

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2049-08-08T05:03:04.380
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 6772123670047000320
 2Mass ID (if available) : 19340158-2142315

Saturn 2049-08-08T05:03:04 K8.94 G11.35 PgtRgt

ICRS Star Coord at Epoch: 19h 34m 01.55140s -21:42:32.15388s

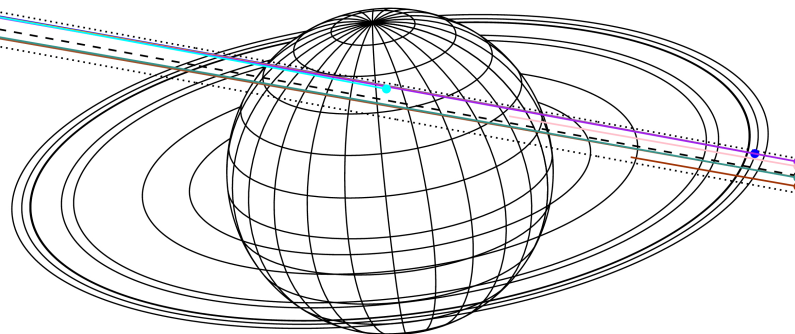
RUWE (>1.4 is poor) : 0.86
 K magnitude : 8.938
 G magnitude : 11.349
 RP magnitude : 10.618
 BP magnitude : 11.937
 DUPflag : 0
 Distance (au) : 9.066
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.64
 Sun-Target sep (deg) : 156.32
 Sun-Moon sep (deg) : 47.87
 B (ring opening deg) : 23.48
 PA of pole (deg) : 6.78

#	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



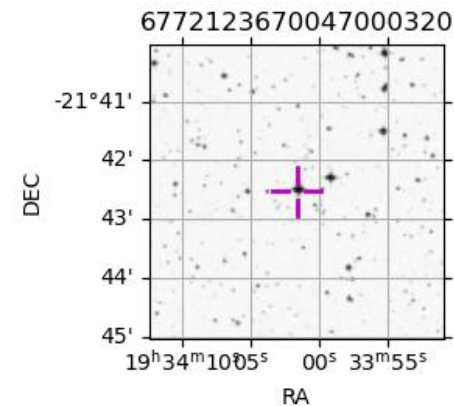
2049-08-08T05:03:04.3800 at: 19 34 01.5514 s: -21 42 32.154 C/A 3.893° PA 169.61 deg v_sky -17.64 km/s D 09.07 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 SAAO

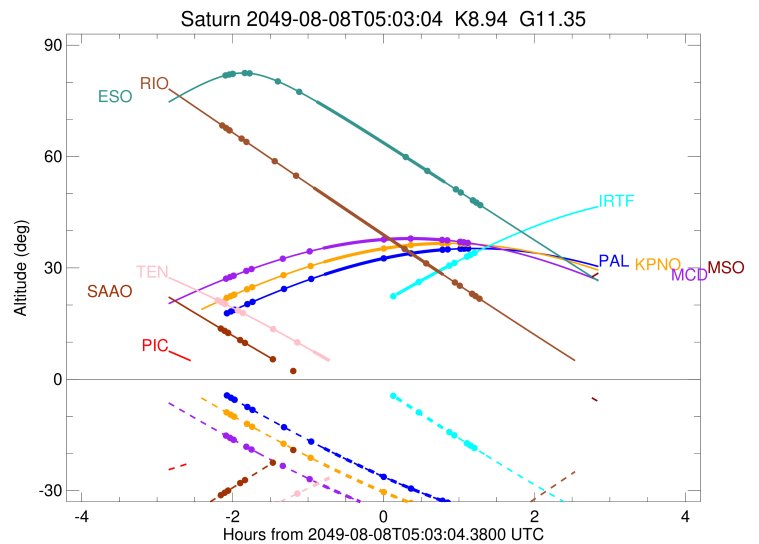
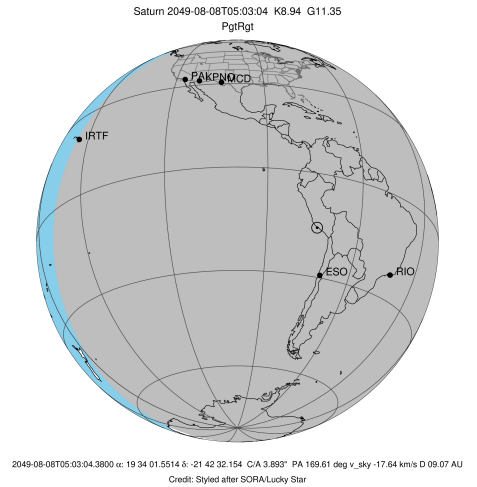


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+	+	+	AUG 08 03:04 - AUG 08 06:10	PieRie
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4	+	+	+	AUG 08 02:58 - AUG 08 06:10	PieRie
MCD	McDonald Obs.	30.7	256.0	+	+	+	AUG 08 02:57 - AUG 08 06:10	PieRie
TEN	Teide Obs./Ten	28.3	343.5	+	+	+	AUG 08 02:51 - AUG 08 04:07	PinRin
IRTF	Mauna Kea/IRTF	19.8	204.5		+	+	AUG 08 05:55 - AUG 08 06:15	PnnRne
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+	+	+	AUG 08 02:54 - AUG 08 06:19	PieRie
ESO	European South	-29.3	289.3	+	+	+	AUG 08 02:57 - AUG 08 06:19	PieRie
AAT	Siding Spring	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro	-32.4	20.8	+	+	+	AUG 08 02:53 - AUG 08 03:35	PnnRin
MSO	Mt. Stromlo Ob	-35.3	149.0					PnnRnn



