

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2044-04-03T16:59:49.570
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 6260640928213402496
 2Mass ID (if available) : 15492685-1742397

Saturn 2044-04-03T16:59:49 K9.55 G11.39 PgtRgt

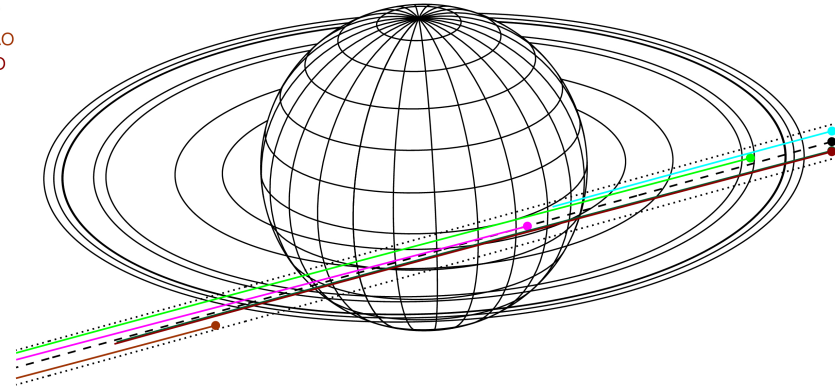
ICRS Star Coord at Epoch: 15h 49m 26.85744s -17:42:47.94183s

RUWE (>1.4 is poor) : 1.07
 K magnitude : 9.546
 G magnitude : 11.389
 RP magnitude : 10.761
 BP magnitude : 11.859
 DUPflag : 0
 Distance (au) : 9.208
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.49
 Sun-Target sep (deg) : 134.87
 Sun-Moon sep (deg) : 153.24
 B (ring opening deg) : 23.93
 PA of pole (deg) : 2.05

Saturn 2044-04-03T16:59:49 K9.55 G11.39
 PgtRgt



Earth
 PMO
 IRTF
 KAV
 AAT
 SAAO
 MSO

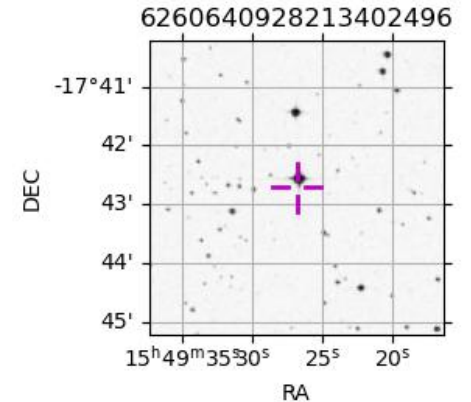


2044-04-03T16:59:49.5700 α: 15 49 26.8574 δ: -17 42 47.942 C/A 4.645° PA 15.48 deg v_sky -11.49 km/s D 09.21 AU
 Credit: Styled after SORA/Lucky Star

