

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-29T08:08:27.800
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4066739021724394752
 2Mass ID (if available) : 18101238-2219116

Saturn 2047-05-29T08:08:27 K7.94 G11.70 PgtRgt

ICRS Star Coord at Epoch: 18h 10m 12.39601s -22:19:11.93299s

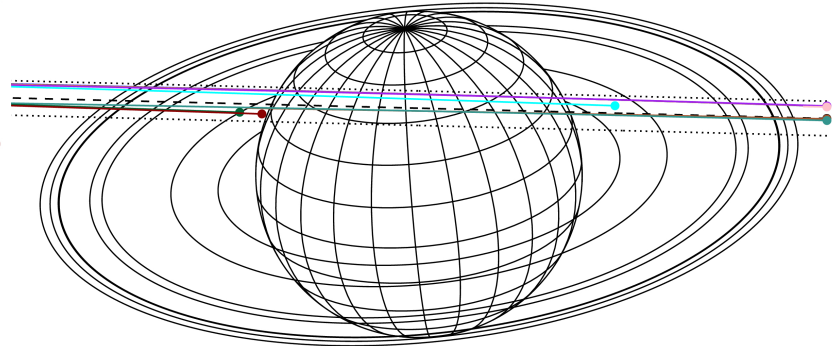
RUWE (>1.4 is poor) : 0.87
 K magnitude : 7.942
 G magnitude : 11.703
 RP magnitude : 10.680
 BP magnitude : 12.785
 DUPflag : 0
 Distance (au) : 9.119
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.37
 Sun-Target sep (deg) : 154.88
 Sun-Moon sep (deg) : 153.92
 B (ring opening deg) : 26.22
 PA of pole (deg) : 5.71

Saturn 2047-05-29T08:08:27 K7.94 G11.70
 PgtRgt



2047-05-29T08:08:27.8000 at: 18 10 12.3960 6: -22 19 11.933 C/A 3.700" PA 178.56 deg v_sky -17.37 km/s D 09.12 AU
 Credit: Styled after SORA/Lucky Star

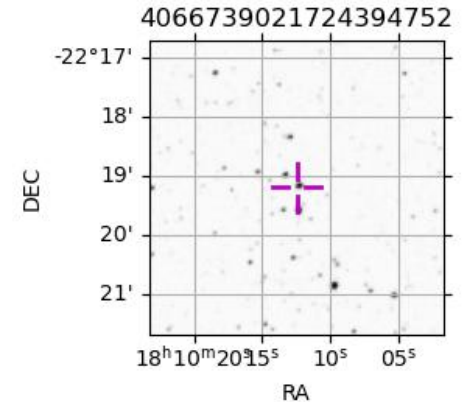
Earth
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 AAT
 MSO



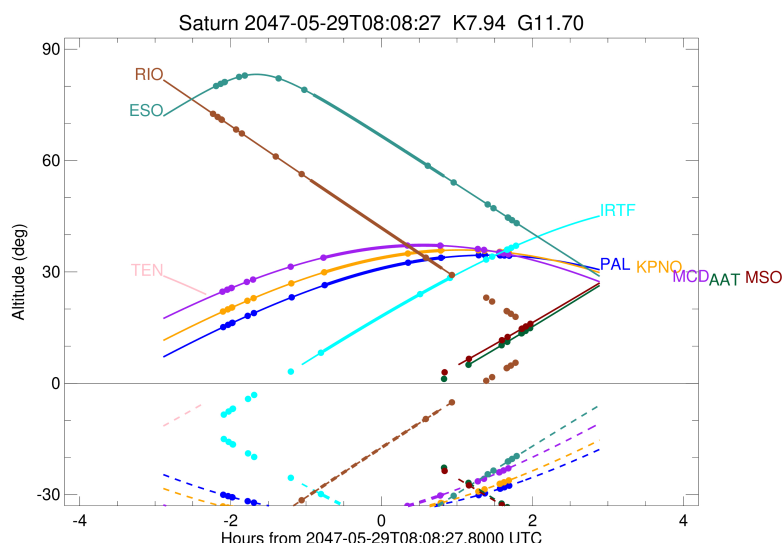
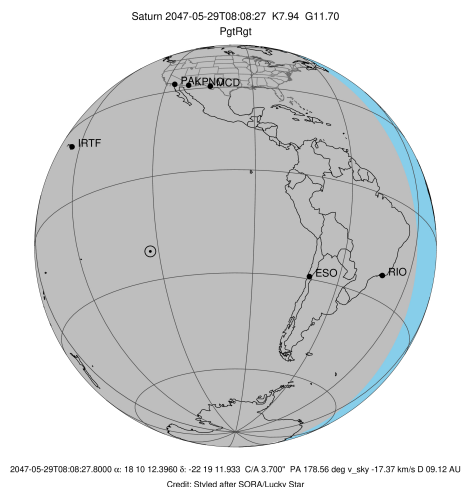
#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring

