

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-17T11:47:33.550
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4090699652208475264
 2Mass ID (if available) : 18130819-2218122

Saturn 2047-05-17T11:47:33 K8.75 G14.50 PgtRgt

ICRS Star Coord at Epoch: 18h 13m 08.18184s -22:18:12.40922s

RUWE (>1.4 is poor) : 4.43
 K magnitude : 8.751
 G magnitude : 14.496
 RP magnitude : 13.082
 BP magnitude : 16.650
 DUPflag : 0
 Distance (au) : 9.222
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.13
 Sun-Target sep (deg) : 142.81
 Sun-Moon sep (deg) : 61.88
 B (ring opening deg) : 26.14
 PA of pole (deg) : 5.76

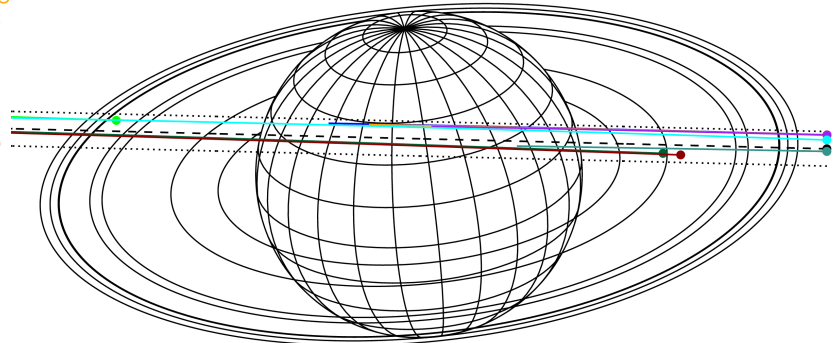
a(km) ring

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



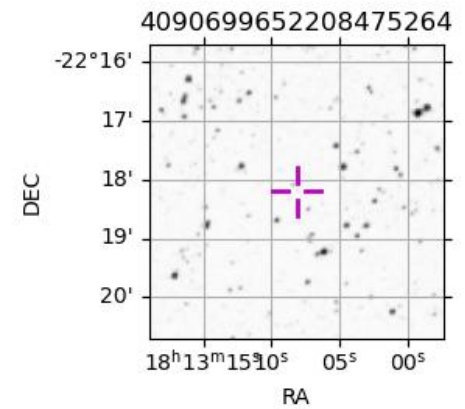
2047-05-17T11:47:33.5500 at: 18 13 08.1818 s: -22 18 12.409 C/A 1.973° PA 178.58 deg v_sky -14.13 km/s D 09.22 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 RIO
 ESO
 AAT
 MSO

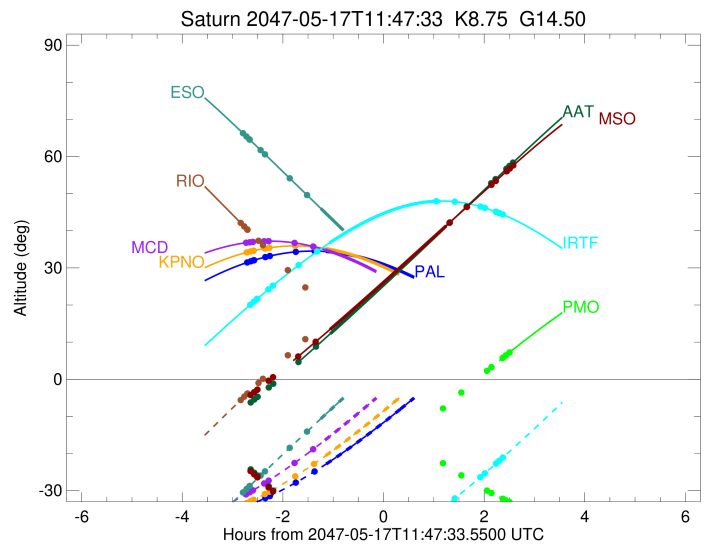
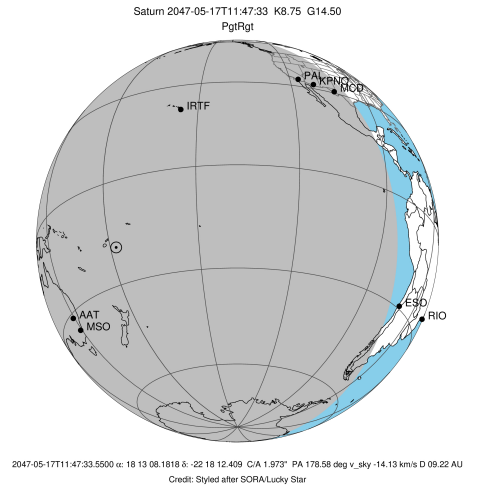


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+ + + + + + +	+		MAY 17 09:05 - MAY 17 10:39	PinRin
PMO	Purple Mtn Obs	32.1	118.8			+ + + +	MAY 17 14:09 - MAY 17 14:17	PnnRne
KPNO	Kitt Peak Natl	32.0	248.4	+ + + + + + +	+		MAY 17 09:04 - MAY 17 10:38	PinRin
MCD	McDonald Obs.	30.7	256.0	+ + + + + + +	+		MAY 17 09:03 - MAY 17 10:37	PinRin
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ + + + + + +	+ +	+ + + + + + +	MAY 17 09:08 - MAY 17 14:09	PieRie
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+			MAY 17 08:57 - MAY 17 08:57	PnnRin
ESO	European South	-29.3	289.3	+ + + + + + +	+		MAY 17 09:00 - MAY 17 10:32	PinRin
AAT	Siding Spring	-31.3	149.1		+	+ + + + + + +	MAY 17 10:27 - MAY 17 14:21	PieRie
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0		+	+ + + + + + +	MAY 17 10:05 - MAY 17 14:22	PieRie