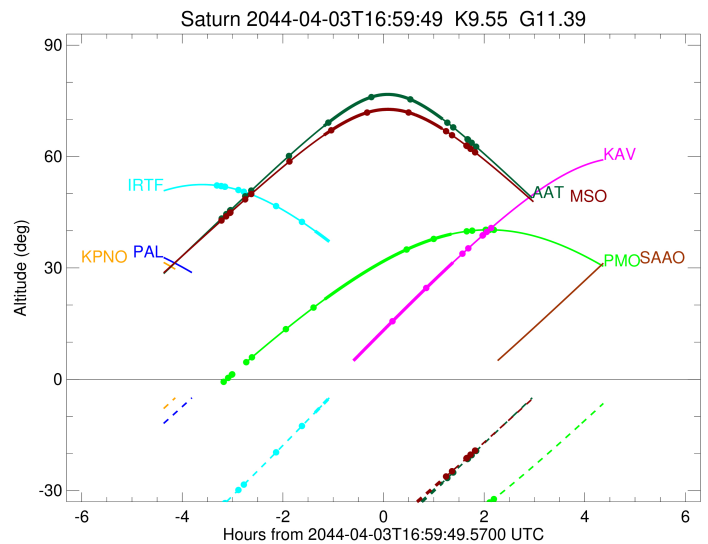
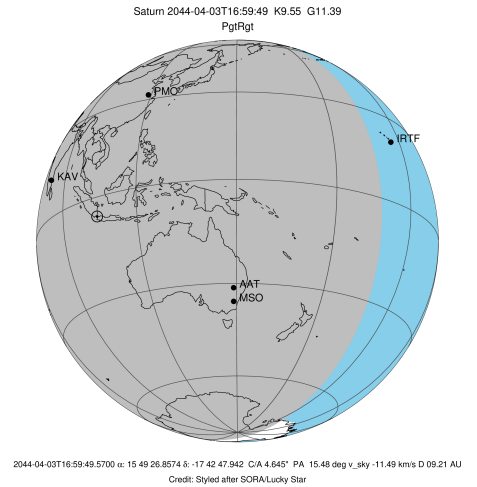
#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring

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

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs	32.1	118.8	+	+	+	APR 03 14:22 - APR 03 19:11	PieRie
KPNO	Kitt Peak Natl	32.0	248.4					PnnRnn
MCD	McDonald Obs.	30.7	256.0					PnnRnn
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+	+		APR 03 13:41 - APR 03 15:38	PinRin
KAV	Kavalur Observ	12.6	78.8		+	+	APR 03 18:22 - APR 03 19:08	PneRne
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3					PnnRnn
AAT	Siding Spring	-31.3	149.1	+	+	+	APR 03 13:46 - APR 03 18:50	PieRie
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0	+	+	+	APR 03 13:46 - APR 03 18:49	PieRie

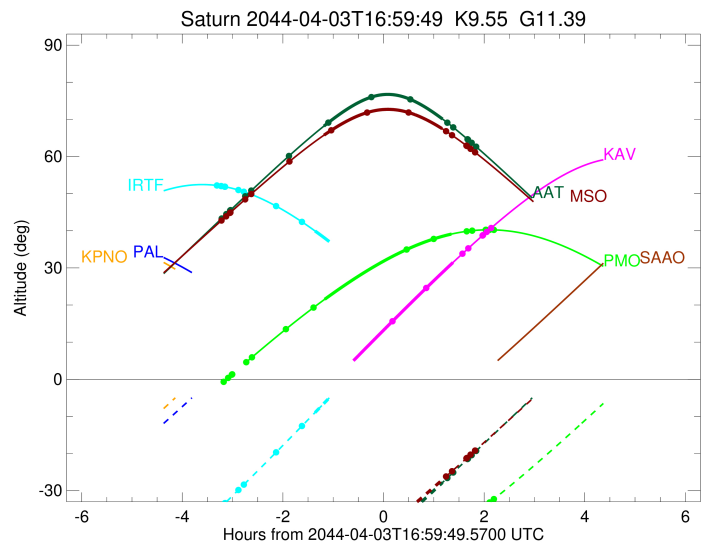
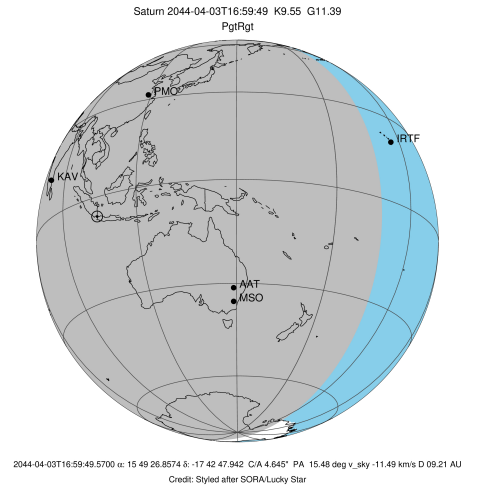


