

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-12-31T14:13:22.910
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3425016176936385024
 2Mass ID (if available) : 06113460+2227067

Saturn 2032-12-31T14:13:22 K8.42 G11.01 PgtRgt

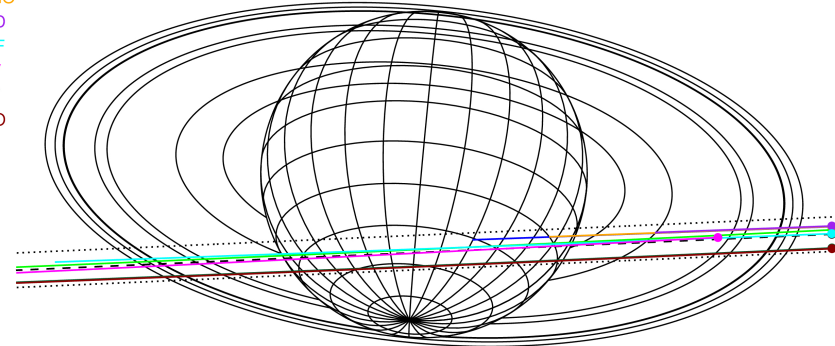
ICRS Star Coord at Epoch: 06h 11m 34.64389s +22:27:05.81808s

RUWE (>1.4 is poor) : 2.76
 K magnitude : 8.418
 G magnitude : 11.012
 RP magnitude : 10.107
 BP magnitude : 11.025
 DUPflag : 0
 Distance (au) : 8.039
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.88
 Sun-Target sep (deg) : 172.61
 Sun-Moon sep (deg) : 174.96
 B (ring opening deg) : -26.32
 PA of pole (deg) : -5.74

Saturn 2032-12-31T14:13:22 K8.42 G11.01
 PgtRgt



Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 KAV
 AAT
 MSO

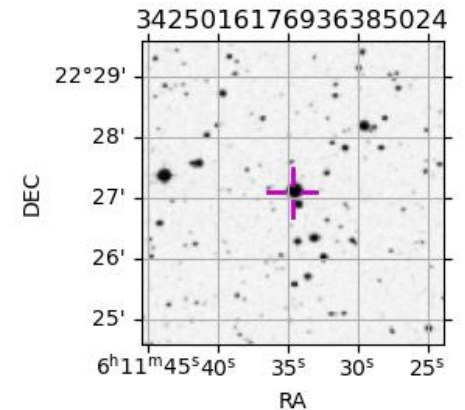


2032-12-31T14:13:22.9100 a: 06 11 34.64389 s: +22 27 05.818 C/A 4.921" PA 2.53 deg v_sky -19.88 km/s D 08.04 AU
 Credit: Styled after SORA/Lucky Star

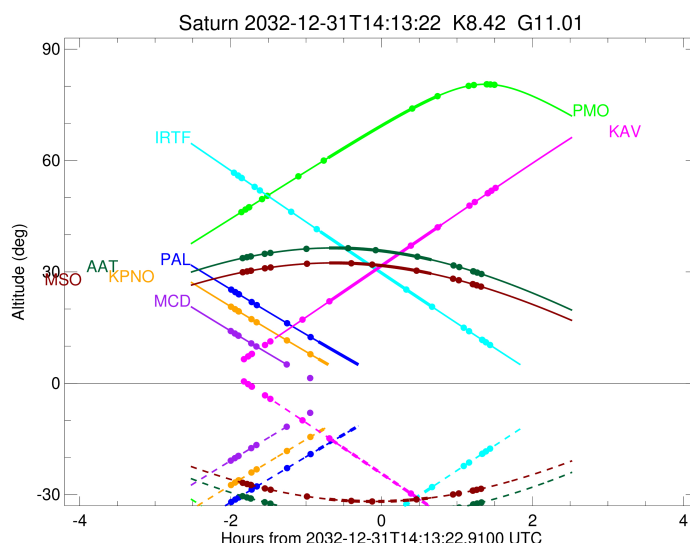
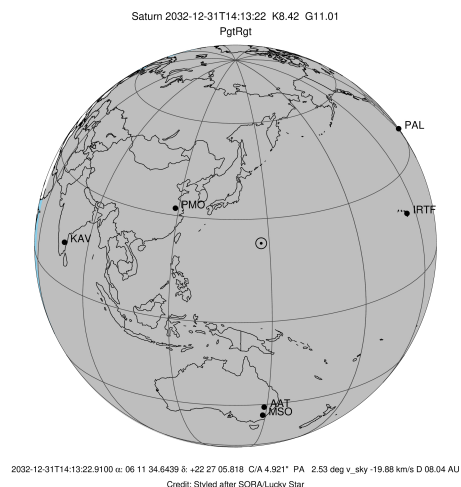
#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring