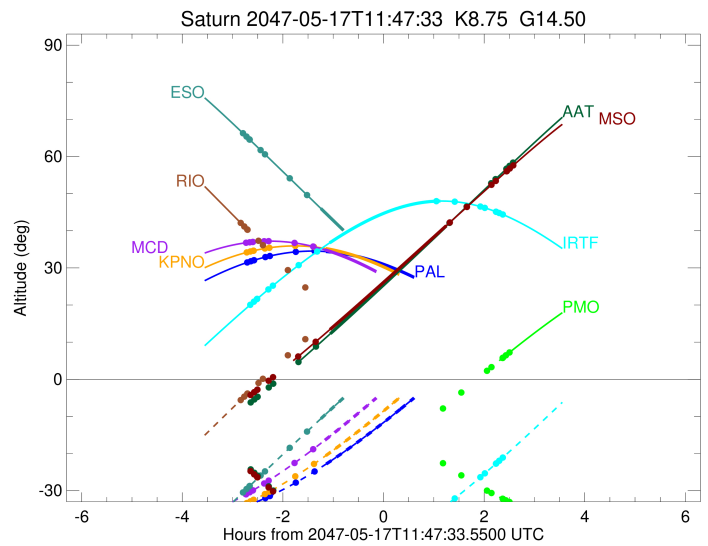
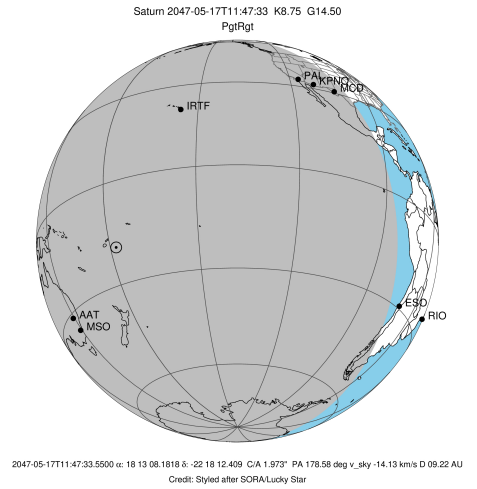
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-17T11:45:15.650
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4090699652208475264
 2Mass ID (if available) : 18130819-2218122
 ICRS Star Coord at Epoch: 18h 13m 08.18184s -22:18:12.40922s
 RUWE (>1.4 is poor) : 4.43
 K magnitude : 8.751
 G magnitude : 14.496
 RP magnitude : 13.082
 BP magnitude : 16.650
 DUPflag : 0
 Distance (au) : 9.222
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.13
 Sun-Target sep (deg) : 142.81
 Sun-Moon sep (deg) : 62.14
 B (ring opening deg) : 26.14
 PA of pole (deg) : 5.76
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.730
 C/A sky separation (km) : 18260.3
 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_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	2047-05-17T09:05:01.268		31.47	-34.01	140461.00	-14.28		
A (OER)	I	2047-05-17T09:09:19.721		31.79	-33.64	136774.40	-14.25		
Encke (OEG)	I	2047-05-17T09:12:52.578		32.04	-33.33	133744.89	-14.22		
Encke (IEG)	I	2047-05-17T09:13:15.199		32.07	-33.30	133423.31	-14.21		
A (IER)	I	2047-05-17T09:26:38.946		32.91	-32.01	122050.38	-14.08		
B (OER)	I	2047-05-17T09:31:57.824		33.20	-31.47	117571.16	-14.01		
B (IER)	I	2047-05-17T10:02:58.558		34.32	-27.84	91984.69	-13.41		
C (IER)	I	2047-05-17T10:25:21.612		34.53	-24.83	74490.58	-12.55		
Saturn	I	2047-05-17T10:39:14.512		34.40	-22.82	60229.29		9.58	11.70
Saturn	E	2047-05-17T12:51:12.586		24.20	0.12x	60074.58		21.87	26.18
C (IER)	E	2047-05-17T12:45:33.793	b	24.92	-0.97x	74490.58	12.46		
B (IER)	E	2047-05-17T13:08:06.288		21.94	3.39x	91984.69	13.31		
B (OER)	E	2047-05-17T13:39:22.918		17.36	9.58x	117571.16	13.88		
A (IER)	E	2047-05-17T13:44:44.882		16.53	10.66x	122050.38	13.94		
Encke (IEG)	E	2047-05-17T13:58:16.871		14.38	13.39x	133423.31	14.06		
Encke (OEG)	E	2047-05-17T13:58:39.733		14.31	13.47x	133744.89	14.07		
A (OER)	E	2047-05-17T14:02:14.887		13.73	14.19x	136774.40	14.09		
F ring	E	2047-05-17T14:06:36.188		13.01	15.08x	140461.00	14.12		