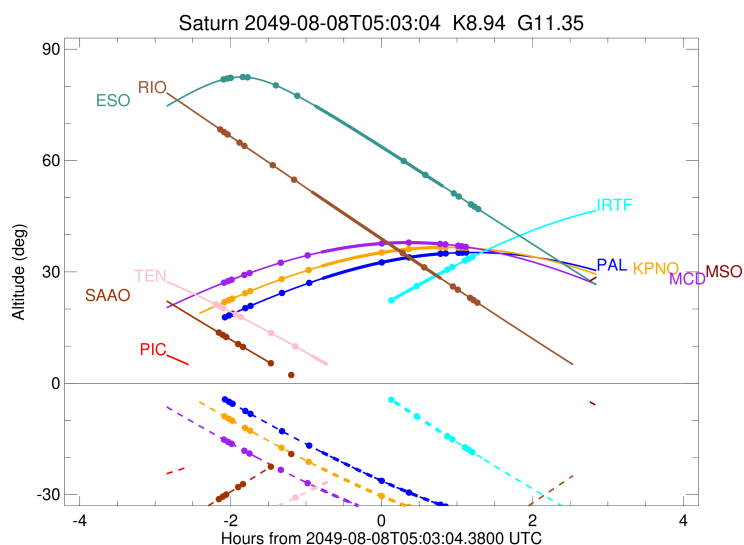
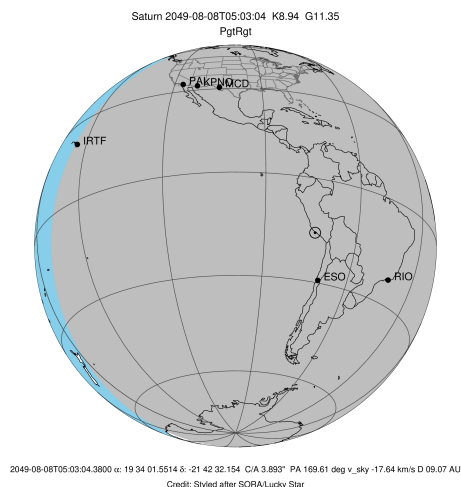
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2049-08-08T05:03:44.960
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 6772123670047000320
 2Mass ID (if available) : 19340158-2142315
 ICRS Star Coord at Epoch: 19h 34m 01.55140s -21:42:32.15388s
 RUWE (>1.4 is poor) : 0.86
 K magnitude : 8.938
 G magnitude : 11.349
 RP magnitude : 10.618
 BP magnitude : 11.937
 DUPflag : 0
 Distance (au) : 9.066
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.64
 Sun-Target sep (deg) : 156.32
 Sun-Moon sep (deg) : 48.19
 B (ring opening deg) : 23.48
 PA of pole (deg) : 6.78
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.704
 C/A sky separation (km) : 30930.9
 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	2049-08-08T02:58:37.774		17.79	-4.36x	140461.00	-19.31		
A (OER)	I	2049-08-08T03:01:49.397		18.28	-4.98x	136774.40	-19.17		
Encke (OEG)	I	2049-08-08T03:04:27.951		18.68	-5.49	133744.89	-19.04		
Encke (IEG)	I	2049-08-08T03:04:44.842		18.73	-5.54	133423.31	-19.03		
A (IER)	I	2049-08-08T03:14:51.062		20.25	-7.47	122050.38	-18.46		
B (OER)	I	2049-08-08T03:18:55.439		20.84	-8.25	117571.16	-18.19		
B (IER)	I	2049-08-08T03:43:58.117		24.32	-12.91	91984.69	-15.54		
C (IER)	I	2049-08-08T04:05:34.199		27.02	-16.79	74490.58	-10.97		
Saturn	I	2049-08-08T04:15:53.299		28.20	-18.58	60215.85		12.64	15.39
Saturn	E	2049-08-08T05:51:05.338		34.91	-32.86	59764.87		43.12	48.72
C (IER)	E	2049-08-08T05:03:07.322	b	32.55	-26.27	74490.58	10.93		
B (IER)	E	2049-08-08T05:24:49.841	b	33.90	-29.43	91984.69	15.46		
B (OER)	E	2049-08-08T05:49:59.068	b	34.88	-32.73	117571.17	18.12		
A (IER)	E	2049-08-08T05:54:04.299		34.98	-33.22	122050.38	18.40		
Encke (IEG)	E	2049-08-08T06:04:12.522		35.16	-34.39	133423.31	18.97		
Encke (OEG)	E	2049-08-08T06:04:29.468		35.16	-34.43	133744.89	18.98		
A (OER)	E	2049-08-08T06:07:08.532		35.19	-34.72	136774.40	19.11		
F ring	E	2049-08-08T06:10:20.767		35.21	-35.06	140461.00	19.25		