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	+ + + + + + +	+		DEC 31 12:13 - DEC 31 13:23	PinRin
PMO	Purple Mtn Obs	32.1	118.8	+ + + + + + +	+		DEC 31 12:21 - DEC 31 15:43	PieRie
KPNO	Kitt Peak Natl	32.0	248.4	+ + + + + + +	+		DEC 31 12:13 - DEC 31 13:23	PinRin
MCD	McDonald Obs.	30.7	256.0	+ + + + + + +			DEC 31 12:13 - DEC 31 12:58	PnnRnn
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ + + + + + +	+		DEC 31 12:16 - DEC 31 15:39	PieRie
KAV	Kavalur Observ	12.6	78.8		+		DEC 31 13:10 - DEC 31 15:44	PieRie
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3					PnnRnn
AAT	Siding Spring	-31.3	149.1	+ + + + + + +	+		DEC 31 12:22 - DEC 31 15:32	PieRie
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0	+ + + + + + +	+		DEC 31 12:23 - DEC 31 15:32	PieRie



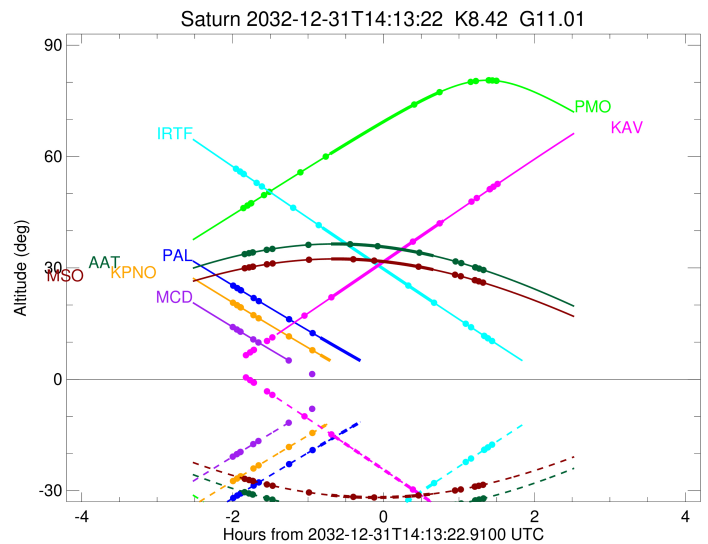
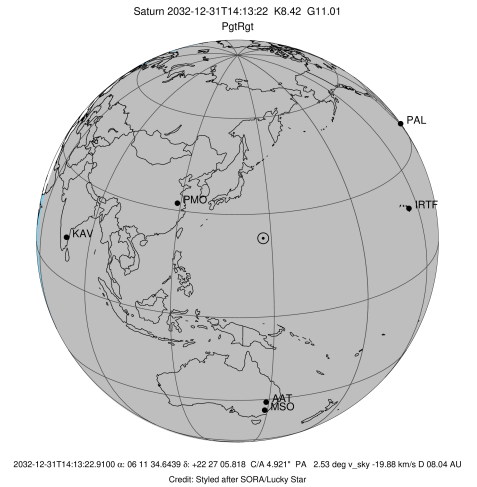
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-12-31T14:09:19.050
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3425016176936385024
 2Mass ID (if available) : 06113460+2227067
 ICRS Star Coord at Epoch: 06h 11m 34.64389s +22:27:05.81808s
 RUWE (>1.4 is poor) : 2.76
 K magnitude : 8.418
 G magnitude : 11.012
 RP magnitude : 10.107
 BP magnitude : 11.025
 DUPflag : 0
 Distance (au) : 8.039
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.88
 Sun-Target sep (deg) : 172.61
 Sun-Moon sep (deg) : 175.93
 B (ring opening deg) : -26.32
 PA of pole (deg) : -5.74
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.248
 C/A sky separation (km) : 24770.5
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



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

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2032-12-31T12:13:53.998		25.22	-31.99	140461.00	-19.15		
A (OER)	I	2032-12-31T12:17:06.984		24.56	-31.32	136774.40	-19.05		
Encke (OEG)	I	2032-12-31T12:19:46.325		24.01	-30.77	133744.89	-18.97		
Encke (IEG)	I	2032-12-31T12:20:03.281		23.95	-30.71	133423.31	-18.96		
A (IER)	I	2032-12-31T12:30:08.902		21.89	-28.63	122050.38	-18.58		
B (OER)	I	2032-12-31T12:34:11.126		21.06	-27.80	117571.16	-18.40		
B (IER)	I	2032-12-31T12:58:19.169		16.17	-22.86	91984.69	-16.74		
C (IER)	I	2032-12-31T13:16:59.139		12.44	-19.08	74490.58	-14.24		
Saturn	I	2032-12-31T13:23:13.802		11.20	-17.83	60175.97		-14.74	-17.90
Saturn	E	2032-12-31T14:55:22.263		-6.20x	0.02x	59944.82		-28.58	-33.66
C (IER)	E	2032-12-31T14:40:19.339	b	-3.49x	-2.78x	74490.58	14.11		
B (IER)	E	2032-12-31T14:59:09.944		-6.87x	0.72x	91984.69	16.58		
B (OER)	E	2032-12-31T15:23:34.797		-11.10x	5.14x	117571.16	18.16		
A (IER)	E	2032-12-31T15:27:40.280		-11.79x	5.87x	122050.38	18.33		
Encke (IEG)	E	2032-12-31T15:37:54.638		-13.48x	7.66x	133423.31	18.68		
Encke (OEG)	E	2032-12-31T15:38:11.850		-13.53x	7.71x	133744.89	18.69		
A (OER)	E	2032-12-31T15:40:53.637		-13.97x	8.17x	136774.40	18.76		
F ring	E	2032-12-31T15:44:09.662		-14.50x	8.74x	140461.00	18.85		