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	+	+	+	MAY 29 06:02 - MAY 29 09:49	PieRie
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4	+	+	+	MAY 29 06:02 - MAY 29 09:49	PieRie
MCD	McDonald Obs.	30.7	256.0	+	+	+	MAY 29 06:01 - MAY 29 09:49	PieRie
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5		+	+	MAY 29 07:20 - MAY 29 09:55	PieRie
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+	+	+	MAY 29 05:54 - MAY 29 09:04	PieRie
ESO	European South	-29.3	289.3	+	+	+	MAY 29 05:56 - MAY 29 09:55	PieRie
AAT	Siding Spring	-31.3	149.1			+	MAY 29 09:43 - MAY 29 10:06	PnnRne
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0			+	MAY 29 09:17 - MAY 29 10:06	PnnRne



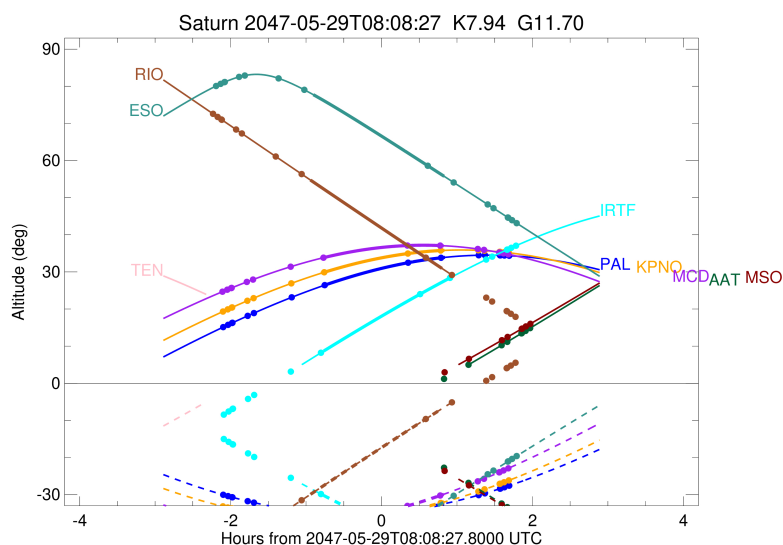
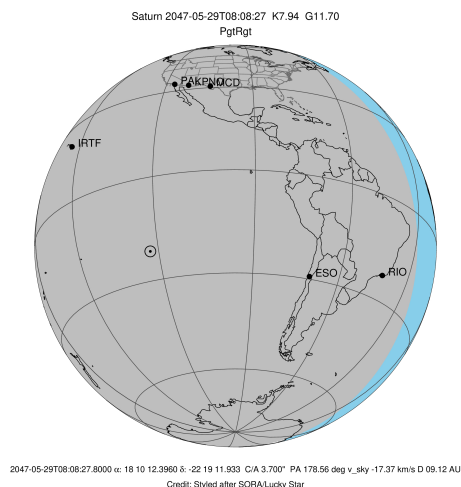
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-29T08:10:03.910
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4066739021724394752
 2Mass ID (if available) : 18101238-2219116
 ICRS Star Coord at Epoch: 18h 10m 12.39601s -22:19:11.93299s
 RUWE (>1.4 is poor) : 0.87
 K magnitude : 7.942
 G magnitude : 11.703
 RP magnitude : 10.680
 BP magnitude : 12.785
 DUPflag : 0
 Distance (au) : 9.119
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.37
 Sun-Target sep (deg) : 154.88
 Sun-Moon sep (deg) : 154.36
 B (ring opening deg) : 26.22
 PA of pole (deg) : 5.71
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.483
 C/A sky separation (km) : 29648.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



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

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-05-29T06:02:36.610		15.12	-30.03	140461.00	-16.11		
A (OER)	I	2047-05-29T06:06:26.312		15.73	-30.40	136774.40	-15.99		
Encke (OEG)	I	2047-05-29T06:09:36.379		16.23	-30.69	133744.89	-15.89		
Encke (IEG)	I	2047-05-29T06:09:56.628		16.29	-30.72	133423.31	-15.88		
A (IER)	I	2047-05-29T06:22:03.457		18.16	-31.76	122050.38	-15.40		
B (OER)	I	2047-05-29T06:26:56.549		18.89	-32.15	117571.16	-15.16		
B (IER)	I	2047-05-29T06:57:02.219		23.15	-34.03	91984.69	-12.89		
C (IER)	I	2047-05-29T07:23:17.391	b	26.43	-34.96	74490.58	-8.89		
Saturn	I	2047-05-29T07:20:51.496		26.15	-34.90	60105.68		19.87	23.89
Saturn	E	2047-05-29T08:58:54.688		33.92	-32.41	59862.88		32.59	37.96
C (IER)	E	2047-05-29T08:29:28.826	b	32.47	-34.17	74490.58	8.85		
B (IER)	E	2047-05-29T08:55:46.001	b	33.80	-32.64	91984.69	12.91		
B (OER)	E	2047-05-29T09:25:46.000		34.48	-30.13	117571.16	15.23		
A (IER)	E	2047-05-29T09:30:37.749		34.51	-29.66	122050.38	15.47		
Encke (IEG)	E	2047-05-29T09:42:40.846		34.46	-28.40	133423.31	15.96		
Encke (OEG)	E	2047-05-29T09:43:00.984		34.46	-28.36	133744.89	15.97		
A (OER)	E	2047-05-29T09:46:09.983		34.42	-28.01	136774.40	16.08		
F ring	E	2047-05-29T09:49:58.348		34.36	-27.59	140461.00	16.20		