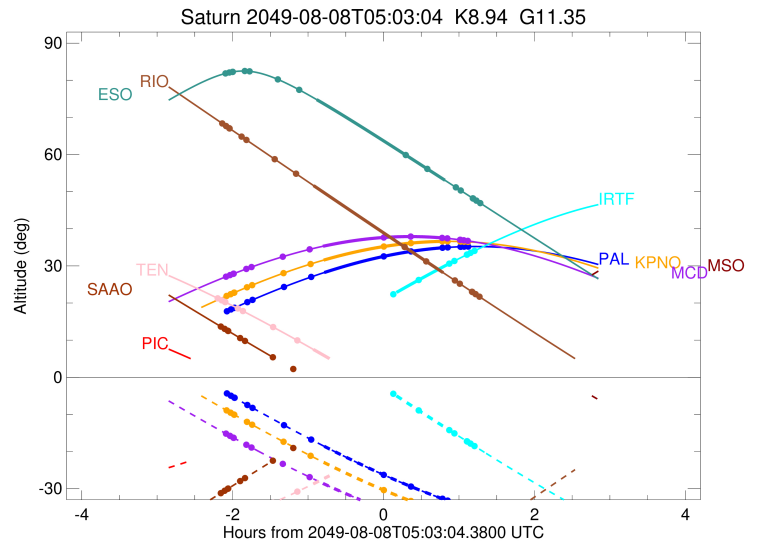
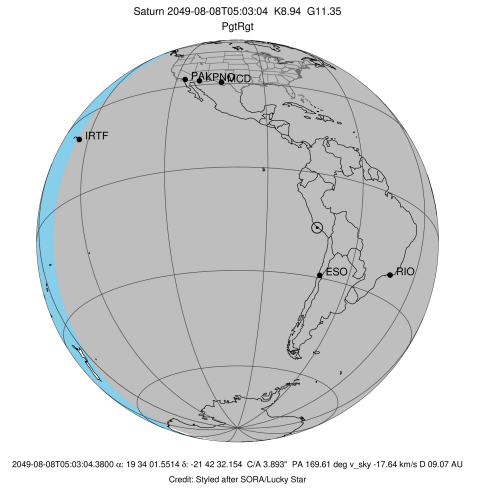
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2049-08-08T05:03:22.020
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 6772123670047000320
 2Mass ID (if available) : 19340158-2142315
 ICRS Star Coord at Epoch: 19h 34m 01.55140s -21:42:32.15388s
 RUWE (>1.4 is poor) : 0.86
 K magnitude : 8.938
 G magnitude : 11.349
 RP magnitude : 10.618
 BP magnitude : 11.937
 DUPflag : 0
 Distance (au) : 9.066
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.64
 Sun-Target sep (deg) : 156.32
 Sun-Moon sep (deg) : 48.26
 B (ring opening deg) : 23.48
 PA of pole (deg) : 6.78
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.685
 C/A sky separation (km) : 30805.6
 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	2049-08-08T02:58:22.405		21.91	-8.93	140461.00	-19.34		
A (OER)	I	2049-08-08T03:01:33.710		22.38	-9.55	136774.40	-19.20		
Encke (OEG)	I	2049-08-08T03:04:11.995		22.76	-10.05	133744.89	-19.08		
Encke (IEG)	I	2049-08-08T03:04:28.857		22.81	-10.10	133423.31	-19.06		
A (IER)	I	2049-08-08T03:14:33.980		24.25	-12.02	122050.38	-18.50		
B (OER)	I	2049-08-08T03:18:37.878		24.81	-12.78	117571.16	-18.23		
B (IER)	I	2049-08-08T03:43:36.633		28.05	-17.37	91984.69	-15.60		
C (IER)	I	2049-08-08T04:05:05.294		30.50	-21.15	74490.58	-11.08		
Saturn	I	2049-08-08T04:15:28.745		31.56	-22.92	60216.52		12.56	15.29
Saturn	E	2049-08-08T05:50:45.277		36.60	-36.41	59767.78		42.96	48.56
C (IER)	E	2049-08-08T05:03:10.445	b	35.21	-30.37	74490.58	11.03		
B (IER)	E	2049-08-08T05:24:46.367	b	36.14	-33.32	91984.69	15.50		
B (OER)	E	2049-08-08T05:49:53.035	b	36.60	-36.32	117571.16	18.14		
A (IER)	E	2049-08-08T05:53:58.058		36.61	-36.76	122050.38	18.42		
Encke (IEG)	E	2049-08-08T06:04:05.928		36.56	-37.79	133423.31	18.98		
Encke (OEG)	E	2049-08-08T06:04:22.867		36.56	-37.81	133744.89	18.99		
A (OER)	E	2049-08-08T06:07:01.870		36.53	-38.07	136774.40	19.11		
F ring	E	2049-08-08T06:10:14.049		36.48	-38.36	140461.00	19.25		