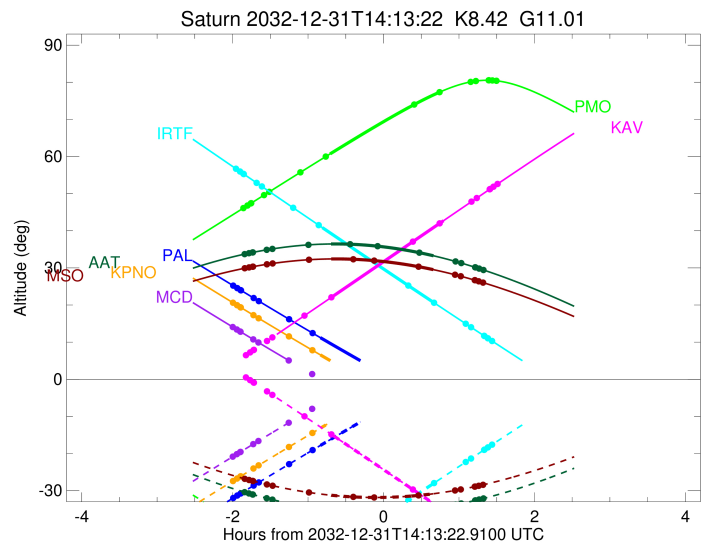
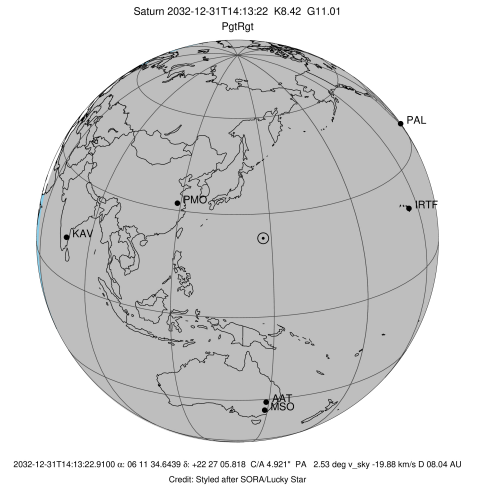
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-12-31T14:14:57.510
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3425016176936385024
 2Mass ID (if available) : 06113460+2227067
 ICRS Star Coord at Epoch: 06h 11m 34.64389s +22:27:05.81808s
 RUWE (>1.4 is poor) : 2.76
 K magnitude : 8.418
 G magnitude : 11.012
 RP magnitude : 10.107
 BP magnitude : 11.025
 DUPflag : 0
 Distance (au) : 8.039
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.88
 Sun-Target sep (deg) : 172.61
 Sun-Moon sep (deg) : 174.94
 B (ring opening deg) : -26.32
 PA of pole (deg) : -5.74
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.734
 C/A sky separation (km) : 27598.7
 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	2032-12-31T12:21:59.317		46.11	-39.65	140461.00	-19.02		
A (OER)	I	2032-12-31T12:25:13.705		46.80	-40.34	136774.40	-18.91		
Encke (OEG)	I	2032-12-31T12:27:54.348		47.37	-40.91	133744.89	-18.81		
Encke (IEG)	I	2032-12-31T12:28:11.451		47.43	-40.97	133423.31	-18.80		
A (IER)	I	2032-12-31T12:38:23.605		49.61	-43.13	122050.38	-18.34		
B (OER)	I	2032-12-31T12:42:29.313		50.48	-43.99	117571.16	-18.12		
B (IER)	I	2032-12-31T13:07:17.604		55.74	-49.26	91984.69	-16.01		
C (IER)	I	2032-12-31T13:27:26.506		59.98	-53.53	74490.58	-12.57		
Saturn	I	2032-12-31T13:30:56.215		60.71	-54.27	60147.78		-16.92	-20.46
Saturn	E	2032-12-31T14:58:41.063		77.45	-72.29	59881.47		-31.57	-36.88
C (IER)	E	2032-12-31T14:37:43.889	b	74.00	-68.16	74490.58	12.53		
B (IER)	E	2032-12-31T14:57:54.616	b	77.34	-72.14	91984.69	16.01		
B (OER)	E	2032-12-31T15:22:41.621		80.11	-76.61	117571.16	18.14		
A (IER)	E	2032-12-31T15:26:46.946		80.34	-77.27	122050.38	18.37		
Encke (IEG)	E	2032-12-31T15:36:58.002		80.54	-78.78	133423.31	18.83		
Encke (OEG)	E	2032-12-31T15:37:15.072		80.54	-78.81	133744.89	18.84		
A (OER)	E	2032-12-31T15:39:55.394		80.50	-79.16	136774.40	18.95		
F ring	E	2032-12-31T15:43:09.377		80.41	-79.56	140461.00	19.06		

