

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-13T23:37:44.290
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4115816792713438208
 2Mass ID (if available) : 17125051-2126196

Saturn 2046-06-13T23:37:44 K7.64 G12.65 PgtRgt

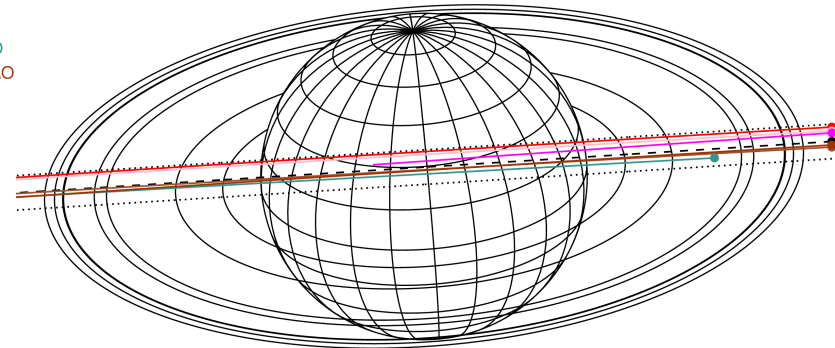
ICRS Star Coord at Epoch: 17h 12m 50.50342s -21:26:19.72788s

RUWE (>1.4 is poor) : 0.94
 K magnitude : 7.641
 G magnitude : 12.649
 RP magnitude : 11.303
 BP magnitude : 14.767
 DUPflag : 0
 Distance (au) : 9.021
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.12
 Sun-Target sep (deg) : 176.22
 Sun-Moon sep (deg) : 55.87
 B (ring opening deg) : 26.53
 PA of pole (deg) : 4.43

Saturn 2046-06-13T23:37:44 K7.64 G12.65
 PgtRgt



Earth
 PIC
 TEN
 KAV
 RIO
 ESO
 SAAO

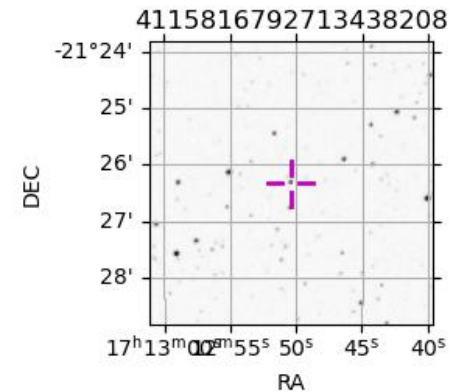


2046-06-13T23:37:44.2900 at: 17 12 50.5034 8: -21 26 19.728 C/A 0.525° PA 183.61 deg v_sky -20.12 km/s D 09.02 AU
 Credit: Styled after SORA/Lucky Star

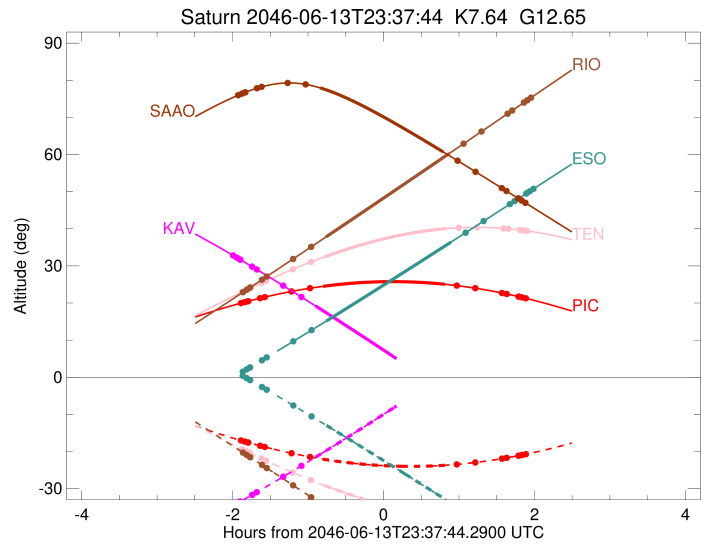
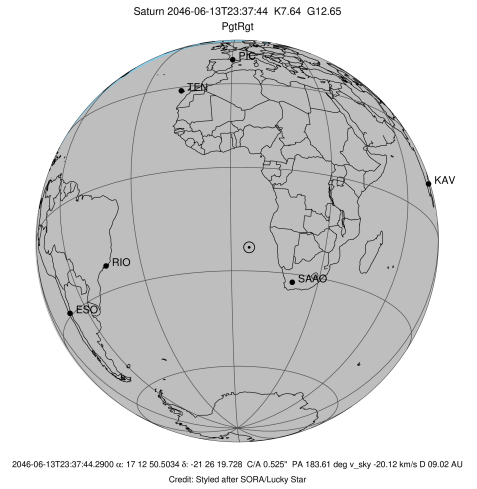
#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring