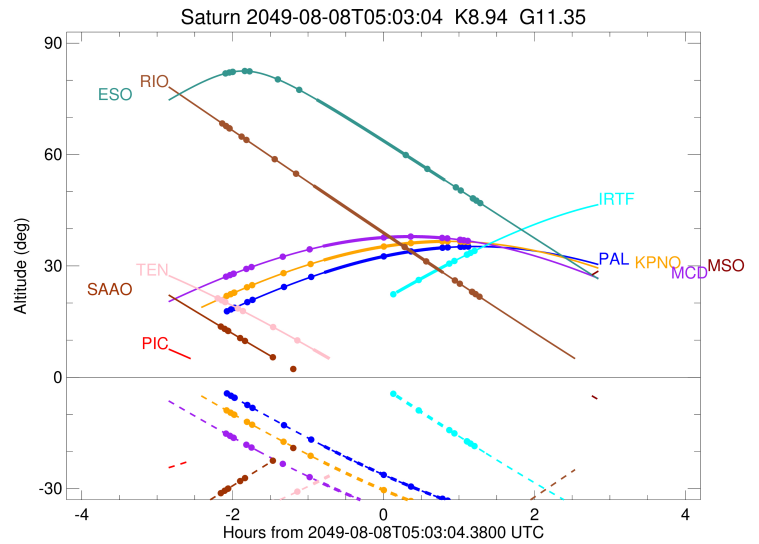
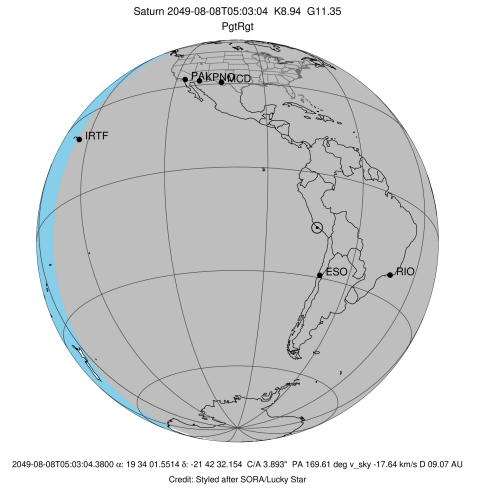
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2049-08-08T05:02:46.230
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 6772123670047000320
 2Mass ID (if available) : 19340158-2142315
 ICRS Star Coord at Epoch: 19h 34m 01.55140s -21:42:32.15388s
 RUWE (>1.4 is poor) : 0.86
 K magnitude : 8.938
 G magnitude : 11.349
 RP magnitude : 10.618
 BP magnitude : 11.937
 DUPflag : 0
 Distance (au) : 9.066
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.64
 Sun-Target sep (deg) : 156.32
 Sun-Moon sep (deg) : 48.36
 B (ring opening deg) : 23.48
 PA of pole (deg) : 6.78
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.659
 C/A sky separation (km) : 30633.8
 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	2049-08-08T02:57:54.338		27.10	-15.20	140461.00	-19.38		
A (OER)	I	2049-08-08T03:01:05.274		27.52	-15.79	136774.40	-19.24		
Encke (OEG)	I	2049-08-08T03:03:43.247		27.87	-16.28	133744.89	-19.12		
Encke (IEG)	I	2049-08-08T03:04:00.076		27.91	-16.33	133423.31	-19.10		
A (IER)	I	2049-08-08T03:14:03.921		29.19	-18.19	122050.38	-18.54		
B (OER)	I	2049-08-08T03:18:07.253		29.69	-18.93	117571.17	-18.27		
B (IER)	I	2049-08-08T03:43:01.264		32.48	-23.33	91984.69	-15.66		
C (IER)	I	2049-08-08T04:04:20.554		34.46	-26.90	74490.58	-11.22		
Saturn	I	2049-08-08T04:14:49.693		35.28	-28.57	60217.44		12.44	15.15
Saturn	E	2049-08-08T05:50:14.645		37.53	-40.44	59771.79		42.74	48.35
C (IER)	E	2049-08-08T05:03:10.083	b	37.65	-35.46	74490.58	11.16		
B (IER)	E	2049-08-08T05:24:37.814	b	37.90	-37.97	91984.69	15.55		
B (OER)	E	2049-08-08T05:49:41.704	b	37.54	-40.39	117571.16	18.16		
A (IER)	E	2049-08-08T05:53:46.558		37.42	-40.72	122050.38	18.43		
Encke (IEG)	E	2049-08-08T06:03:54.219		37.03	-41.48	133423.31	18.98		
Encke (OEG)	E	2049-08-08T06:04:11.156		37.02	-41.50	133744.89	18.99		
A (OER)	E	2049-08-08T06:06:50.149		36.90	-41.68	136774.40	19.11		
F ring	E	2049-08-08T06:10:02.336		36.75	-41.88	140461.00	19.25		