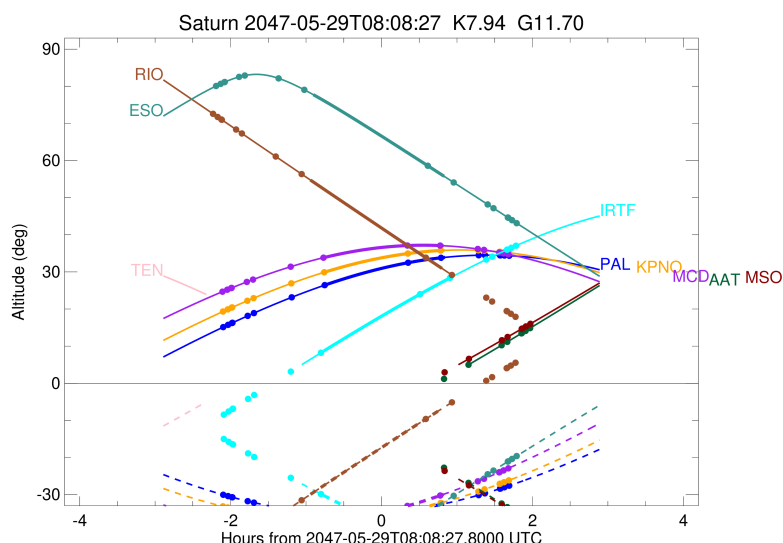
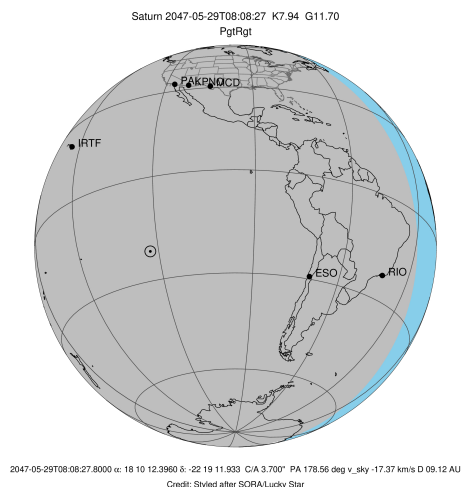
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-29T08:09:40.200
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 4066739021724394752
 2Mass ID (if available) : 18101238-2219116
 ICRS Star Coord at Epoch: 18h 10m 12.39601s -22:19:11.93299s
 RUWE (>1.4 is poor) : 0.87
 K magnitude : 7.942
 G magnitude : 11.703
 RP magnitude : 10.680
 BP magnitude : 12.785
 DUPflag : 0
 Distance (au) : 9.119
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.37
 Sun-Target sep (deg) : 154.88
 Sun-Moon sep (deg) : 154.32
 B (ring opening deg) : 26.22
 PA of pole (deg) : 5.71
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.476
 C/A sky separation (km) : 29603.2
 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_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	2047-05-29T06:02:23.425		19.32	-33.16	140461.00	-16.13		
A (OER)	I	2047-05-29T06:06:12.733		19.90	-33.46	136774.40	-16.02		
Encke (OEG)	I	2047-05-29T06:09:22.474		20.38	-33.71	133744.89	-15.91		
Encke (IEG)	I	2047-05-29T06:09:42.689		20.43	-33.73	133423.31	-15.90		
A (IER)	I	2047-05-29T06:21:48.262		22.22	-34.58	122050.38	-15.42		
B (OER)	I	2047-05-29T06:26:40.839		22.92	-34.88	117571.16	-15.19		
B (IER)	I	2047-05-29T06:56:43.016		26.91	-36.20	91984.69	-12.92		
C (IER)	I	2047-05-29T07:22:53.335	b	29.89	-36.59	74490.58	-8.93		
Saturn	I	2047-05-29T07:20:29.542		29.64	-36.58	60105.84		19.86	23.87
Saturn	E	2047-05-29T08:58:30.473		35.80	-31.96	59864.62		32.51	37.88
C (IER)	E	2047-05-29T08:29:17.668	b	34.94	-34.33	74490.58	8.89		
B (IER)	E	2047-05-29T08:55:31.044	b	35.76	-32.24	91984.69	12.93		
B (OER)	E	2047-05-29T09:25:29.585		35.80	-29.15	117571.16	15.24		
A (IER)	E	2047-05-29T09:30:21.226		35.72	-28.58	122050.38	15.48		
Encke (IEG)	E	2047-05-29T09:42:24.166		35.41	-27.11	133423.31	15.96		
Encke (OEG)	E	2047-05-29T09:42:44.301		35.40	-27.07	133744.89	15.98		
A (OER)	E	2047-05-29T09:45:53.283		35.29	-26.66	136774.40	16.08		
F ring	E	2047-05-29T09:49:41.638		35.15	-26.17	140461.00	16.20		