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2044-04-03T17:05:52.860
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 6260640928213402496
 2Mass ID (if available) : 15492685-1742397
 ICRS Star Coord at Epoch: 15h 49m 26.85744s -17:42:47.94183s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 9.546
 G magnitude : 11.389
 RP magnitude : 10.761
 BP magnitude : 11.859
 DUPflag : 0
 Distance (au) : 9.208
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.49
 Sun-Target sep (deg) : 134.87
 Sun-Moon sep (deg) : 154.12
 B (ring opening deg) : 23.93
 PA of pole (deg) : 2.05
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.082
 C/A sky separation (km) : 27261.0
 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



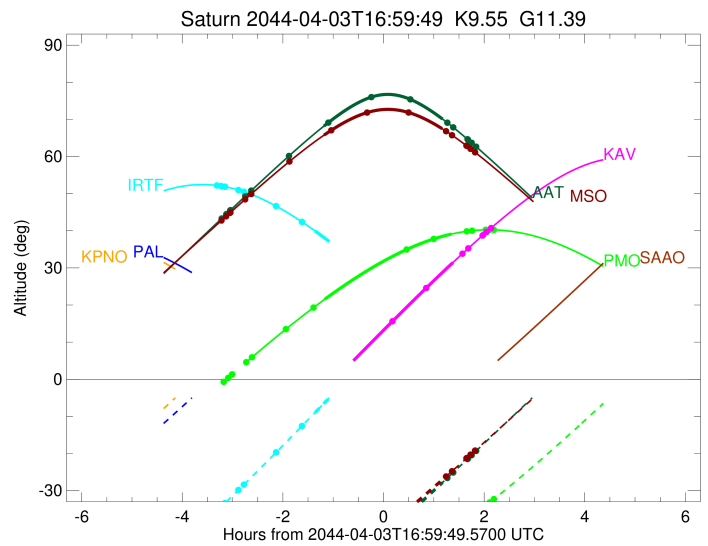
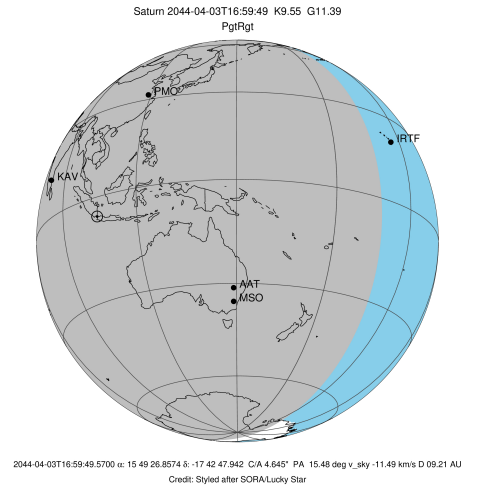
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2044-04-03T13:49:14.633	-0.68x	-40.00	140461.00	-11.57			
A (OER)	I	2044-04-03T13:54:34.026	0.37x	-40.83	136774.40	-11.51			
Encke (OEG)	I	2044-04-03T13:58:57.845	1.24x	-41.49	133744.89	-11.45			
Encke (IEG)	I	2044-04-03T13:59:25.926	1.33x	-41.56	133423.31	-11.45			
A (IER)	I	2044-04-03T14:16:10.181	4.61x	-43.96	122050.38	-11.19			
B (OER)	I	2044-04-03T14:22:52.838	5.91	-44.87	117571.16	-11.06			
B (IER)	I	2044-04-03T15:03:27.944	13.51	-49.39	91984.69	-9.79			
C (IER)	I	2044-04-03T15:36:27.634	19.32	-51.65	74490.58	-7.65			
Saturn	I	2044-04-03T15:49:46.712	21.55	-52.13	60210.69			-12.99	-15.81
Saturn	E	2044-04-03T18:20:52.060	39.11	-40.76	59881.75			-35.86	-41.39
C (IER)	E	2044-04-03T17:27:16.247	b	34.94	-47.84	74490.58	7.71		
B (IER)	E	2044-04-03T17:59:47.424	b	37.81	-43.83	91984.69	10.00		
B (OER)	E	2044-04-03T18:39:16.597		39.86	-37.83	117571.16	11.43		
A (IER)	E	2044-04-03T18:45:45.706		40.03	-36.75	122050.38	11.59		
Encke (IEG)	E	2044-04-03T19:01:53.276		40.25	-33.98	133423.31	11.91		
Encke (OEG)	E	2044-04-03T19:02:20.273		40.25	-33.90	133744.89	11.92		
A (OER)	E	2044-04-03T19:06:33.769		40.26	-33.15	136774.40	11.99		