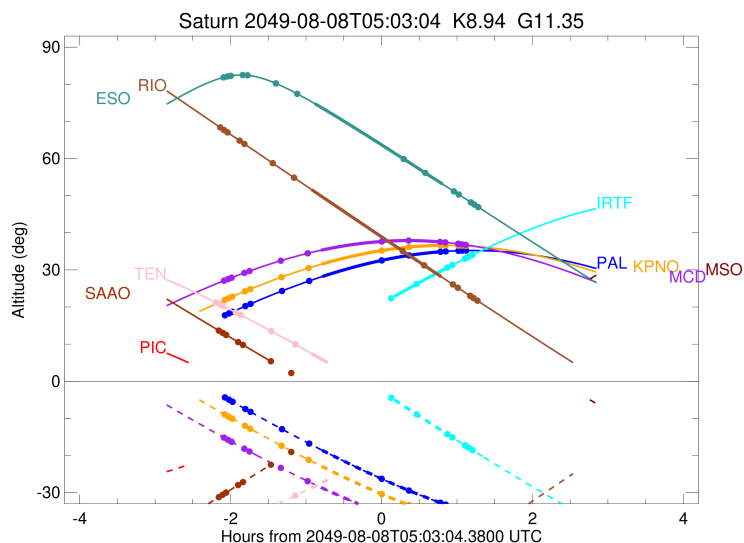
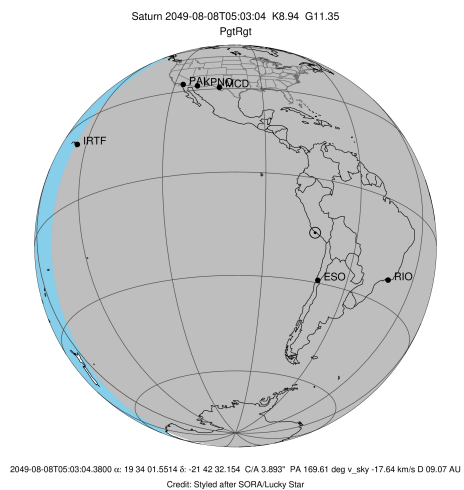
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2049-08-08T04:57:36.380
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 6772123670047000320
 2Mass ID (if available) : 19340158-2142315
 ICRS Star Coord at Epoch: 19h 34m 01.55140s -21:42:32.15388s
 RUWE (>1.4 is poor) : 0.86
 K magnitude : 8.938
 G magnitude : 11.349
 RP magnitude : 10.618
 BP magnitude : 11.937
 DUPflag : 0
 Distance (au) : 9.066
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.64
 Sun-Target sep (deg) : 156.32
 Sun-Moon sep (deg) : 48.44
 B (ring opening deg) : 23.48
 PA of pole (deg) : 6.78
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.205
 C/A sky separation (km) : 27647.9
 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	2049-08-08T02:51:18.965		21.25	-39.68	140461.00	-19.53		
A (OER)	I	2049-08-08T02:54:28.265		20.73	-39.31	136774.40	-19.42		
Encke (OEG)	I	2049-08-08T02:57:04.701		20.28	-39.00	133744.89	-19.31		
Encke (IEG)	I	2049-08-08T02:57:21.356		20.24	-38.96	133423.31	-19.30		
A (IER)	I	2049-08-08T03:07:17.342		18.53	-37.72	122050.38	-18.84		
B (OER)	I	2049-08-08T03:11:16.435		17.84	-37.20	117571.16	-18.62		
B (IER)	I	2049-08-08T03:35:20.117		13.52	-33.80	91984.69	-16.58		
C (IER)	I	2049-08-08T03:54:34.791		9.93	-30.81	74490.58	-13.39		
Saturn	I	2049-08-08T04:07:17.265		7.51	-28.72	60236.31		9.82	12.00
Saturn	E	2049-08-08T05:47:45.458		-12.85x	-9.98	59827.42		39.72	45.34
C (IER)	E	2049-08-08T05:07:50.649	b	-4.56x	-17.81	74490.58	13.23		
B (IER)	E	2049-08-08T05:27:20.797	b	-8.58x	-14.03	91984.69	16.35		
B (OER)	E	2049-08-08T05:51:45.910		-13.69x	-9.17	117571.16	18.33		
A (IER)	E	2049-08-08T05:55:48.908		-14.55x	-8.36	122050.38	18.54		
Encke (IEG)	E	2049-08-08T06:05:55.204		-16.69x	-6.30	133423.31	18.96		
Encke (OEG)	E	2049-08-08T06:06:12.160		-16.75x	-6.24	133744.89	18.97		
A (OER)	E	2049-08-08T06:08:51.453		-17.32x	-5.70	136774.40	19.06		
F ring	E	2049-08-08T06:12:04.294		-18.00x	-5.04	140461.00	19.17		