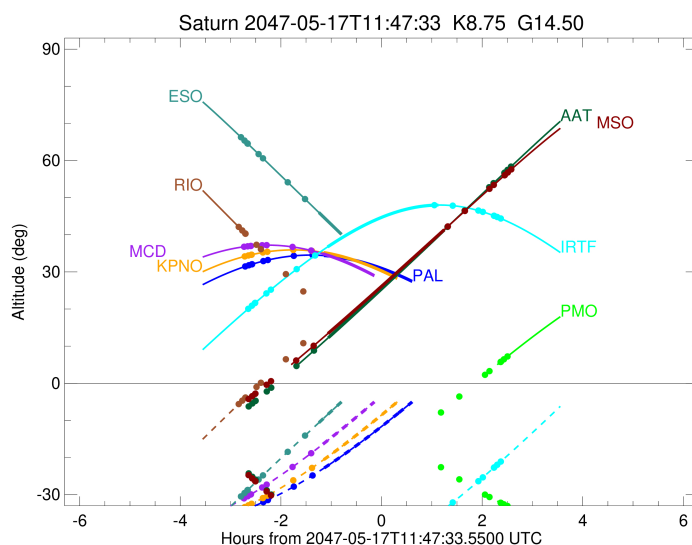
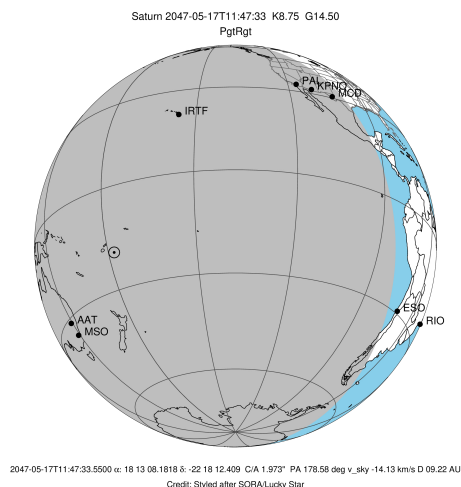
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-17T11:53:30.770
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 4090699652208475264
 2Mass ID (if available) : 18130819-2218122
 ICRS Star Coord at Epoch: 18h 13m 08.18184s -22:18:12.40922s
 RUWE (>1.4 is poor) : 4.43
 K magnitude : 8.751
 G magnitude : 14.496
 RP magnitude : 13.082
 BP magnitude : 16.650
 DUPflag : 0
 Distance (au) : 9.222
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.13
 Sun-Target sep (deg) : 142.81
 Sun-Moon sep (deg) : 61.92
 B (ring opening deg) : 26.14
 PA of pole (deg) : 5.76
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.400
 C/A sky separation (km) : 16054.5
 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



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	2047-05-17T09:06:27.127	-56.33x	21.35x	140461.00	-13.83			
A (OER)	I	2047-05-17T09:10:53.926	-55.39x	20.42x	136774.40	-13.81			
Encke (OEG)	I	2047-05-17T09:14:33.458	-54.62x	19.66x	133744.89	-13.79			
Encke (IEG)	I	2047-05-17T09:14:56.777	-54.53x	19.58x	133423.31	-13.79			
A (IER)	I	2047-05-17T09:28:43.812	-51.61x	16.72x	122050.38	-13.71			
B (OER)	I	2047-05-17T09:34:11.011	-50.45x	15.59x	117571.16	-13.67			
B (IER)	I	2047-05-17T10:05:45.781	-43.73x	9.13x	91984.69	-13.29			
C (IER)	I	2047-05-17T10:28:08.503	-38.97x	4.63x	74490.58	-12.71			
Saturn	I	2047-05-17T10:44:19.762	-35.54x	1.42x	60247.61			6.93	8.50
Saturn	E	2047-05-17T13:01:52.498	-7.20x	-23.14	60092.97			20.75	24.90
C (IER)	E	2047-05-17T12:58:24.347	b	-7.89x	-22.61	74490.58	12.95		
B (IER)	E	2047-05-17T13:20:18.138		-3.59x	-25.88	91984.69	13.62		
B (OER)	E	2047-05-17T13:50:59.569		2.28x	-29.99	117571.16	14.12		
A (IER)	E	2047-05-17T13:56:16.181		3.26x	-30.64	122050.38	14.18		
Encke (IEG)	E	2047-05-17T14:09:34.749		5.72	-32.18	133423.31	14.30		
Encke (OEG)	E	2047-05-17T14:09:57.231		5.79	-32.22	133744.89	14.31		
A (OER)	E	2047-05-17T14:13:28.787		6.43	-32.60	136774.40	14.33		
F ring	E	2047-05-17T14:17:45.674		7.21	-33.05	140461.00	14.37		

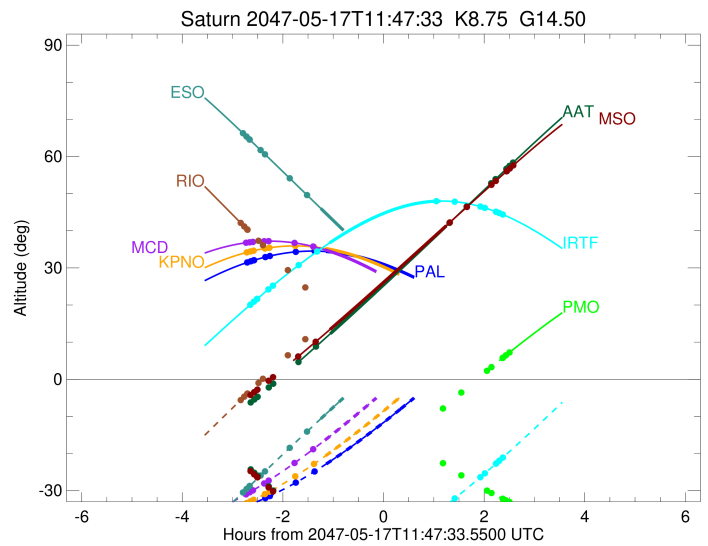
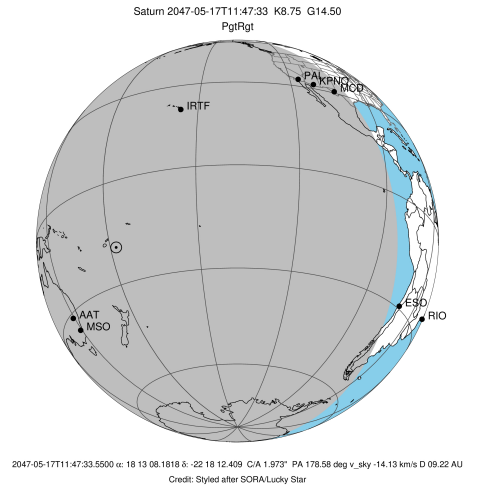
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-17T11:44:43.450
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 4090699652208475264
 2Mass ID (if available) : 18130819-2218122
 ICRS Star Coord at Epoch: 18h 13m 08.18184s -22:18:12.40922s
 RUWE (>1.4 is poor) : 4.43
 K magnitude : 8.751
 G magnitude : 14.496
 RP magnitude : 13.082
 BP magnitude : 16.650
 DUPflag : 0
 Distance (au) : 9.222
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.13
 Sun-Target sep (deg) : 142.81
 Sun-Moon sep (deg) : 62.10
 B (ring opening deg) : 26.14
 PA of pole (deg) : 5.76
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.704
 C/A sky separation (km) : 18083.5
 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