F ring	E	2044-04-03T19:11:40.310		40.24	-32.24	140461.00	12.07		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2044-04-03T16:54:13.720
 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 : 6260640928213402496
 2Mass ID (if available) : 15492685-1742397
 ICRS Star Coord at Epoch: 15h 49m 26.85744s -17:42:47.94183s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 9.546
 G magnitude : 11.389
 RP magnitude : 10.761
 BP magnitude : 11.859
 DUPflag : 0
 Distance (au) : 9.208
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.49
 Sun-Target sep (deg) : 134.87
 Sun-Moon sep (deg) : 153.03
 B (ring opening deg) : 23.93
 PA of pole (deg) : 2.05
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.000
 C/A sky separation (km) : 26715.8
 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	2044-04-03T13:41:09.770		52.20	-35.47	140461.00	-12.14		
A (OER)	I	2044-04-03T13:46:14.290		52.04	-34.36	136774.40	-12.07		
Encke (OEG)	I	2044-04-03T13:50:25.815		51.88	-33.45	133744.89	-12.02		
Encke (IEG)	I	2044-04-03T13:50:52.586		51.86	-33.35	133423.31	-12.01		
A (IER)	I	2044-04-03T14:06:49.831		50.98	-29.82	122050.38	-11.74		
B (OER)	I	2044-04-03T14:13:13.465		50.52	-28.39	117571.16	-11.61		
B (IER)	I	2044-04-03T14:51:46.714		46.64	-19.67	91984.69	-10.36		
C (IER)	I	2044-04-03T15:22:37.604		42.39	-12.57	74490.58	-8.33		
Saturn	I	2044-04-03T15:38:08.902		39.95	-8.97	60220.93		-11.75	-14.33
Saturn	E	2044-04-03T18:10:18.850		10.12	26.74x	59875.62		-36.19	-41.74
C (IER)	E	2044-04-03T17:17:45.282	b	21.26	14.37x	74490.58	8.26		
B (IER)	E	2044-04-03T17:48:51.279	b	14.74	21.69x	91984.69	10.28		
B (OER)	E	2044-04-03T18:27:39.302		6.34	30.81x	117571.16	11.54		
A (IER)	E	2044-04-03T18:34:05.364		4.92x	32.32x	122050.38	11.67		
Encke (IEG)	E	2044-04-03T18:50:08.825		1.37x	36.08x	133423.31	11.93		
Encke (OEG)	E	2044-04-03T18:50:35.774		1.27x	36.18x	133744.89	11.94		
A (OER)	E	2044-04-03T18:54:48.978		0.33x	37.17x	136774.40	11.99		
F ring	E	2044-04-03T18:59:55.558		-0.82x	38.36x	140461.00	12.06		