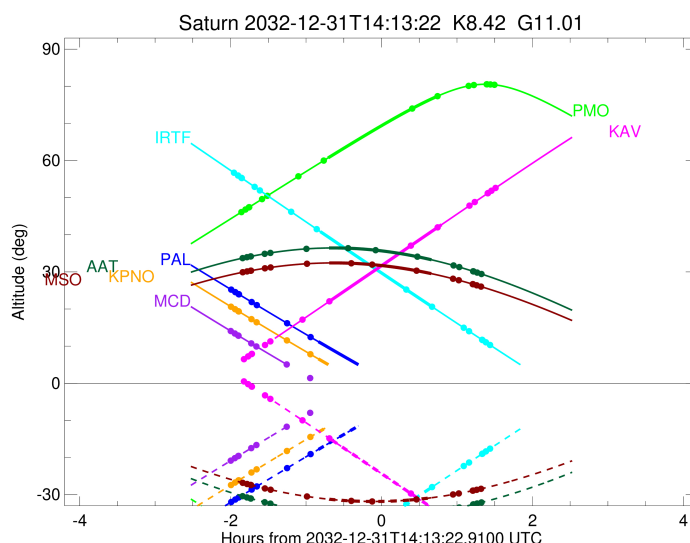
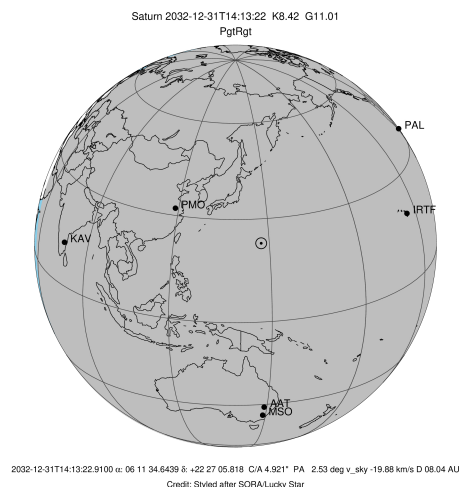
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-12-31T14:09:21.510
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 3425016176936385024
 2Mass ID (if available) : 06113460+2227067
 ICRS Star Coord at Epoch: 06h 11m 34.64389s +22:27:05.81808s
 RUWE (>1.4 is poor) : 2.76
 K magnitude : 8.418
 G magnitude : 11.012
 RP magnitude : 10.107
 BP magnitude : 11.025
 DUPflag : 0
 Distance (au) : 8.039
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.88
 Sun-Target sep (deg) : 172.61
 Sun-Moon sep (deg) : 175.92
 B (ring opening deg) : -26.32
 PA of pole (deg) : -5.74
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.237
 C/A sky separation (km) : 24702.4
 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	2032-12-31T12:13:43.069		20.62	-27.41	140461.00	-19.13		
A (OER)	I	2032-12-31T12:16:56.277		19.95	-26.74	136774.40	-19.03		
Encke (OEG)	I	2032-12-31T12:19:35.797		19.41	-26.19	133744.89	-18.95		
Encke (IEG)	I	2032-12-31T12:19:52.772		19.35	-26.13	133423.31	-18.94		
A (IER)	I	2032-12-31T12:29:59.029		17.27	-24.04	122050.38	-18.56		
B (OER)	I	2032-12-31T12:34:01.485		16.45	-23.20	117571.17	-18.38		
B (IER)	I	2032-12-31T12:58:10.446		11.55	-18.25	91984.69	-16.74		
C (IER)	I	2032-12-31T13:16:49.922		7.83	-14.46	74490.58	-14.26		
Saturn	I	2032-12-31T13:23:09.665		6.58	-13.19	60176.80		-14.68	-17.82
Saturn	E	2032-12-31T14:55:31.267		-10.70x	4.60x	59945.88		-28.53	-33.60
C (IER)	E	2032-12-31T14:40:33.765	b	-8.05x	1.84x	74490.58	14.13		
B (IER)	E	2032-12-31T14:59:23.663		-11.37x	5.31x	91984.69	16.57		
B (OER)	E	2032-12-31T15:23:49.072		-15.49x	9.66x	117571.16	18.15		
A (IER)	E	2032-12-31T15:27:54.715		-16.16x	10.37x	122050.38	18.32		
Encke (IEG)	E	2032-12-31T15:38:09.515		-17.80x	12.12x	133423.31	18.66		
Encke (OEG)	E	2032-12-31T15:38:26.741		-17.85x	12.17x	133744.89	18.67		
A (OER)	E	2032-12-31T15:41:08.651		-18.27x	12.62x	136774.40	18.75		
F ring	E	2032-12-31T15:44:24.830		-18.78x	13.17x	140461.00	18.83		