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	2047-05-17T09:04:29.875		34.18	-33.34	140461.00	-14.30		
A (OER)	I	2047-05-17T09:08:47.950		34.43	-32.89	136774.40	-14.27		
Encke (OEG)	I	2047-05-17T09:12:20.493		34.62	-32.51	133744.89	-14.24		
Encke (IEG)	I	2047-05-17T09:12:43.081		34.63	-32.47	133423.31	-14.24		
A (IER)	I	2047-05-17T09:26:05.615		35.23	-30.93	122050.38	-14.10		
B (OER)	I	2047-05-17T09:31:23.992		35.42	-30.28	117571.16	-14.04		
B (IER)	I	2047-05-17T10:02:21.288		35.92	-26.14	91984.69	-13.44		
C (IER)	I	2047-05-17T10:24:40.554		35.65	-22.80	74490.58	-12.59		
Saturn	I	2047-05-17T10:38:37.463		35.22	-20.59	60230.18		9.46	11.57
Saturn	E	2047-05-17T12:50:48.125		22.46	3.64x	60077.90		21.68	25.96
C (IER)	E	2047-05-17T12:45:31.944	b	23.21	2.59x	74490.58	12.49		
B (IER)	E	2047-05-17T13:08:02.680		19.91	7.09x	91984.69	13.32		
B (OER)	E	2047-05-17T13:39:19.600		14.92	13.47x	117571.16	13.87		
A (IER)	E	2047-05-17T13:44:41.802		14.02	14.57x	122050.38	13.93		
Encke (IEG)	E	2047-05-17T13:58:14.567		11.71	17.37x	133423.31	14.05		
Encke (OEG)	E	2047-05-17T13:58:37.455		11.64	17.45x	133744.89	14.05		
A (OER)	E	2047-05-17T14:02:12.852		11.02	18.20x	136774.40	14.08		
F ring	E	2047-05-17T14:06:34.468		10.26	19.11x	140461.00	14.11		

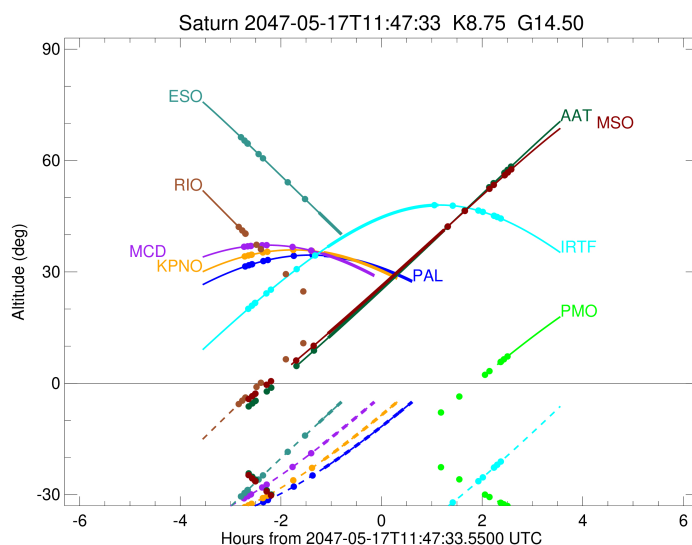
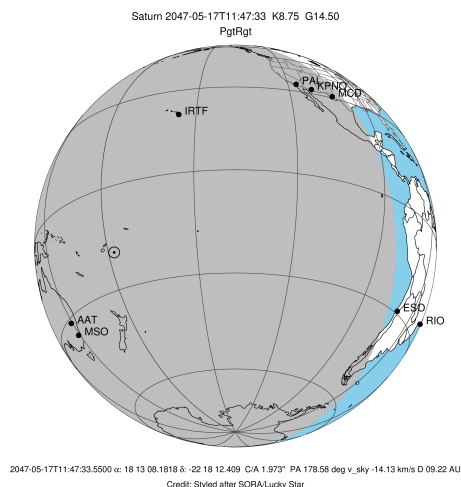
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-17T11:43:59.390
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 4090699652208475264
 2Mass ID (if available) : 18130819-2218122
 ICRS Star Coord at Epoch: 18h 13m 08.18184s -22:18:12.40922s
 RUWE (>1.4 is poor) : 4.43
 K magnitude : 8.751
 G magnitude : 14.496
 RP magnitude : 13.082
 BP magnitude : 16.650
 DUPflag : 0
 Distance (au) : 9.222
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.13
 Sun-Target sep (deg) : 142.81
 Sun-Moon sep (deg) : 62.03
 B (ring opening deg) : 26.14
 PA of pole (deg) : 5.76
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.668
 C/A sky separation (km) : 17844.7
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