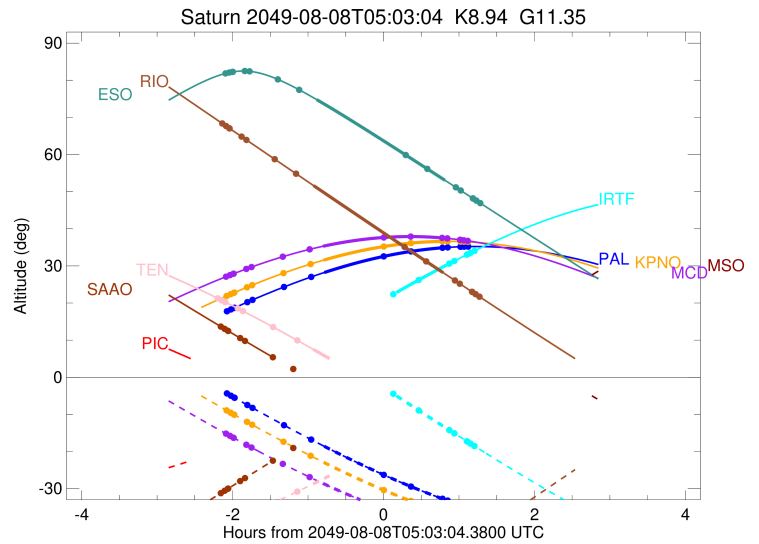
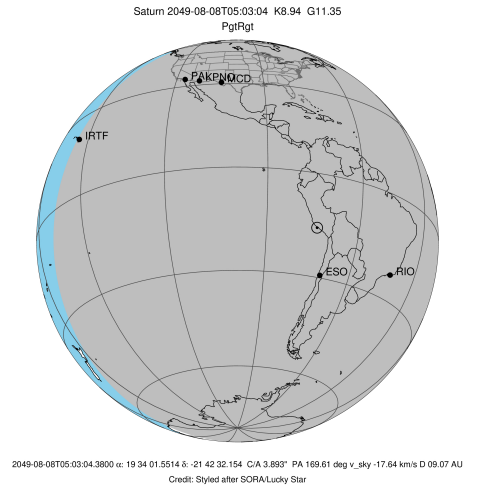
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2049-08-08T05:06:59.030
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 6772123670047000320
 2Mass ID (if available) : 19340158-2142315
 ICRS Star Coord at Epoch: 19h 34m 01.55140s -21:42:32.15388s
 RUWE (>1.4 is poor) : 0.86
 K magnitude : 8.938
 G magnitude : 11.349
 RP magnitude : 10.618
 BP magnitude : 11.937
 DUPflag : 0
 Distance (au) : 9.066
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.64
 Sun-Target sep (deg) : 156.32
 Sun-Moon sep (deg) : 47.68
 B (ring opening deg) : 23.48
 PA of pole (deg) : 6.78
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.519
 C/A sky separation (km) : 29710.6
 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	2049-08-08T03:01:12.463		-4.77x	25.19x	140461.00	-19.39		
A (OER)	I	2049-08-08T03:04:22.974		-4.07x	24.46x	136774.40	-19.29		
Encke (OEG)	I	2049-08-08T03:07:00.464		-3.50x	23.85x	133744.89	-19.18		
Encke (IEG)	I	2049-08-08T03:07:17.235		-3.43x	23.78x	133423.31	-19.17		
A (IER)	I	2049-08-08T03:17:17.918		-1.25x	21.46x	122050.38	-18.67		
B (OER)	I	2049-08-08T03:21:19.312		-0.37x	20.52x	117571.16	-18.43		
B (IER)	I	2049-08-08T03:45:47.994		4.91x	14.87x	91984.69	-16.12		
C (IER)	I	2049-08-08T04:06:02.377		9.21	10.22x	74490.58	-12.28		
Saturn	I	2049-08-08T04:18:05.848		11.73	7.47x	60227.73		11.08	13.53
Saturn	E	2049-08-08T05:55:13.023		30.59	-14.20	59780.70		42.26	47.87
C (IER)	E	2049-08-08T05:10:43.454	b	22.33	-4.41x	74490.58	12.27		
B (IER)	E	2049-08-08T05:30:58.608	b	26.19	-8.90	91984.69	16.13		
B (OER)	E	2049-08-08T05:55:22.964		30.62	-14.23	117571.17	18.52		
A (IER)	E	2049-08-08T05:59:23.088		31.32	-15.10	122050.38	18.78		
Encke (IEG)	E	2049-08-08T06:09:20.081		33.02	-17.24	133423.31	19.30		
Encke (OEG)	E	2049-08-08T06:09:36.738		33.07	-17.30	133744.89	19.31		
A (OER)	E	2049-08-08T06:12:13.143		33.51	-17.86	136774.40	19.43		
F ring	E	2049-08-08T06:15:22.283		34.03	-18.53	140461.00	19.55		

