05-23T15:40:10.927		78.49	-65.33	133423.31	12.21		
Encke (OEG)	E	2047-05-23T15:40:37.241		78.55	-65.24	133744.89	12.23		
A (OER)	E	2047-05-23T15:44:42.388		79.11	-64.41	136774.40	12.48		
F ring	E	2047-05-23T15:49:34.619		79.71	-63.42	140461.00	12.75		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-23T13:43:56.940
 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 : 4066730264362419840
 2Mass ID (if available) : 18114276-2218503
 ICRS Star Coord at Epoch: 18h 11m 42.76073s -22:18:50.17982s
 RUWE (>1.4 is poor) : 1.11
 K magnitude : 7.734
 G magnitude : 14.638
 RP magnitude : 13.098
 BP magnitude : 18.376
 DUPflag : 0
 Distance (au) : 9.165
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -15.94
 Sun-Target sep (deg) : 148.99
 Sun-Moon sep (deg) : 134.75
 B (ring opening deg) : 26.18
 PA of pole (deg) : 5.73
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.412
 C/A sky separation (km) : 42621.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-05-23T12:21:38.592		38.14	-63.86	140461.00	-12.49		
A (OER)	I	2047-05-23T12:26:36.874		39.16	-64.76	136774.40	-12.22		
Encke (OEG)	I	2047-05-23T12:30:47.211		40.02	-65.50	133744.89	-11.98		
Encke (IEG)	I	2047-05-23T12:31:14.089		40.11	-65.58	133423.31	-11.95		
A (IER)	I	2047-05-23T12:47:52.498		43.52	-68.41	122050.38	-10.78		
B (OER)	I	2047-05-23T12:54:59.975		44.98	-69.54	117571.16	-10.17		
Saturn	I	2047-05-23T13:01:13.374		46.25	-70.48	59555.65		-45.92	-51.45
Saturn	E	2047-05-23T14:26:57.656		63.40	-74.39	59842.67		-33.58	-39.01
B (OER)	E	2047-05-23T15:15:55.543		72.00	-68.02	117571.16	10.26		
A (IER)	E	2047-05-23T15:22:59.079		73.04	-66.83	122050.38	10.88		
Encke (IEG)	E	2047-05-23T15:39:27.667		75.14	-63.92	133423.31	12.08		
Encke (OEG)	E	2047-05-23T15:39:54.265		75.19	-63.84	133744.89	12.10		
A (OER)	E	2047-05-23T15:44:01.962		75.62	-63.09	136774.40	12.35		
F ring	E	2047-05-23T15:48:56.997		76.07	-62.18	140461.00	12.63		