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

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-05-17T09:03:41.414		36.77	-31.00	140461.00	-14.32		
A (OER)	I	2047-05-17T09:07:59.112		36.90	-30.44	136774.40	-14.29		
Encke (OEG)	I	2047-05-17T09:11:31.345		36.98	-29.97	133744.89	-14.26		
Encke (IEG)	I	2047-05-17T09:11:53.899		36.99	-29.92	133423.31	-14.26		
A (IER)	I	2047-05-17T09:25:15.232		37.18	-28.07	122050.38	-14.12		
B (OER)	I	2047-05-17T09:30:33.111		37.21	-27.31	117571.16	-14.06		
B (IER)	I	2047-05-17T10:01:26.851		36.73	-22.55	91984.69	-13.48		
C (IER)	I	2047-05-17T10:23:41.864		35.76	-18.84	74490.58	-12.65		
Saturn	I	2047-05-17T10:37:44.446		34.88	-16.40	60231.33		9.32	11.39
Saturn	E	2047-05-17T12:50:17.032		18.83	9.26x	60082.32		21.41	25.65
C (IER)	E	2047-05-17T12:45:30.811	b	19.59	8.28x	74490.58	12.52		
B (IER)	E	2047-05-17T13:08:00.024		15.91	12.92x	91984.69	13.32		
B (OER)	E	2047-05-17T13:39:18.390		10.45	19.49x	117571.16	13.85		
A (IER)	E	2047-05-17T13:44:41.084		9.48	20.62x	122050.38	13.91		
Encke (IEG)	E	2047-05-17T13:58:15.312		7.00	23.50x	133423.31	14.02		
Encke (OEG)	E	2047-05-17T13:58:38.245		6.93	23.58x	133744.89	14.02		
A (OER)	E	2047-05-17T14:02:14.078		6.26	24.35x	136774.40	14.05		
F ring	E	2047-05-17T14:06:36.245		5.44	25.28x	140461.00	14.08		

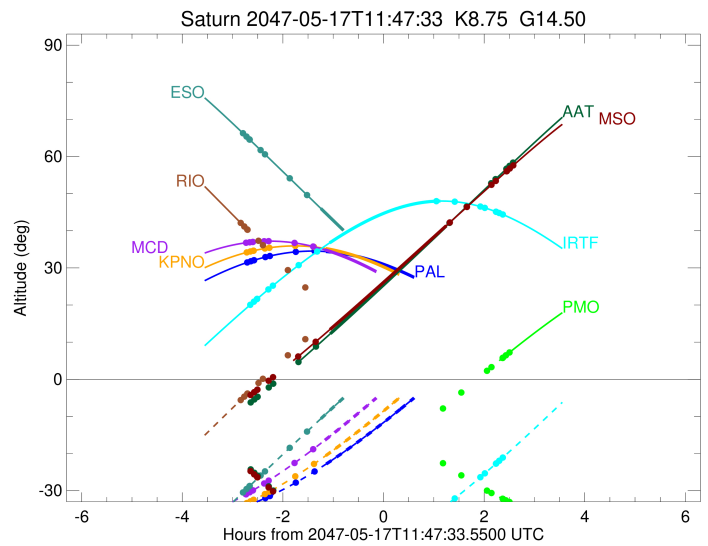
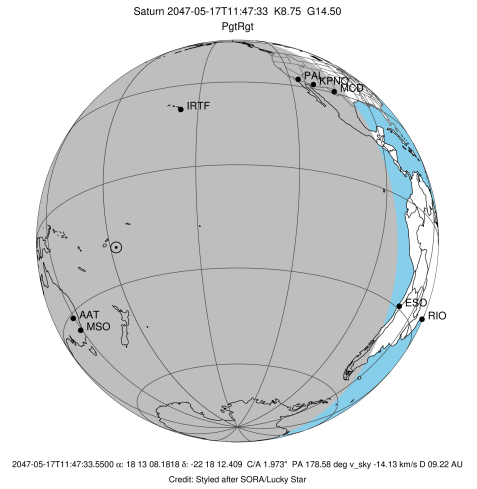
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-17T11:49:25.820
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 4090699652208475264
 2Mass ID (if available) : 18130819-2218122
 ICRS Star Coord at Epoch: 18h 13m 08.18184s -22:18:12.40922s
 RUWE (>1.4 is poor) : 4.43
 K magnitude : 8.751
 G magnitude : 14.496
 RP magnitude : 13.082
 BP magnitude : 16.650
 DUPflag : 0
 Distance (au) : 9.222
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.13
 Sun-Target sep (deg) : 142.81
 Sun-Moon sep (deg) : 62.55
 B (ring opening deg) : 26.14
 PA of pole (deg) : 5.76
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.604
 C/A sky separation (km) : 17416.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



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

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-05-17T09:08:40.995		20.06	-47.39	140461.00	-14.27		
A (OER)	I	2047-05-17T09:12:59.573		20.90	-47.80	136774.40	-14.24		
Encke (OEG)	I	2047-05-17T09:16:32.418		21.59	-48.12	133744.89	-14.22		
Encke (IEG)	I	2047-05-17T09:16:55.031		21.66	-48.16	133423.31	-14.22		
A (IER)	I	2047-05-17T09:30:17.686		24.21	-49.22	122050.38	-14.11		
B (OER)	I	2047-05-17T09:35:35.651		25.21	-49.57	117571.16	-14.06		
B (IER)	I	2047-05-17T10:06:24.094		30.75	-50.83	91984.69	-13.56		
C (IER)	I	2047-05-17T10:28:27.095		34.42	-50.85	74490.58	-12.81		
Saturn	I	2047-05-17T10:43:11.322		36.72	-50.46	60237.71		8.46	10.36
Saturn	E	2047-05-17T12:55:15.732		48.01	-35.15	60081.54		21.46	25.71
C (IER)	E	2047-05-17T12:50:31.614	b	47.98	-35.96	74490.58	12.85		
B (IER)	E	2047-05-17T13:12:28.647		47.84	-32.11	91984.69	13.63		
B (OER)	E	2047-05-17T13:43:05.086		46.53	-26.38	117571.16	14.17		
A (IER)	E	2047-05-17T13:48:20.609		46.17	-25.36	122050.38	14.22		
Encke (IEG)	E	2047-05-17T14:01:36.639		45.14	-22.74	133423.31	14.34		
Encke (OEG)	E	2047-05-17T14:01:59.056		45.10	-22.67	133744.89	14.35		
A (OER)	E	2047-05-17T14:05:30.030		44.79	-21.97	136774.40	14.37		
F ring	E	2047-05-17T14:09:46.274		44.39	-21.11	140461.00	14.40		