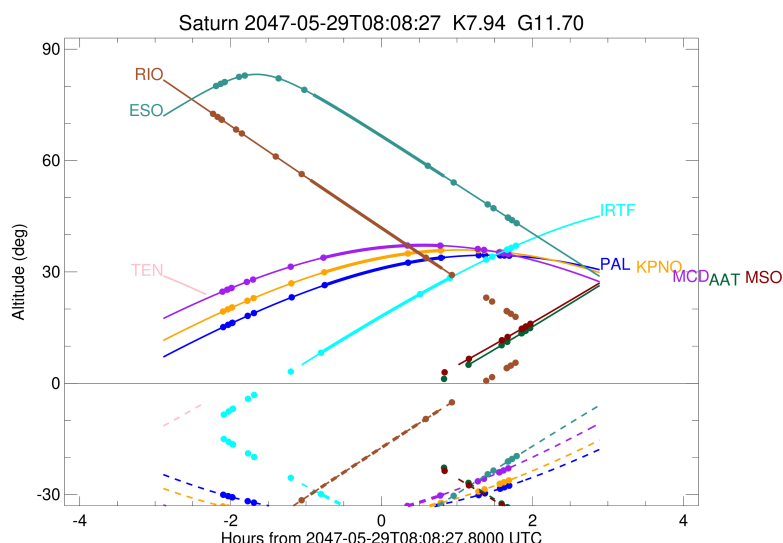
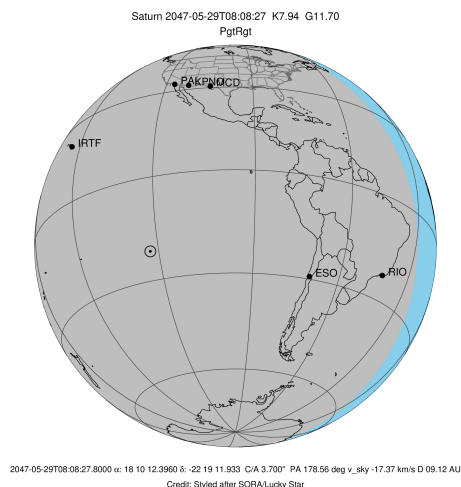
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-29T08:09:03.220
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 4066739021724394752
 2Mass ID (if available) : 18101238-2219116
 ICRS Star Coord at Epoch: 18h 10m 12.39601s -22:19:11.93299s
 RUWE (>1.4 is poor) : 0.87
 K magnitude : 7.942
 G magnitude : 11.703
 RP magnitude : 10.680
 BP magnitude : 12.785
 DUPflag : 0
 Distance (au) : 9.119
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.37
 Sun-Target sep (deg) : 154.88
 Sun-Moon sep (deg) : 154.24
 B (ring opening deg) : 26.22
 PA of pole (deg) : 5.71
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.468
 C/A sky separation (km) : 29552.5
 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	2047-05-29T06:01:59.453		24.67	-36.44	140461.00	-16.17		
A (OER)	I	2047-05-29T06:05:48.308		25.20	-36.65	136774.40	-16.05		
Encke (OEG)	I	2047-05-29T06:08:57.677		25.64	-36.80	133744.89	-15.95		
Encke (IEG)	I	2047-05-29T06:09:17.852		25.69	-36.82	133423.31	-15.93		
A (IER)	I	2047-05-29T06:21:22.014		27.30	-37.32	122050.38	-15.45		
B (OER)	I	2047-05-29T06:26:14.025		27.92	-37.48	117571.16	-15.22		
B (IER)	I	2047-05-29T06:56:12.517		31.39	-37.88	91984.69	-12.95		
C (IER)	I	2047-05-29T07:22:18.032	b	33.83	-37.42	74490.58	-8.97		
Saturn	I	2047-05-29T07:19:54.291		33.63	-37.49	60105.78		19.86	23.88
Saturn	E	2047-05-29T08:57:53.650		37.05	-29.91	59866.85		32.40	37.77
C (IER)	E	2047-05-29T08:28:55.814	b	37.10	-33.05	74490.58	8.92		
B (IER)	E	2047-05-29T08:55:05.997	b	37.09	-30.24	91984.69	12.94		
B (OER)	E	2047-05-29T09:25:03.917		36.17	-26.41	117571.17	15.24		
A (IER)	E	2047-05-29T09:29:55.604		35.93	-25.74	122050.38	15.47		
Encke (IEG)	E	2047-05-29T09:41:58.784		35.24	-24.00	133423.31	15.96		
Encke (OEG)	E	2047-05-29T09:42:18.928		35.21	-23.96	133744.89	15.97		
A (OER)	E	2047-05-29T09:45:28.002		35.01	-23.49	136774.40	16.08		
F ring	E	2047-05-29T09:49:16.482		34.75	-22.92	140461.00	16.19		