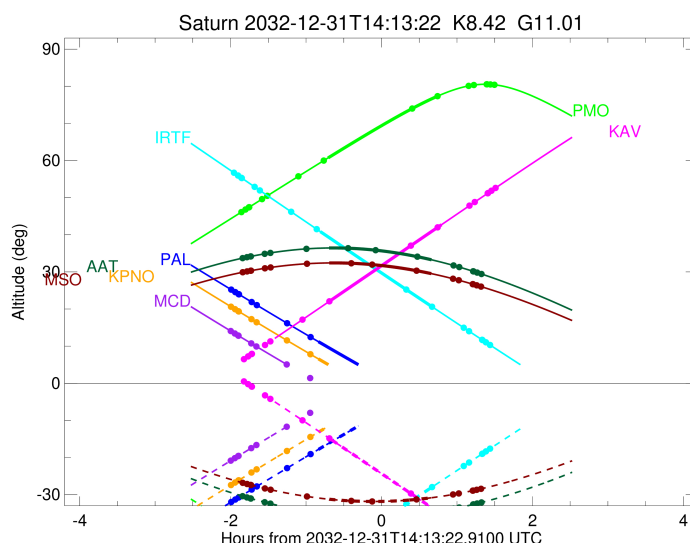
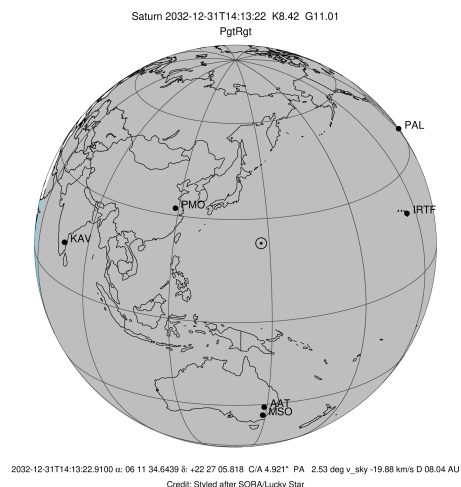
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-12-31T14:09:31.360
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 3425016176936385024
 2Mass ID (if available) : 06113460+2227067
 ICRS Star Coord at Epoch: 06h 11m 34.64389s +22:27:05.81808s
 RUWE (>1.4 is poor) : 2.76
 K magnitude : 8.418
 G magnitude : 11.012
 RP magnitude : 10.107
 BP magnitude : 11.025
 DUPflag : 0
 Distance (au) : 8.039
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.88
 Sun-Target sep (deg) : 172.61
 Sun-Moon sep (deg) : 175.91
 B (ring opening deg) : -26.32
 PA of pole (deg) : -5.74
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.212
 C/A sky separation (km) : 24557.5
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



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

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2032-12-31T12:13:32.226		14.07	-20.84	140461.00	-19.10		
A (OER)	I	2032-12-31T12:16:45.700		13.41	-20.18	136774.40	-19.01		
Encke (OEG)	I	2032-12-31T12:19:25.429		12.86	-19.62	133744.89	-18.92		
Encke (IEG)	I	2032-12-31T12:19:42.426		12.80	-19.56	133423.31	-18.92		
A (IER)	I	2032-12-31T12:29:49.376		10.74	-17.47	122050.38	-18.54		
B (OER)	I	2032-12-31T12:33:52.057		9.92	-16.64	117571.16	-18.37		
B (IER)	I	2032-12-31T12:58:01.314		5.07	-11.71	91984.69	-16.75		
C (IER)	I	2032-12-31T13:16:38.431		1.40x	-7.97	74490.58	-14.32		
Saturn	I	2032-12-31T13:23:08.965		0.14x	-6.67	60178.60		-14.53	-17.64
Saturn	E	2032-12-31T14:55:51.355		-16.69x	10.81x	59948.09		-28.42	-33.48
C (IER)	E	2032-12-31T14:41:06.341	b	-14.19x	8.17x	74490.58	14.19		
B (IER)	E	2032-12-31T14:59:53.337		-17.35x	11.51x	91984.69	16.60		
B (OER)	E	2032-12-31T15:24:18.110		-21.24x	15.68x	117571.16	18.15		
A (IER)	E	2032-12-31T15:28:23.793		-21.86x	16.36x	122050.38	18.31		
Encke (IEG)	E	2032-12-31T15:38:38.788		-23.39x	18.02x	133423.31	18.66		
Encke (OEG)	E	2032-12-31T15:38:56.021		-23.43x	18.07x	133744.89	18.66		
A (OER)	E	2032-12-31T15:41:38.001		-23.82x	18.50x	136774.40	18.74		
F ring	E	2032-12-31T15:44:54.271		-24.29x	19.01x	140461.00	18.83		