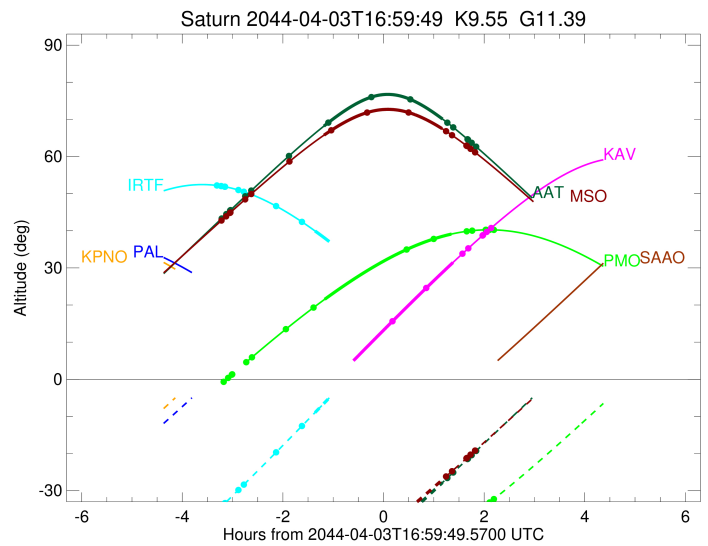
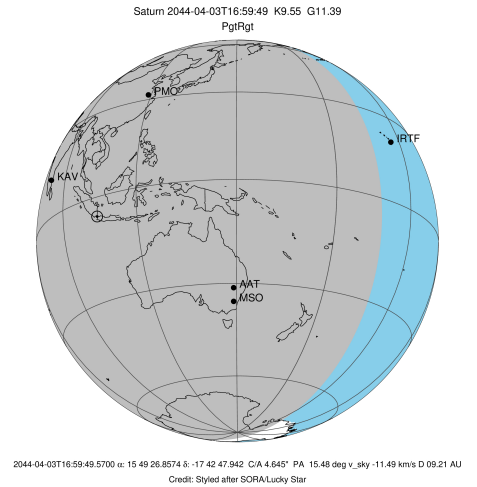
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2044-04-03T17:09:22.310
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 6260640928213402496
 2Mass ID (if available) : 15492685-1742397
 ICRS Star Coord at Epoch: 15h 49m 26.85744s -17:42:47.94183s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 9.546
 G magnitude : 11.389
 RP magnitude : 10.761
 BP magnitude : 11.859
 DUPflag : 0
 Distance (au) : 9.208
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.49
 Sun-Target sep (deg) : 134.87
 Sun-Moon sep (deg) : 154.19
 B (ring opening deg) : 23.93
 PA of pole (deg) : 2.05
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.587
 C/A sky separation (km) : 30635.0
 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_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	2044-04-03T13:48:50.310		-31.50x	-13.58	140461.00	-10.96		
A (OER)	I	2044-04-03T13:54:27.907		-30.16x	-14.93	136774.40	-10.88		
Encke (OEG)	I	2044-04-03T13:59:07.377		-29.05x	-16.06	133744.89	-10.80		
Encke (IEG)	I	2044-04-03T13:59:37.159		-28.93x	-16.17	133423.31	-10.79		
A (IER)	I	2044-04-03T14:17:27.326		-24.69x	-20.46	122050.38	-10.44		
B (OER)	I	2044-04-03T14:24:39.704		-22.98x	-22.18	117571.16	-10.27		
B (IER)	I	2044-04-03T15:09:26.829		-12.40x	-32.81	91984.69	-8.55		
C (IER)	I	2044-04-03T15:50:34.838		-2.75x	-42.38	74490.58	-5.26		
Saturn	I	2044-04-03T15:54:28.885		-1.84x	-43.28	60178.18		-16.35	-19.79
Saturn	E	2044-04-03T18:22:39.749		31.45	-70.71	59824.90		-38.90	-44.50
C (IER)	E	2044-04-03T17:10:19.561	b	15.58	-59.71	74490.58	5.31		
B (IER)	E	2044-04-03T17:50:50.865	b	24.60	-66.93	91984.69	8.75		
B (OER)	E	2044-04-03T18:34:13.151		33.88	-71.43	117571.16	10.69		
A (IER)	E	2044-04-03T18:41:08.009		35.31	-71.66	122050.38	10.90		
Encke (IEG)	E	2044-04-03T18:58:10.810		38.76	-71.54	133423.31	11.32		
Encke (OEG)	E	2044-04-03T18:58:39.196		38.86	-71.52	133744.89	11.33		
A (OER)	E	2044-04-03T19:03:05.367		39.73	-71.32	136774.40	11.43		
F ring	E	2044-04-03T19:08:26.427		40.78	-71.00	140461.00	11.54		