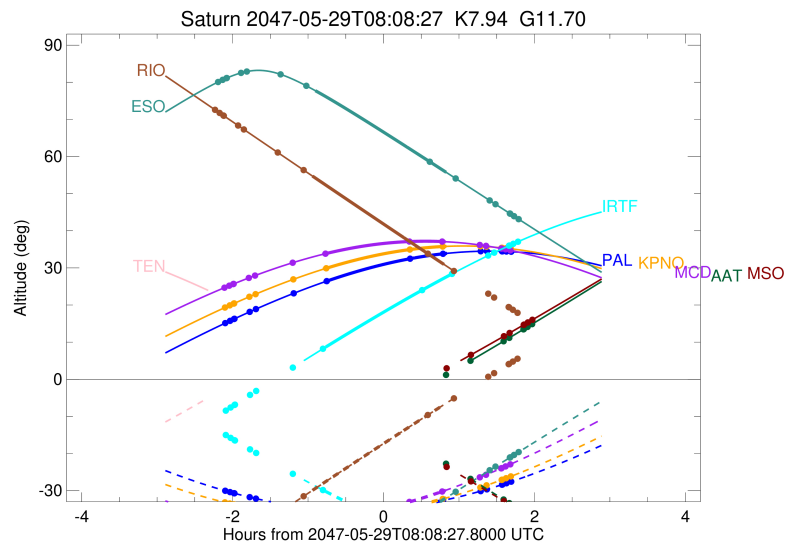
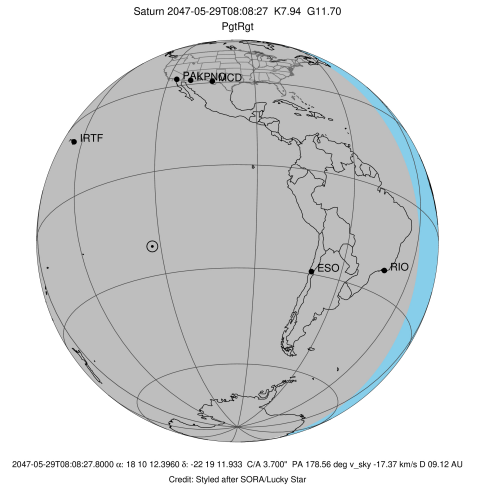
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-29T08:13:05.130
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 4066739021724394752
 2Mass ID (if available) : 18101238-2219116
 ICRS Star Coord at Epoch: 18h 10m 12.39601s -22:19:11.93299s
 RUWE (>1.4 is poor) : 0.87
 K magnitude : 7.942
 G magnitude : 11.703
 RP magnitude : 10.680
 BP magnitude : 12.785
 DUPflag : 0
 Distance (au) : 9.119
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.37
 Sun-Target sep (deg) : 154.88
 Sun-Moon sep (deg) : 154.72
 B (ring opening deg) : 26.22
 PA of pole (deg) : 5.71
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.204
 C/A sky separation (km) : 27804.5
 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	2047-05-29T06:03:04.595		-8.45x	-15.01	140461.00	-16.20		
A (OER)	I	2047-05-29T06:06:52.838		-7.61x	-15.79	136774.40	-16.10		
Encke (OEG)	I	2047-05-29T06:10:01.459		-6.92x	-16.42	133744.89	-16.02		
Encke (IEG)	I	2047-05-29T06:10:21.541		-6.84x	-16.49	133423.31	-16.01		
A (IER)	I	2047-05-29T06:22:20.404		-4.22x	-18.89	122050.38	-15.61		
B (OER)	I	2047-05-29T06:27:09.026		-3.17x	-19.84	117571.16	-15.42		
B (IER)	I	2047-05-29T06:56:20.583		3.14x	-25.46	91984.69	-13.56		
C (IER)	I	2047-05-29T07:20:17.730		8.21	-29.84	74490.58	-10.45		
Saturn	I	2047-05-29T07:22:27.583		8.67	-30.22	60136.17		17.83	21.52
Saturn	E	2047-05-29T09:03:12.129		28.43	-44.68	59894.54		31.12	36.40
C (IER)	E	2047-05-29T08:39:04.071	b	23.99	-41.96	74490.58	10.47		
B (IER)	E	2047-05-29T09:02:52.773	b	28.38	-44.65	91984.69	13.69		
B (OER)	E	2047-05-29T09:31:42.637		33.33	-47.06	117571.17	15.66		
A (IER)	E	2047-05-29T09:36:26.783		34.11	-47.36	122050.38	15.87		
Encke (IEG)	E	2047-05-29T09:48:13.493		35.96	-47.97	133423.31	16.30		
Encke (OEG)	E	2047-05-29T09:48:33.215		36.01	-47.99	133744.89	16.31		
A (OER)	E	2047-05-29T09:51:38.408		36.49	-48.11	136774.40	16.41		
F ring	E	2047-05-29T09:55:22.375		37.05	-48.25	140461.00	16.51		