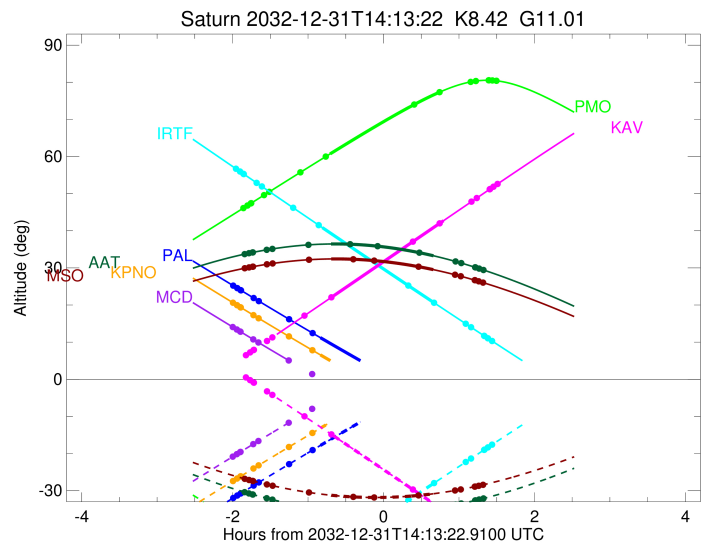
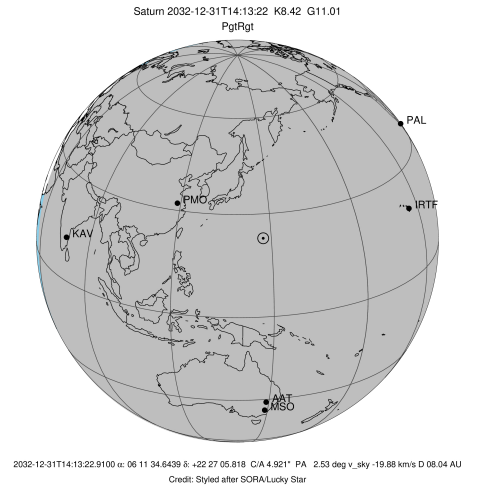
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-12-31T14:09:05.070
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 3425016176936385024
 2Mass ID (if available) : 06113460+2227067
 ICRS Star Coord at Epoch: 06h 11m 34.64389s +22:27:05.81808s
 RUWE (>1.4 is poor) : 2.76
 K magnitude : 8.418
 G magnitude : 11.012
 RP magnitude : 10.107
 BP magnitude : 11.025
 DUPflag : 0
 Distance (au) : 8.039
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.88
 Sun-Target sep (deg) : 172.61
 Sun-Moon sep (deg) : 175.69
 B (ring opening deg) : -26.32
 PA of pole (deg) : -5.74
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.707
 C/A sky separation (km) : 27445.8
 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

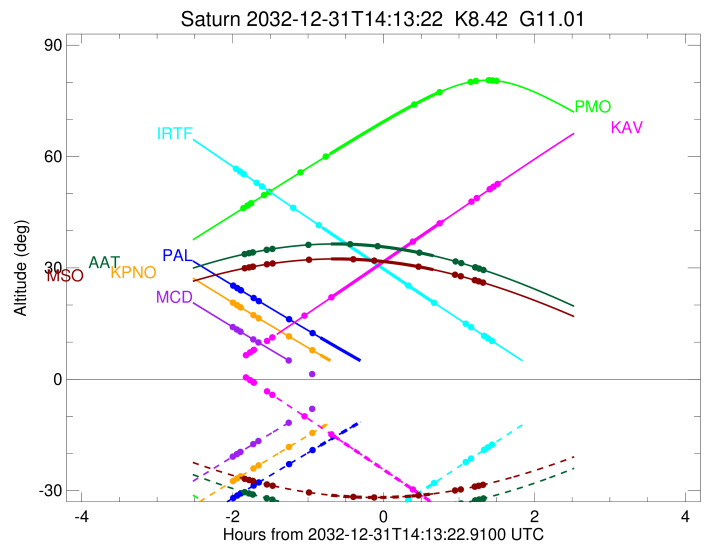
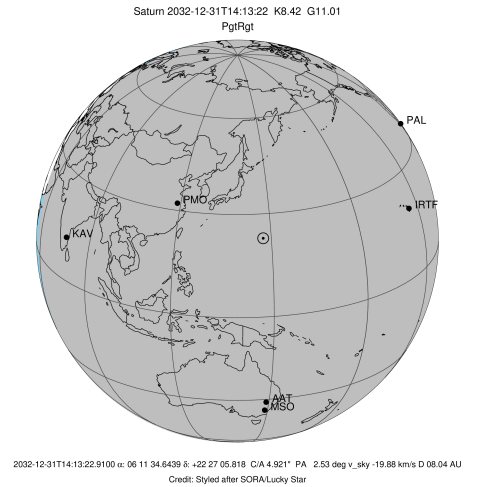
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2032-12-31T12:16:04.309		56.71	-63.99	140461.00	-19.00		
A (OER)	I	2032-12-31T12:19:18.961		55.96	-63.24	136774.40	-18.88		
Encke (OEG)	I	2032-12-31T12:21:59.875		55.34	-62.63	133744.89	-18.77		
Encke (IEG)	I	2032-12-31T12:22:17.009		55.28	-62.56	133423.31	-18.76		
A (IER)	I	2032-12-31T12:32:30.655		52.91	-60.21	122050.38	-18.28		
B (OER)	I	2032-12-31T12:36:37.155		51.96	-59.26	117571.16	-18.05		
B (IER)	I	2032-12-31T13:01:32.569		46.20	-53.53	91984.69	-15.91		
C (IER)	I	2032-12-31T13:21:49.993		41.53	-48.87	74490.58	-12.47		
Saturn	I	2032-12-31T13:24:42.976		40.86	-48.21	60142.71		-17.28	-20.88
Saturn	E	2032-12-31T14:53:23.554		20.65	-28.01	59894.35		-30.98	-36.25
C (IER)	E	2032-12-31T14:33:02.596	b	25.25	-32.61	74490.58	12.34		
B (IER)	E	2032-12-31T14:53:32.859		20.62	-27.97	91984.69	15.73		
B (OER)	E	2032-12-31T15:18:47.310		14.96	-22.29	117571.16	17.79		
A (IER)	E	2032-12-31T15:22:57.478		14.03	-21.35	122050.38	18.01		
Encke (IEG)	E	2032-12-31T15:33:20.952		11.71	-19.03	133423.31	18.45		
Encke (OEG)	E	2032-12-31T15:33:38.375		11.65	-18.97	133744.89	18.46		
A (OER)	E	2032-12-31T15:36:22.040		11.05	-18.36	136774.40	18.56		
F ring	E	2032-12-31T15:39:40.111		10.31	-17.62	140461.00	18.67		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-12-31T14:17:42.820
 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 : 3425016176936385024
 2Mass ID (if available) : 06113460+2227067
 ICRS Star Coord at Epoch: 06h 11m 34.64389s +22:27:05.81808s
 RUWE (>1.4 is poor) : 2.76
 K magnitude : 8.418
 G magnitude : 11.012
 RP magnitude : 10.107
 BP magnitude : 11.025
 DUPflag : 0
 Distance (au) : 8.039
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.88
 Sun-Target sep (deg) : 172.61
 Sun-Moon sep (deg) : 174.38
 B (ring opening deg) : -26.32
 PA of pole (deg) : -5.74
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.951
 C/A sky separation (km) : 28867.7
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2032-12-31T12:24:01.087		6.48	0.50x	140461.00	-18.66		
A (OER)	I	2032-12-31T12:27:19.274		7.24	-0.24x	136774.40	-18.54		
Encke (OEG)	I	2032-12-31T12:30:03.140		7.86	-0.85x	133744.89	-18.43		
Encke (IEG)	I	2032-12-31T12:30:20.590		7.93	-0.91x	133423.31	-18.42		
A (IER)	I	2032-12-31T12:40:45.916		10.31	-3.25x	122050.38	-17.93		
B (OER)	I	2032-12-31T12:44:57.393		11.26	-4.20x	117571.16	-17.69		
B (IER)	I	2032-12-31T13:10:31.621		17.13	-9.98	91984.69	-15.38		
C (IER)	I	2032-12-31T13:31:55.324		22.07	-14.84	74490.58	-11.46		
Saturn	I	2032-12-31T13:33:55.302		22.53	-15.30	60134.14		-17.89	-21.59
Saturn	E	2032-12-31T15:01:05.041		42.71	-35.30	59849.64		-33.02	-38.42
C (IER)	E	2032-12-31T14:36:38.812	b	37.05	-29.68	74490.58	11.45		
B (IER)	E	2032-12-31T14:57:59.066	b	41.99	-34.58	91984.69	15.46		
B (OER)	E	2032-12-31T15:23:20.950		47.85	-40.41	117571.17	17.87		
A (IER)	E	2032-12-31T15:27:29.811		48.81	-41.37	122050.38	18.12		
Encke (IEG)	E	2032-12-31T15:37:48.002		51.18	-43.73	133423.31	18.65		
Encke (OEG)	E	2032-12-31T15:38:05.241		51.24	-43.80	133744.89	18.66		
A (OER)	E	2032-12-31T15:40:47.086		51.86	-44.42	136774.40	18.78		
F ring	E	2032-12-31T15:44:02.753		52.61	-45.16	140461.00	18.91		