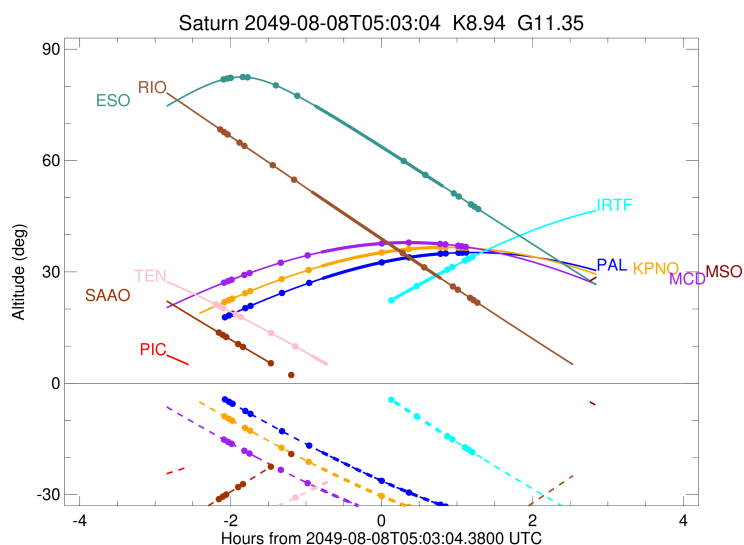
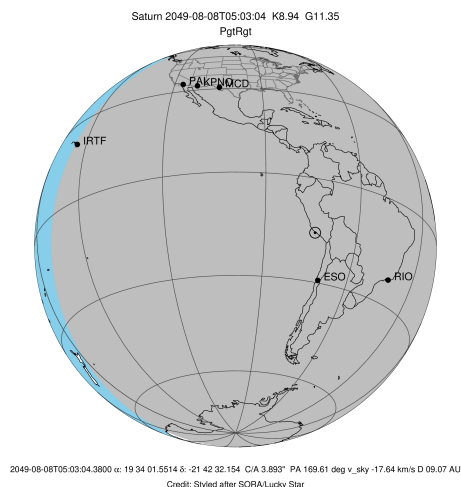
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2049-08-08T04:59:01.670
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 6772123670047000320
 2Mass ID (if available) : 19340158-2142315
 ICRS Star Coord at Epoch: 19h 34m 01.55140s -21:42:32.15388s
 RUWE (>1.4 is poor) : 0.86
 K magnitude : 8.938
 G magnitude : 11.349
 RP magnitude : 10.618
 BP magnitude : 11.937
 DUPflag : 0
 Distance (au) : 9.066
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.64
 Sun-Target sep (deg) : 156.32
 Sun-Moon sep (deg) : 48.80
 B (ring opening deg) : 23.48
 PA of pole (deg) : 6.78
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.605
 C/A sky separation (km) : 23701.6
 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	2049-08-08T02:54:56.310		68.36	-83.21	140461.00	-20.22		
A (OER)	I	2049-08-08T02:57:58.980		67.66	-83.26	136774.40	-20.14		
Encke (OEG)	I	2049-08-08T03:00:29.683		67.08	-83.25	133744.89	-20.06		
Encke (IEG)	I	2049-08-08T03:00:45.714		67.01	-83.24	133423.31	-20.06		
A (IER)	I	2049-08-08T03:10:17.297		64.81	-82.71	122050.38	-19.72		
B (OER)	I	2049-08-08T03:14:05.297		63.94	-82.32	117571.17	-19.56		
B (IER)	I	2049-08-08T03:36:36.762		58.74	-78.77	91984.69	-18.13		
C (IER)	I	2049-08-08T03:53:34.734		54.83	-75.37	74490.58	-16.02		
Saturn	I	2049-08-08T04:07:26.934		51.64	-72.41	60256.01		6.02	7.38
Saturn	E	2049-08-08T05:50:29.374		28.18	-49.01	59894.15		36.03	41.57
C (IER)	E	2049-08-08T05:19:45.510	b	35.13	-56.09	74490.58	15.80		
B (IER)	E	2049-08-08T05:36:57.759	b	31.23	-52.13	91984.69	17.88		
B (OER)	E	2049-08-08T05:59:49.952		26.08	-46.86	117571.16	19.24		
A (IER)	E	2049-08-08T06:03:41.851		25.21	-45.97	122050.38	19.39		
Encke (IEG)	E	2049-08-08T06:13:23.810		23.04	-43.73	133423.31	19.68		
Encke (OEG)	E	2049-08-08T06:13:40.144		22.98	-43.67	133744.89	19.69		
A (OER)	E	2049-08-08T06:16:13.738		22.41	-43.08	136774.40	19.76		
F ring	E	2049-08-08T06:19:19.996		21.71	-42.36	140461.00	19.83		