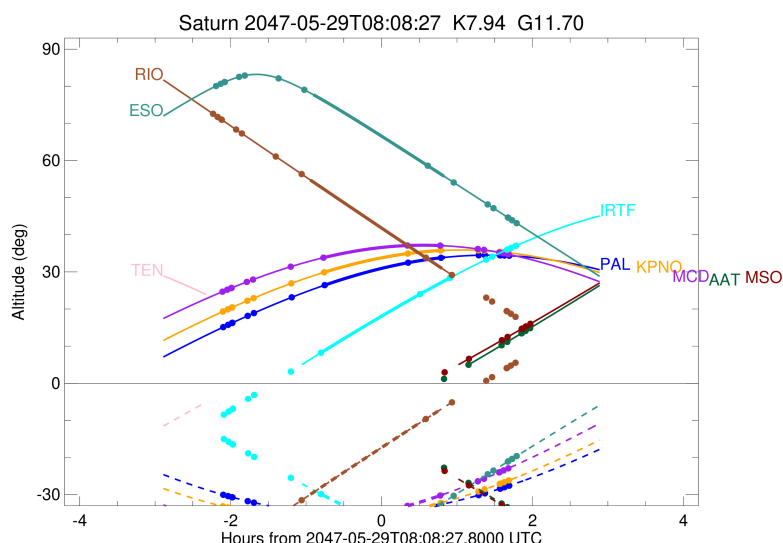
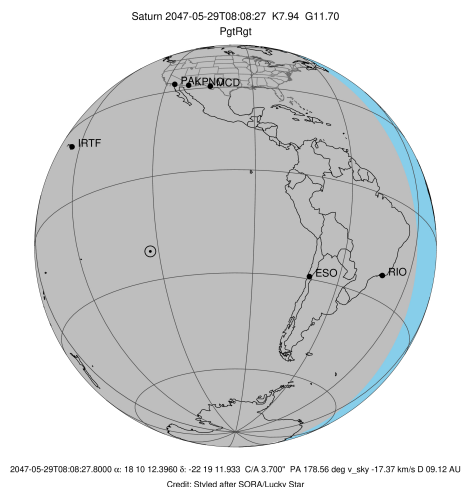
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-29T08:04:15.410
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 4066739021724394752
 2Mass ID (if available) : 18101238-2219116
 ICRS Star Coord at Epoch: 18h 10m 12.39601s -22:19:11.93299s
 RUWE (>1.4 is poor) : 0.87
 K magnitude : 7.942
 G magnitude : 11.703
 RP magnitude : 10.680
 BP magnitude : 12.785
 DUPflag : 0
 Distance (au) : 9.119
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.37
 Sun-Target sep (deg) : 154.88
 Sun-Moon sep (deg) : 153.59
 B (ring opening deg) : 26.22
 PA of pole (deg) : 5.71
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.545
 C/A sky separation (km) : 23447.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



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

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-05-29T05:54:33.054		72.58	-47.49	140461.00	-16.97		
A (OER)	I	2047-05-29T05:58:10.733		71.74	-46.66	136774.40	-16.90		
Encke (OEG)	I	2047-05-29T06:01:10.367		71.05	-45.98	133744.89	-16.83		
Encke (IEG)	I	2047-05-29T06:01:29.477		70.98	-45.91	133423.31	-16.82		
A (IER)	I	2047-05-29T06:12:51.307		68.35	-43.32	122050.38	-16.52		
B (OER)	I	2047-05-29T06:17:23.561		67.31	-42.28	117571.16	-16.38		
B (IER)	I	2047-05-29T06:44:23.005		61.08	-36.16	91984.69	-15.06		
C (IER)	I	2047-05-29T07:04:56.729		56.36	-31.51	74490.58	-13.09		
Saturn	I	2047-05-29T07:11:57.681		54.74	-29.93	60179.60		14.51	17.62
Saturn	E	2047-05-29T08:56:33.717		30.94	-6.84	59991.89		26.35	31.21
C (IER)	E	2047-05-29T08:43:37.439	b	33.85	-9.64	74490.58	12.96		
B (IER)	E	2047-05-29T09:04:24.345		29.17	-5.15	91984.69	14.89		
B (OER)	E	2047-05-29T09:31:45.455		23.05	0.67x	117571.16	16.13		
A (IER)	E	2047-05-29T09:36:21.932		22.03	1.64x	122050.38	16.27		
Encke (IEG)	E	2047-05-29T09:47:55.085		19.47	4.06x	133423.31	16.54		
Encke (OEG)	E	2047-05-29T09:48:14.528		19.39	4.12x	133744.89	16.54		
A (OER)	E	2047-05-29T09:51:17.331		18.72	4.76x	136774.40	16.60		
F ring	E	2047-05-29T09:54:58.947		17.90	5.52x	140461.00	16.67		