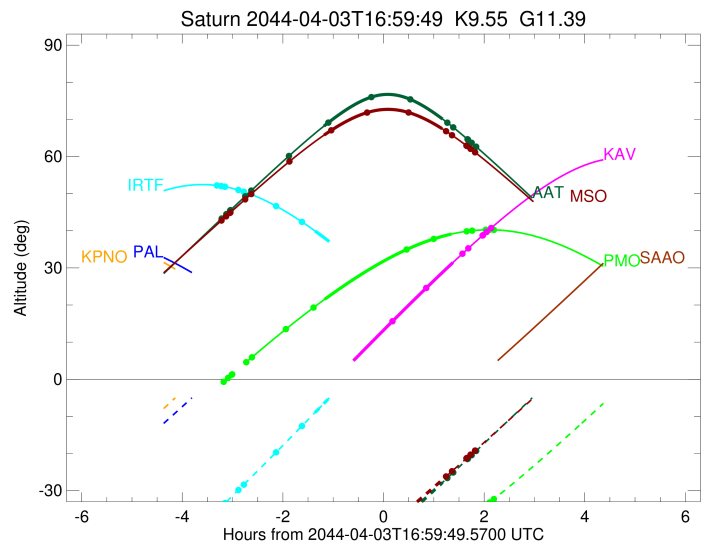
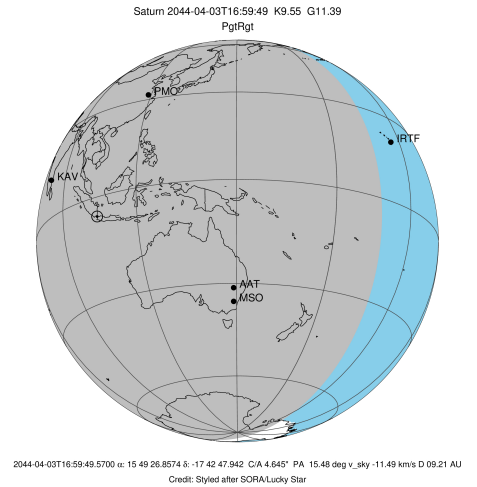
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2044-04-03T16:59:51.770
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 6260640928213402496
 2Mass ID (if available) : 15492685-1742397
 ICRS Star Coord at Epoch: 15h 49m 26.85744s -17:42:47.94183s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 9.546
 G magnitude : 11.389
 RP magnitude : 10.761
 BP magnitude : 11.859
 DUPflag : 0
 Distance (au) : 9.208
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.49
 Sun-Target sep (deg) : 134.87
 Sun-Moon sep (deg) : 153.58
 B (ring opening deg) : 23.93
 PA of pole (deg) : 2.05
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.862
 C/A sky separation (km) : 32467.8
 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	2044-04-03T13:46:53.410		43.32	-64.17	140461.00	-11.21		
A (OER)	I	2044-04-03T13:52:23.736		44.49	-64.37	136774.40	-11.11		
Encke (OEG)	I	2044-04-03T13:56:57.490		45.47	-64.49	133744.89	-11.02		
Encke (IEG)	I	2044-04-03T13:57:26.680		45.57	-64.50	133423.31	-11.01		
A (IER)	I	2044-04-03T14:14:58.361		49.30	-64.53	122050.38	-10.60		
B (OER)	I	2044-04-03T14:22:05.180		50.81	-64.35	117571.16	-10.39		
B (IER)	I	2044-04-03T15:07:07.756		60.16	-60.93	91984.69	-8.27		
C (IER)	I	2044-04-03T15:54:05.221	b	69.15	-54.27	74490.58	-3.64		
Saturn	I	2044-04-03T15:48:42.263		68.19	-55.14	60159.11		-18.06	-21.79
Saturn	E	2044-04-03T18:10:12.254		70.10	-27.81	59783.97		-41.04	-46.66
C (IER)	E	2044-04-03T16:45:08.535	b	76.00	-45.08	74490.58	3.65		
B (IER)	E	2044-04-03T17:31:51.612	b	75.39	-35.77	91984.69	8.35		
B (OER)	E	2044-04-03T18:16:11.884		69.07	-26.55	117571.16	10.61		
A (IER)	E	2044-04-03T18:23:09.311		67.83	-25.08	122050.38	10.84		
Encke (IEG)	E	2044-04-03T18:40:15.179		64.61	-21.45	133423.31	11.31		
Encke (OEG)	E	2044-04-03T18:40:43.601		64.52	-21.35	133744.89	11.32		
A (OER)	E	2044-04-03T18:45:10.020		63.66	-20.40	136774.40	11.42		