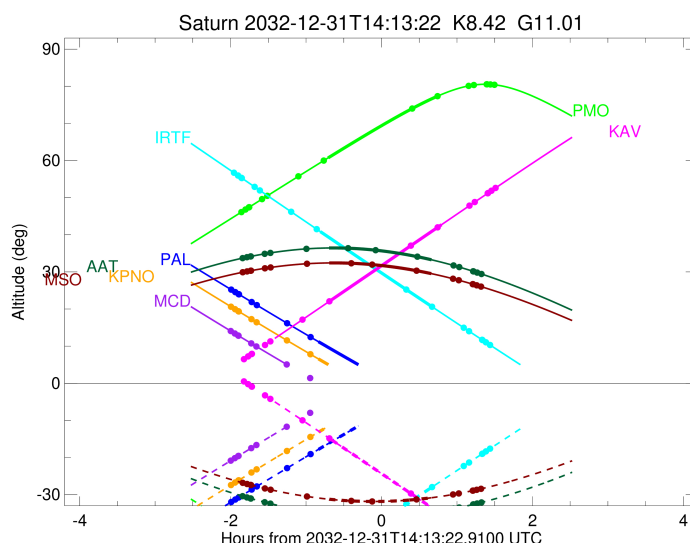
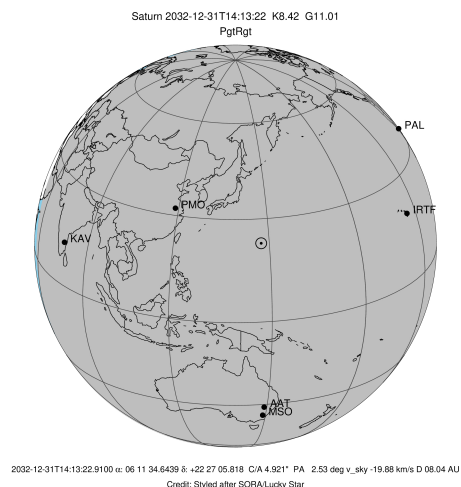
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-12-31T14:12:29.740
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 3425016176936385024
 2Mass ID (if available) : 06113460+2227067
 ICRS Star Coord at Epoch: 06h 11m 34.64389s +22:27:05.81808s
 RUWE (>1.4 is poor) : 2.76
 K magnitude : 8.418
 G magnitude : 11.012
 RP magnitude : 10.107
 BP magnitude : 11.025
 DUPflag : 0
 Distance (au) : 8.039
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.88
 Sun-Target sep (deg) : 172.61
 Sun-Moon sep (deg) : 174.55
 B (ring opening deg) : -26.32
 PA of pole (deg) : -5.74
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.786
 C/A sky separation (km) : 33733.5
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