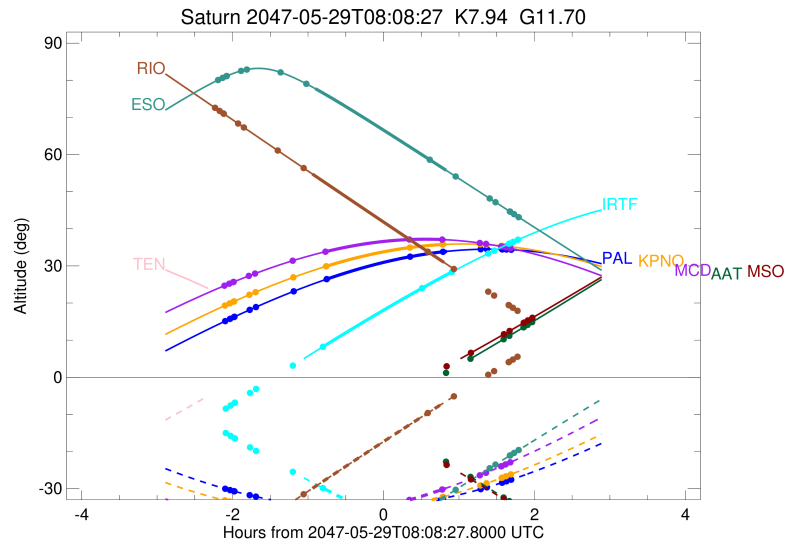
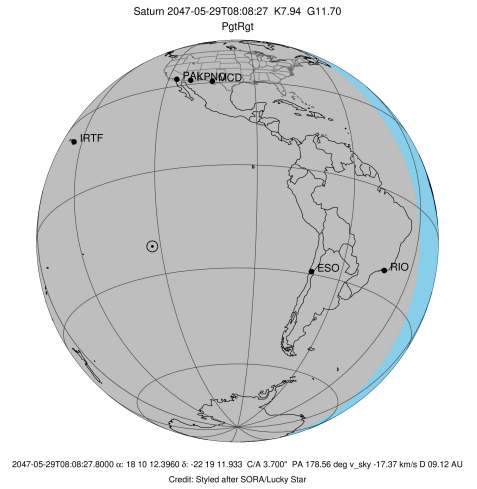
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-29T08:06:22.690
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4066739021724394752
 2Mass ID (if available) : 18101238-2219116
 ICRS Star Coord at Epoch: 18h 10m 12.39601s -22:19:11.93299s
 RUWE (>1.4 is poor) : 0.87
 K magnitude : 7.942
 G magnitude : 11.703
 RP magnitude : 10.680
 BP magnitude : 12.785
 DUPflag : 0
 Distance (au) : 9.119
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.37
 Sun-Target sep (deg) : 154.88
 Sun-Moon sep (deg) : 153.99
 B (ring opening deg) : 26.22
 PA of pole (deg) : 5.71
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.547
 C/A sky separation (km) : 23462.6
 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	2047-05-29T05:56:56.983		80.08	-71.16	140461.00	-17.01		
A (OER)	I	2047-05-29T06:00:34.231		80.66	-70.41	136774.40	-16.93		
Encke (OEG)	I	2047-05-29T06:03:33.483		81.11	-69.79	133744.89	-16.87		
Encke (IEG)	I	2047-05-29T06:03:52.551		81.15	-69.72	133423.31	-16.86		
A (IER)	I	2047-05-29T06:15:12.685		82.53	-67.33	122050.38	-16.57		
B (OER)	I	2047-05-29T06:19:44.159		82.89	-66.37	117571.16	-16.43		
B (IER)	I	2047-05-29T06:46:37.695		82.13	-60.59	91984.69	-15.13		
C (IER)	I	2047-05-29T07:07:05.293		79.05	-56.14	74490.58	-13.17		
Saturn	I	2047-05-29T07:14:19.795		77.73	-54.57	60181.67		14.34	17.41
Saturn	E	2047-05-29T08:58:19.157		55.74	-31.93	59988.57		26.52	31.40
C (IER)	E	2047-05-29T08:45:12.337	b	58.61	-34.76	74490.58	13.08		
B (IER)	E	2047-05-29T09:05:47.894		54.10	-30.32	91984.69	15.03		
B (OER)	E	2047-05-29T09:32:53.542		48.17	-24.50	117571.16	16.29		
A (IER)	E	2047-05-29T09:37:27.341		47.17	-23.53	122050.38	16.43		
Encke (IEG)	E	2047-05-29T09:48:53.690		44.67	-21.10	133423.31	16.70		
Encke (OEG)	E	2047-05-29T09:49:12.940		44.60	-21.03	133744.89	16.71		
A (OER)	E	2047-05-29T09:52:13.927		43.94	-20.39	136774.40	16.77		
F ring	E	2047-05-29T09:55:53.329		43.14	-19.62	140461.00	16.84		