F ring	E	2044-04-03T18:50:31.185		62.61	-19.26	140461.00	11.53		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2044-04-03T16:59:41.440
 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 : 6260640928213402496
 2Mass ID (if available) : 15492685-1742397
 ICRS Star Coord at Epoch: 15h 49m 26.85744s -17:42:47.94183s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 9.546
 G magnitude : 11.389
 RP magnitude : 10.761
 BP magnitude : 11.859
 DUPflag : 0
 Distance (au) : 9.208
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.49
 Sun-Target sep (deg) : 134.87
 Sun-Moon sep (deg) : 153.55
 B (ring opening deg) : 23.93
 PA of pole (deg) : 2.05
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.924
 C/A sky separation (km) : 32885.6
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2044-04-03T13:46:38.392		42.78	-60.19	140461.00	-11.15		
A (OER)	I	2044-04-03T13:52:10.399		43.90	-60.37	136774.40	-11.05		
Encke (OEG)	I	2044-04-03T13:56:45.643		44.83	-60.47	133744.89	-10.96		
Encke (IEG)	I	2044-04-03T13:57:14.997		44.92	-60.48	133423.31	-10.95		
A (IER)	I	2044-04-03T14:14:53.414		48.47	-60.51	122050.38	-10.52		
B (OER)	I	2044-04-03T14:22:03.512		49.89	-60.37	117571.16	-10.30		
B (IER)	I	2044-04-03T15:07:41.006		58.67	-57.42	91984.69	-8.10		
C (IER)	I	2044-04-03T15:57:35.763	b	67.08	-51.09	74490.58	-3.02		
Saturn	I	2044-04-03T15:48:49.002		65.75	-52.38	60154.32		-18.47	-22.26
Saturn	E	2044-04-03T18:09:44.456		67.51	-27.13	59775.88		-41.47	-47.08
C (IER)	E	2044-04-03T16:40:04.043	b	71.83	-44.13	74490.58	3.03		
B (IER)	E	2044-04-03T17:29:44.730	b	71.86	-34.96	91984.69	8.18		
B (OER)	E	2044-04-03T18:14:41.611		66.79	-26.14	117571.16	10.52		
A (IER)	E	2044-04-03T18:21:42.609		65.72	-24.73	122050.38	10.76		
Encke (IEG)	E	2044-04-03T18:38:55.968		62.89	-21.26	133423.31	11.23		
Encke (OEG)	E	2044-04-03T18:39:24.576		62.81	-21.17	133744.89	11.25		
A (OER)	E	2044-04-03T18:43:52.692		62.04	-20.26	136774.40	11.35		
F ring	E	2044-04-03T18:49:15.795		61.09	-19.17	140461.00	11.47		