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

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2032-12-31T12:22:55.901		33.71	-30.41	140461.00	-18.00		
A (OER)	I	2032-12-31T12:26:21.794		33.96	-30.75	136774.40	-17.81		
Encke (OEG)	I	2032-12-31T12:29:12.652		34.16	-31.02	133744.89	-17.65		
Encke (IEG)	I	2032-12-31T12:29:30.882		34.18	-31.05	133423.31	-17.63		
A (IER)	I	2032-12-31T12:40:29.449		34.86	-32.04	122050.38	-16.87		
B (OER)	I	2032-12-31T12:44:57.790		35.11	-32.42	117571.16	-16.50		
B (IER)	I	2032-12-31T13:13:39.018		36.20	-34.39	91984.69	-12.77		
C (IER)	I	2032-12-31T13:46:48.097	b	36.38	-35.66	74490.58	-3.88		
Saturn	I	2032-12-31T13:31:38.850		36.45	-35.22	60048.82		-23.17	-27.65
Saturn	E	2032-12-31T14:53:04.712		33.27	-34.76	59753.51		-37.23	-42.80
C (IER)	E	2032-12-31T14:08:30.094	b	35.86	-35.87	74490.58	3.86		
B (IER)	E	2032-12-31T14:41:52.206	b	34.10	-35.24	91984.69	12.70		
B (OER)	E	2032-12-31T15:10:41.564		31.73	-33.77	117571.16	16.43		
A (IER)	E	2032-12-31T15:15:11.179		31.30	-33.47	122050.38	16.79		
Encke (IEG)	E	2032-12-31T15:26:13.038		30.17	-32.65	133423.31	17.54		
Encke (OEG)	E	2032-12-31T15:26:31.364		30.13	-32.62	133744.89	17.56		
A (OER)	E	2032-12-31T15:29:23.123		29.82	-32.39	136774.40	17.72		
F ring	E	2032-12-31T15:32:50.128		29.44	-32.10	140461.00	17.90		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-12-31T14:12:31.230
 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 : 3425016176936385024
 2Mass ID (if available) : 06113460+2227067
 ICRS Star Coord at Epoch: 06h 11m 34.64389s +22:27:05.81808s
 RUWE (>1.4 is poor) : 2.76
 K magnitude : 8.418
 G magnitude : 11.012
 RP magnitude : 10.107
 BP magnitude : 11.025
 DUPflag : 0
 Distance (au) : 8.039
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.88
 Sun-Target sep (deg) : 172.61
 Sun-Moon sep (deg) : 174.51
 B (ring opening deg) : -26.32
 PA of pole (deg) : -5.74
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.830
 C/A sky separation (km) : 33988.9
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2032-12-31T12:23:00.989		29.90	-26.82	140461.00	-17.93		
A (OER)	I	2032-12-31T12:26:27.653		30.13	-27.13	136774.40	-17.74		
Encke (OEG)	I	2032-12-31T12:29:19.186		30.32	-27.38	133744.89	-17.58		
Encke (IEG)	I	2032-12-31T12:29:37.490		30.33	-27.41	133423.31	-17.56		
A (IER)	I	2032-12-31T12:40:39.048		30.97	-28.33	122050.38	-16.79		
B (OER)	I	2032-12-31T12:45:08.823		31.19	-28.67	117571.16	-16.41		
B (IER)	I	2032-12-31T13:14:05.198		32.20	-30.49	91984.69	-12.59		
C (IER)	I	2032-12-31T13:49:20.554	b	32.33	-31.69	74490.58	-2.93		
Saturn	I	2032-12-31T13:31:47.114		32.41	-31.24	60044.23		-23.43	-27.94
Saturn	E	2032-12-31T14:52:59.191		29.54	-30.84	59747.52		-37.49	-43.06
C (IER)	E	2032-12-31T14:05:44.168	b	31.97	-31.84	74490.58	2.92		
B (IER)	E	2032-12-31T14:41:12.907	b	30.33	-31.29	91984.69	12.53		
B (OER)	E	2032-12-31T15:10:17.276		28.16	-29.96	117571.16	16.34		
A (IER)	E	2032-12-31T15:14:48.281		27.76	-29.68	122050.38	16.71		
Encke (IEG)	E	2032-12-31T15:25:53.009		26.71	-28.93	133423.31	17.47		
Encke (OEG)	E	2032-12-31T15:26:11.405		26.68	-28.91	133744.89	17.49		
A (OER)	E	2032-12-31T15:29:03.803		26.39	-28.70	136774.40	17.65		
F ring	E	2032-12-31T15:32:31.535		26.04	-28.43	140461.00	17.84		