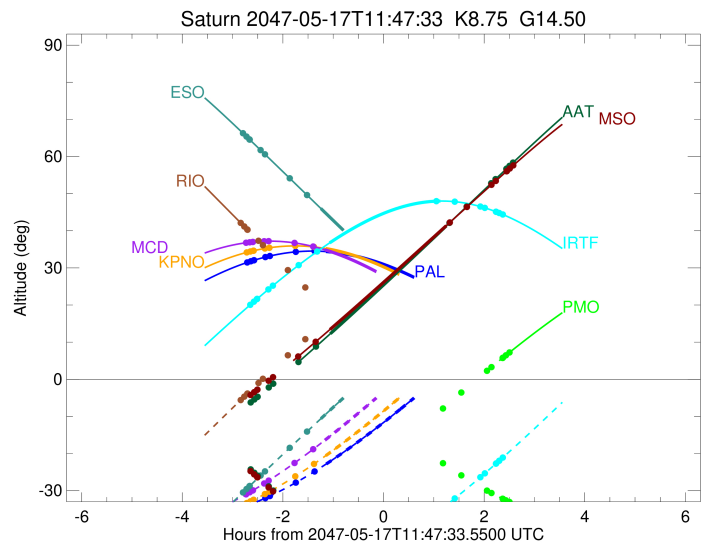
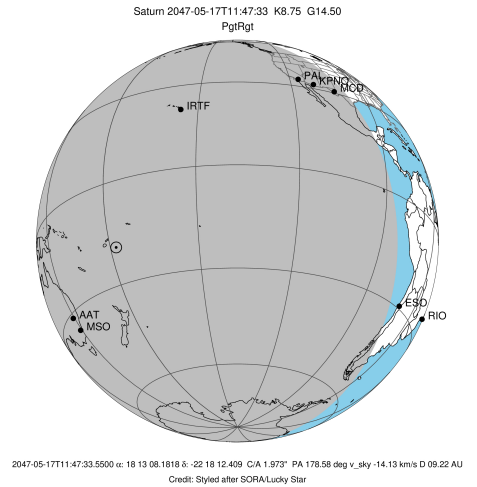
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-17T11:40:51.830
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 4090699652208475264
 2Mass ID (if available) : 18130819-2218122
 ICRS Star Coord at Epoch: 18h 13m 08.18184s -22:18:12.40922s
 RUWE (>1.4 is poor) : 4.43
 K magnitude : 8.751
 G magnitude : 14.496
 RP magnitude : 13.082
 BP magnitude : 16.650
 DUPflag : 0
 Distance (au) : 9.222
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.13
 Sun-Target sep (deg) : 142.81
 Sun-Moon sep (deg) : 61.56
 B (ring opening deg) : 26.14
 PA of pole (deg) : 5.76
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.588
 C/A sky separation (km) : 10620.9
 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	2047-05-17T08:57:19.236		42.11	-5.59	140461.00	-14.52		
A (OER)	I	2047-05-17T09:01:33.213		41.15	-4.67x	136774.40	-14.51		
Encke (OEG)	I	2047-05-17T09:05:02.157		40.36	-3.91x	133744.89	-14.49		
Encke (IEG)	I	2047-05-17T09:05:24.349		40.27	-3.83x	133423.31	-14.49		
A (IER)	I	2047-05-17T09:18:30.945		37.30	-0.99x	122050.38	-14.42		
B (OER)	I	2047-05-17T09:23:41.776		36.12	0.12x	117571.16	-14.40		
B (IER)	I	2047-05-17T09:53:32.499		29.39	6.47x	91984.69	-14.16		
C (IER)	I	2047-05-17T10:14:19.994		24.73	10.80x	74490.58	-13.86		
Saturn	I	2047-05-17T10:31:01.031		21.02	14.21x	60263.38		3.29	4.04
Saturn	E	2047-05-17T12:51:10.404		-8.96x	38.95x	60175.31		14.93	18.11
C (IER)	E	2047-05-17T12:56:57.680		-10.12x	39.73x	74490.58	13.61		
B (IER)	E	2047-05-17T13:18:10.437		-14.34x	42.35x	91984.69	13.85		
B (OER)	E	2047-05-17T13:48:46.351		-20.19x	45.34x	117571.16	14.00		
A (IER)	E	2047-05-17T13:54:06.061		-21.18x	45.75x	122050.38	14.02		
Encke (IEG)	E	2047-05-17T14:07:36.426		-23.63x	46.64x	133423.31	14.05		
Encke (OEG)	E	2047-05-17T14:07:59.315		-23.70x	46.66x	133744.89	14.05		
A (OER)	E	2047-05-17T14:11:34.893		-24.34x	46.85x	136774.40	14.06		
F ring	E	2047-05-17T14:15:57.101		-25.11x	47.07x	140461.00	14.06		