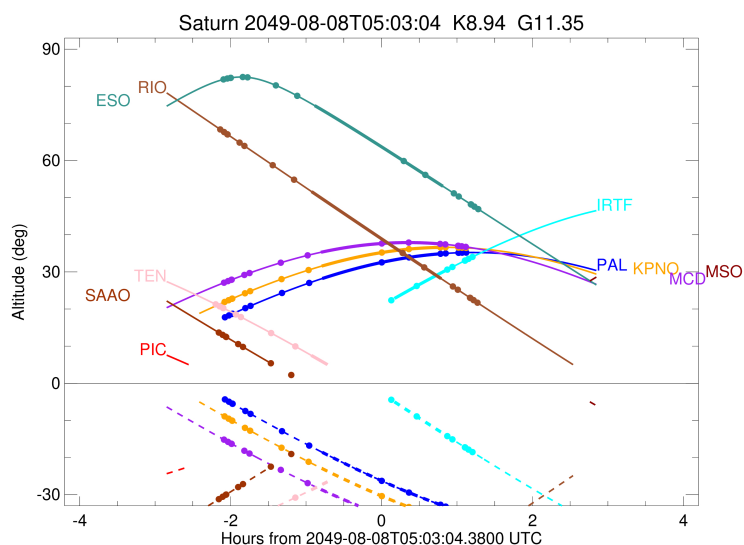
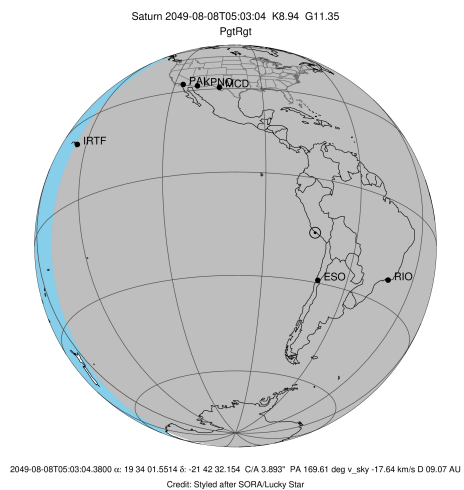
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2049-08-08T05:01:02.610
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 6772123670047000320
 2Mass ID (if available) : 19340158-2142315
 ICRS Star Coord at Epoch: 19h 34m 01.55140s -21:42:32.15388s
 RUWE (>1.4 is poor) : 0.86
 K magnitude : 8.938
 G magnitude : 11.349
 RP magnitude : 10.618
 BP magnitude : 11.937
 DUPflag : 0
 Distance (au) : 9.066
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.64
 Sun-Target sep (deg) : 156.32
 Sun-Moon sep (deg) : 48.77
 B (ring opening deg) : 23.48
 PA of pole (deg) : 6.78
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.663
 C/A sky separation (km) : 24083.8
 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	2049-08-08T02:57:31.046		81.86	-61.34	140461.00	-20.28		
A (OER)	I	2049-08-08T03:00:33.200		82.10	-61.96	136774.40	-20.20		
Encke (OEG)	I	2049-08-08T03:03:03.482		82.26	-62.46	133744.89	-20.12		
Encke (IEG)	I	2049-08-08T03:03:19.467		82.27	-62.52	133423.31	-20.11		
A (IER)	I	2049-08-08T03:12:49.506		82.49	-64.41	122050.38	-19.77		
B (OER)	I	2049-08-08T03:16:36.931		82.41	-65.15	117571.16	-19.61		
B (IER)	I	2049-08-08T03:39:06.114		80.24	-69.36	91984.69	-18.14		
C (IER)	I	2049-08-08T03:56:05.663		77.43	-72.21	74490.58	-15.95		
Saturn	I	2049-08-08T04:09:54.006		74.81	-74.18	60255.08		6.25	7.66
Saturn	E	2049-08-08T05:51:57.749		53.06	-70.38	59886.39		36.47	42.02
C (IER)	E	2049-08-08T05:20:38.642	b	59.89	-74.96	74490.58	15.76		
B (IER)	E	2049-08-08T05:37:50.040	b	56.15	-72.66	91984.69	17.93		
B (OER)	E	2049-08-08T06:00:35.397		51.17	-68.86	117571.16	19.36		
A (IER)	E	2049-08-08T06:04:25.806		50.33	-68.17	122050.38	19.51		
Encke (IEG)	E	2049-08-08T06:14:03.754		48.21	-66.36	133423.31	19.83		
Encke (OEG)	E	2049-08-08T06:14:19.971		48.16	-66.31	133744.89	19.83		
A (OER)	E	2049-08-08T06:16:52.449		47.60	-65.82	136774.40	19.90		
F ring	E	2049-08-08T06:19:57.328		46.92	-65.22	140461.00	19.98		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2049-08-08T04:59:29.810
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : SAAO
 Location : So. Afr. Astro. Obs. (Sutherland)
 Latitude (deg) : -32.37953
 E. Longitude (deg) : 20.81070
 Altitude (km) : 1.768
 Gaia source ID : 6772123670047000320
 2Mass ID (if available) : 19340158-2142315
 ICRS Star Coord at Epoch: 19h 34m 01.55140s -21:42:32.15388s
 RUWE (>1.4 is poor) : 0.86
 K magnitude : 8.938
 G magnitude : 11.349
 RP magnitude : 10.618
 BP magnitude : 11.937
 DUPflag : 0
 Distance (au) : 9.066
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.64
 Sun-Target sep (deg) : 156.32
 Sun-Moon sep (deg) : 48.14
 B (ring opening deg) : 23.48
 PA of pole (deg) : 6.78
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.147
 C/A sky separation (km) : 20689.4
 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	2049-08-08T02:53:48.275		13.64	-31.20	140461.00	-20.15		
A (OER)	I	2049-08-08T02:56:51.532		13.02	-30.56	136774.40	-20.09		
Encke (OEG)	I	2049-08-08T02:59:22.569		12.51	-30.03	133744.89	-20.03		
Encke (IEG)	I	2049-08-08T02:59:38.626		12.46	-29.97	133423.31	-20.02		
A (IER)	I	2049-08-08T03:09:09.957		10.54	-27.95	122050.38	-19.78		
B (OER)	I	2049-08-08T03:12:57.088		9.79	-27.15	117571.17	-19.66		
B (IER)	I	2049-08-08T03:35:09.296		5.38	-22.47	91984.69	-18.63		
C (IER)	I	2049-08-08T03:51:22.600		2.22x	-19.05	74490.58	-17.17		
Saturn	I	2049-08-08T04:05:31.679		-0.50x	-16.09	60264.98		3.02	3.70
Saturn	E	2049-08-08T05:53:23.462		-19.37x	5.82x	59937.10		33.58	39.01
C (IER)	E	2049-08-08T05:27:31.224	b	-15.21x	0.71x	74490.58	16.99		
B (IER)	E	2049-08-08T05:43:54.074	b	-17.88x	3.96x	91984.69	18.45		
B (OER)	E	2049-08-08T06:06:19.885		-21.33x	8.32x	117571.16	19.45		
A (IER)	E	2049-08-08T06:10:09.559		-21.90x	9.05x	122050.38	19.56		
Encke (IEG)	E	2049-08-08T06:19:47.642		-23.29x	10.88x	133423.31	19.78		
Encke (OEG)	E	2049-08-08T06:20:03.897		-23.33x	10.93x	133744.89	19.79		
A (OER)	E	2049-08-08T06:22:36.811		-23.69x	11.41x	136774.40	19.84		
F ring	E	2049-08-08T06:25:42.396		-24.12x	11.99x	140461.00	19.89		