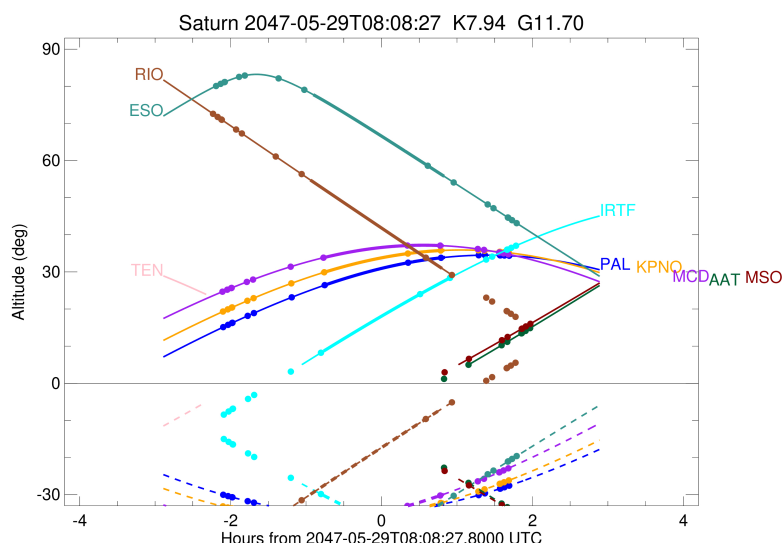
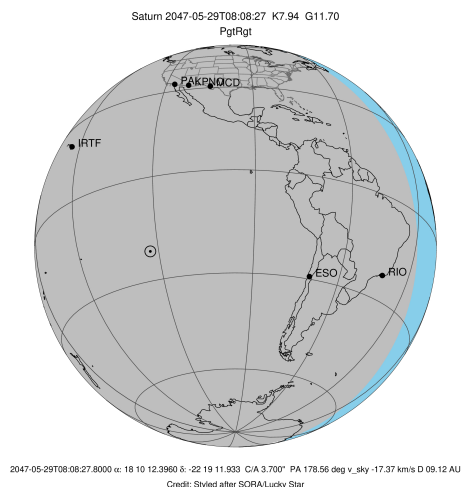
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-29T08:13:11.300
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 4066739021724394752
 2Mass ID (if available) : 18101238-2219116
 ICRS Star Coord at Epoch: 18h 10m 12.39601s -22:19:11.93299s
 RUWE (>1.4 is poor) : 0.87
 K magnitude : 7.942
 G magnitude : 11.703
 RP magnitude : 10.680
 BP magnitude : 12.785
 DUPflag : 0
 Distance (au) : 9.119
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.37
 Sun-Target sep (deg) : 154.88
 Sun-Moon sep (deg) : 154.53
 B (ring opening deg) : 26.22
 PA of pole (deg) : 5.71
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.135
 C/A sky separation (km) : 20735.2
 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_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	2047-05-29T05:57:59.533		-28.39x	12.53x	140461.00	-16.68		
A (OER)	I	2047-05-29T06:01:40.921		-27.95x	11.88x	136774.40	-16.63		
Encke (OEG)	I	2047-05-29T06:04:43.352		-27.57x	11.34x	133744.89	-16.58		
Encke (IEG)	I	2047-05-29T06:05:02.745		-27.53x	11.28x	133423.31	-16.58		
A (IER)	I	2047-05-29T06:16:32.616		-26.06x	9.22x	122050.38	-16.38		
B (OER)	I	2047-05-29T06:21:06.827		-25.45x	8.39x	117571.16	-16.29		
B (IER)	I	2047-05-29T06:47:56.428		-21.62x	3.40x	91984.69	-15.39		
C (IER)	I	2047-05-29T07:07:38.697		-18.57x	-0.37x	74490.58	-14.06		
Saturn	I	2047-05-29T07:18:19.309		-16.85x	-2.45x	60214.23		11.27	13.74
Saturn	E	2047-05-29T09:07:33.547		3.00x	-24.71	60022.21		24.75	29.43
C (IER)	E	2047-05-29T08:58:07.813	b	1.17x	-22.74	74490.58	14.19		
B (IER)	E	2047-05-29T09:17:35.907		4.98x	-26.83	91984.69	15.62		
B (OER)	E	2047-05-29T09:43:58.136		10.24	-32.40	117571.16	16.61		
A (IER)	E	2047-05-29T09:48:26.858		11.15	-33.36	122050.38	16.72		
Encke (IEG)	E	2047-05-29T09:59:41.915		13.43	-35.75	133423.31	16.96		
Encke (OEG)	E	2047-05-29T10:00:00.872		13.50	-35.82	133744.89	16.97		
A (OER)	E	2047-05-29T10:02:59.140		14.11	-36.45	136774.40	17.02		
F ring	E	2047-05-29T10:06:35.346		14.84	-37.22	140461.00	17.08		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-05-29T08:12:59.260
 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 : 4066739021724394752
 2Mass ID (if available) : 18101238-2219116
 ICRS Star Coord at Epoch: 18h 10m 12.39601s -22:19:11.93299s
 RUWE (>1.4 is poor) : 0.87
 K magnitude : 7.942
 G magnitude : 11.703
 RP magnitude : 10.680
 BP magnitude : 12.785
 DUPflag : 0
 Distance (au) : 9.119
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.37
 Sun-Target sep (deg) : 154.88
 Sun-Moon sep (deg) : 154.52
 B (ring opening deg) : 26.22
 PA of pole (deg) : 5.71
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.087
 C/A sky separation (km) : 20416.7
 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	2047-05-29T05:57:48.764		-25.07x	10.26x	140461.00	-16.72		
A (OER)	I	2047-05-29T06:01:29.607		-24.66x	9.65x	136774.40	-16.67		
Encke (OEG)	I	2047-05-29T06:04:31.573		-24.31x	9.14x	133744.89	-16.63		
Encke (IEG)	I	2047-05-29T06:04:50.916		-24.27x	9.08x	133423.31	-16.62		
A (IER)	I	2047-05-29T06:16:18.862		-22.91x	7.13x	122050.38	-16.43		
B (OER)	I	2047-05-29T06:20:52.223		-22.34x	6.35x	117571.16	-16.34		
B (IER)	I	2047-05-29T06:47:35.261		-18.79x	1.62x	91984.69	-15.47		
C (IER)	I	2047-05-29T07:07:09.355		-15.95x	-1.96x	74490.58	-14.19		
Saturn	I	2047-05-29T07:18:01.937		-14.30x	-3.98x	60216.74		11.00	13.42
Saturn	E	2047-05-29T09:07:27.764		4.60x	-25.38	60027.81		24.45	29.09
C (IER)	E	2047-05-29T08:58:35.645	b	2.95x	-23.59	74490.58	14.32		
B (IER)	E	2047-05-29T09:17:56.143		6.57	-27.49	91984.69	15.69		
B (OER)	E	2047-05-29T09:44:12.954		11.60	-32.83	117571.16	16.65		
A (IER)	E	2047-05-29T09:48:41.054		12.47	-33.74	122050.38	16.76		
Encke (IEG)	E	2047-05-29T09:59:54.804		14.66	-36.03	133423.31	16.99		
Encke (OEG)	E	2047-05-29T10:00:13.727		14.72	-36.10	133744.89	17.00		
A (OER)	E	2047-05-29T10:03:11.704		15.30	-36.70	136774.40	17.05		
F ring	E	2047-05-29T10:06:47.582		16.01	-37.44	140461.00	17.11		