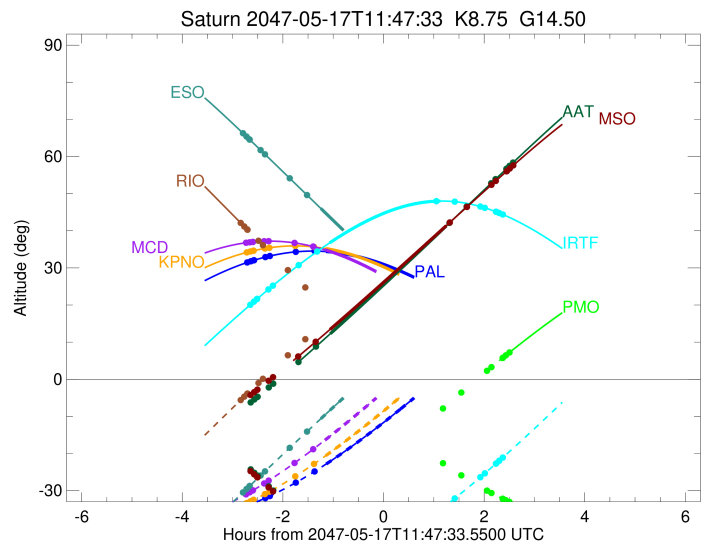
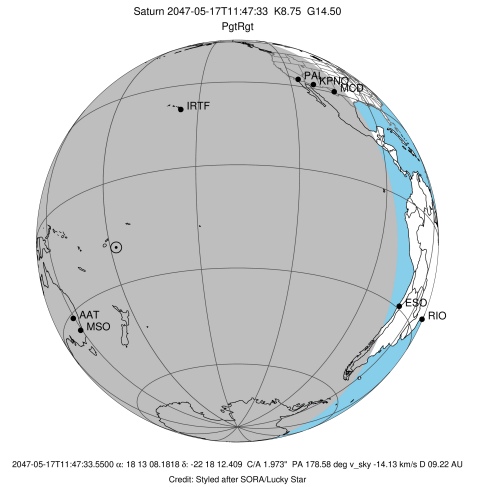
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-17T11:41:46.020
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4090699652208475264
 2Mass ID (if available) : 18130819-2218122
 ICRS Star Coord at Epoch: 18h 13m 08.18184s -22:18:12.40922s
 RUWE (>1.4 is poor) : 4.43
 K magnitude : 8.751
 G magnitude : 14.496
 RP magnitude : 13.082
 BP magnitude : 16.650
 DUPflag : 0
 Distance (au) : 9.222
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.13
 Sun-Target sep (deg) : 142.81
 Sun-Moon sep (deg) : 61.95
 B (ring opening deg) : 26.14
 PA of pole (deg) : 5.76
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.651
 C/A sky separation (km) : 11043.2
 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_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	2047-05-17T08:59:59.605		66.27	-30.48	140461.00	-14.64		
A (OER)	I	2047-05-17T09:04:11.637		65.37	-29.56	136774.40	-14.62		
Encke (OEG)	I	2047-05-17T09:07:38.961		64.62	-28.82	133744.89	-14.61		
Encke (IEG)	I	2047-05-17T09:08:00.980		64.54	-28.74	133423.31	-14.60		
A (IER)	I	2047-05-17T09:21:01.317		61.72	-25.92	122050.38	-14.54		
B (OER)	I	2047-05-17T09:26:09.623		60.60	-24.82	117571.16	-14.51		
B (IER)	I	2047-05-17T09:55:45.618		54.13	-18.47	91984.69	-14.27		
C (IER)	I	2047-05-17T10:16:23.476		49.61	-14.09	74490.58	-13.96		
Saturn	I	2047-05-17T10:32:52.189		46.01	-10.62	60262.62		3.56	4.37
Saturn	E	2047-05-17T12:51:01.187		16.26	16.66x	60170.55		15.32	18.57
C (IER)	E	2047-05-17T12:56:12.377		15.18	17.59x	74490.58	13.74		
B (IER)	E	2047-05-17T13:17:12.872		10.81	21.26x	91984.69	13.99		
B (OER)	E	2047-05-17T13:47:29.420		4.63x	26.22x	117571.16	14.15		
A (IER)	E	2047-05-17T13:52:45.708		3.57x	27.04x	122050.38	14.17		
Encke (IEG)	E	2047-05-17T14:06:07.442		0.90x	29.04x	133423.31	14.20		
Encke (OEG)	E	2047-05-17T14:06:30.089		0.83x	29.09x	133744.89	14.20		
A (OER)	E	2047-05-17T14:10:03.392		0.13x	29.61x	136774.40	14.21		
F ring	E	2047-05-17T14:14:22.847		-0.73x	30.22x	140461.00	14.21		

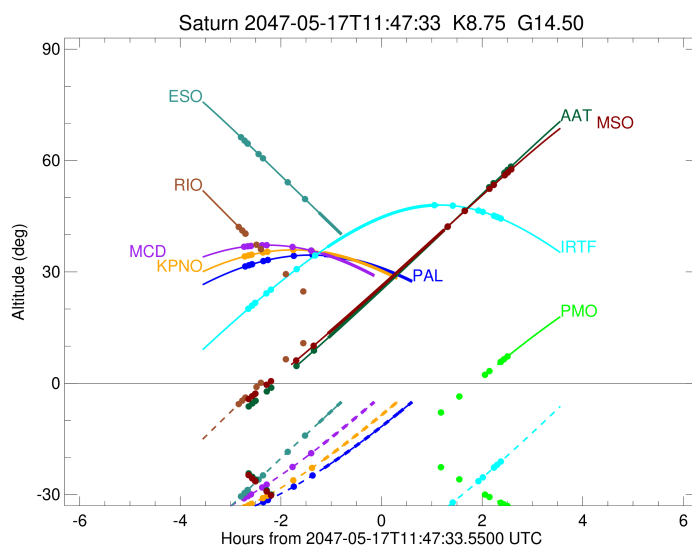
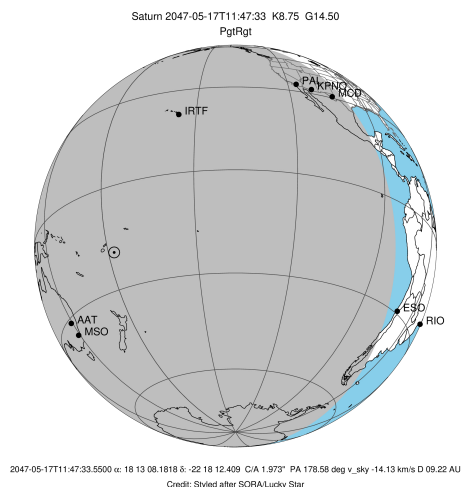
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-17T11:53:36.930
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 4090699652208475264
 2Mass ID (if available) : 18130819-2218122
 ICRS Star Coord at Epoch: 18h 13m 08.18184s -22:18:12.40922s
 RUWE (>1.4 is poor) : 4.43
 K magnitude : 8.751
 G magnitude : 14.496
 RP magnitude : 13.082
 BP magnitude : 16.650
 DUPflag : 0
 Distance (au) : 9.222
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.13
 Sun-Target sep (deg) : 142.81
 Sun-Moon sep (deg) : 62.59
 B (ring opening deg) : 26.14
 PA of pole (deg) : 5.76
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.640
 C/A sky separation (km) : 10965.7
 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	2047-05-17T09:09:13.796	-6.23x	-24.29	140461.00	-14.25			
A (OER)	I	2047-05-17T09:13:32.547	-5.43x	-25.20	136774.40	-14.25			
Encke (OEG)	I	2047-05-17T09:17:05.233	-4.77x	-25.95	133744.89	-14.24			
Encke (IEG)	I	2047-05-17T09:17:27.812	-4.70x	-26.03	133423.31	-14.24			
A (IER)	I	2047-05-17T09:30:46.914	-2.20x	-28.86	122050.38	-14.22			
B (OER)	I	2047-05-17T09:36:02.030	-1.20x	-29.98	117571.16	-14.21			
B (IER)	I	2047-05-17T10:06:10.289	4.66x	-36.42	91984.69	-14.07			
C (IER)	I	2047-05-17T10:27:03.153	8.81	-40.89	74490.58	-13.83			
Saturn	I	2047-05-17T10:44:01.192		12.24	-44.52	60265.40		2.47	3.04
Saturn	E	2047-05-17T13:02:28.158		41.32	-72.51	60158.68		16.25	19.67
C (IER)	E	2047-05-17T13:06:12.375		42.12	-73.13	74490.58	14.08		
B (IER)	E	2047-05-17T13:26:39.715		46.51	-76.07	91984.69	14.39		
B (OER)	E	2047-05-17T13:56:01.164		52.81	-78.25	117571.16	14.63		
A (IER)	E	2047-05-17T14:01:06.980		53.90	-78.29	122050.38	14.66		
Encke (IEG)	E	2047-05-17T14:14:01.048		56.65	-77.88	133423.31	14.72		
Encke (OEG)	E	2047-05-17T14:14:22.891		56.73	-77.86	133744.89	14.72		
A (OER)	E	2047-05-17T14:17:48.555		57.46	-77.63	136774.40	14.74		
F ring	E	2047-05-17T14:21:58.573		58.35	-77.29	140461.00	14.75		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-17T11:53:22.040
 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 : 4090699652208475264
 2Mass ID (if available) : 18130819-2218122
 ICRS Star Coord at Epoch: 18h 13m 08.18184s -22:18:12.40922s
 RUWE (>1.4 is poor) : 4.43
 K magnitude : 8.751
 G magnitude : 14.496
 RP magnitude : 13.082
 BP magnitude : 16.650
 DUPflag : 0
 Distance (au) : 9.222
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.13
 Sun-Target sep (deg) : 142.81
 Sun-Moon sep (deg) : 62.59
 B (ring opening deg) : 26.14
 PA of pole (deg) : 5.76
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.582
 C/A sky separation (km) : 10578.6
 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	2047-05-17T09:09:01.869	-4.23x	-24.75	140461.00	-14.27			
A (OER)	I	2047-05-17T09:13:20.301	-3.48x	-25.63	136774.40	-14.26			
Encke (OEG)	I	2047-05-17T09:16:52.719	-2.85x	-26.35	133744.89	-14.26			
Encke (IEG)	I	2047-05-17T09:17:15.269	-2.78x	-26.42	133423.31	-14.26			
A (IER)	I	2047-05-17T09:30:33.286	-0.39x	-29.13	122050.38	-14.24			
B (OER)	I	2047-05-17T09:35:47.934	0.56x	-30.20	117571.16	-14.23			
B (IER)	I	2047-05-17T10:05:52.787	6.14	-36.35	91984.69	-14.10			
C (IER)	I	2047-05-17T10:26:41.937	10.11	-40.60	74490.58	-13.88			
Saturn	I	2047-05-17T10:43:40.077		13.40	-44.06	60266.01		2.16	2.65
Saturn	E	2047-05-17T13:02:21.077		41.36	-69.71	60163.26		15.89	19.25
C (IER)	E	2047-05-17T13:06:34.873		42.23	-70.28	74490.58	14.13		
B (IER)	E	2047-05-17T13:26:59.415		46.41	-72.62	91984.69	14.42		
B (OER)	E	2047-05-17T13:56:19.152		52.38	-74.23	117571.16	14.64		
A (IER)	E	2047-05-17T14:01:24.838		53.41	-74.26	122050.38	14.67		
Encke (IEG)	E	2047-05-17T14:14:18.730		56.01	-73.96	133423.31	14.72		
Encke (OEG)	E	2047-05-17T14:14:40.570		56.08	-73.94	133744.89	14.72		
A (OER)	E	2047-05-17T14:18:06.221		56.77	-73.78	136774.40	14.74		
F ring	E	2047-05-17T14:22:16.237		57.60	-73.53	140461.00	14.75		