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	OEncode
PIC	Pic du Midi	42.9	0.1	+	+	+	JUN 13 21:44 - JUN 14 01:30	PieRie
PAL	Palomar Mt (20	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
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	+	+	+	JUN 13 21:45 - JUN 14 01:32	PieRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observ	12.6	78.8	+	+	+	JUN 13 21:38 - JUN 13 22:43	PinRin
RIO	Rio de Janeiro	-22.9	316.8	+	+	+	JUN 13 21:46 - JUN 14 01:35	PieRie
ESO	European South	-29.3	289.3		+	+	JUN 13 22:26 - JUN 14 01:36	PieRie
AAT	Siding Spring	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro	-32.4	20.8	+	+	+	JUN 13 21:42 - JUN 14 01:30	PieRie
MSO	Mt. Stromlo Ob	-35.3	149.0					PnnRnn

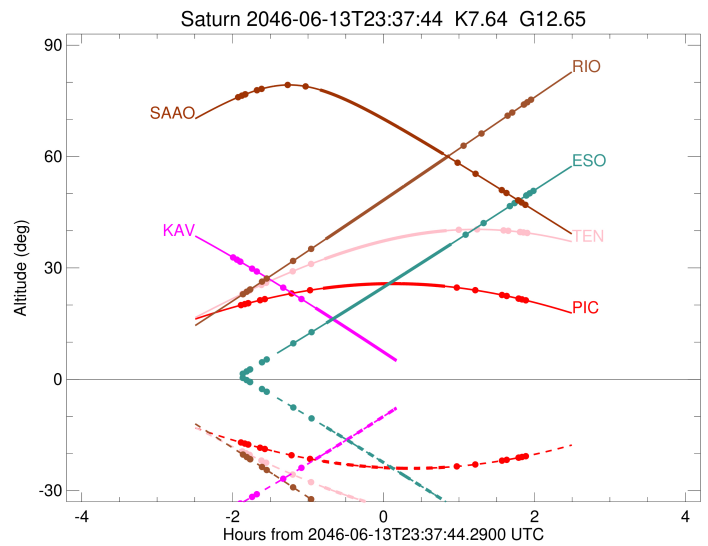
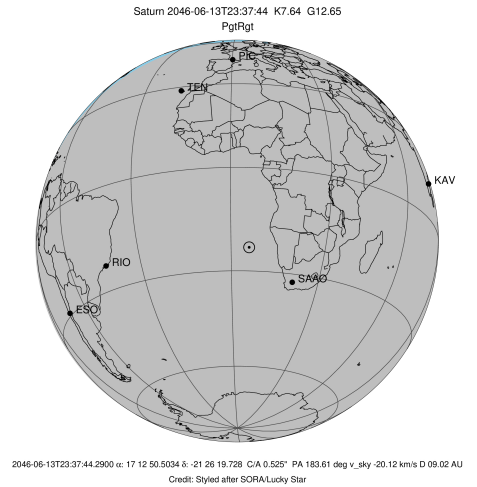


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-13T23:38:07.450
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 4115816792713438208
 2Mass ID (if available) : 17125051-2126196
 ICRS Star Coord at Epoch: 17h 12m 50.50342s -21:26:19.72788s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 7.641
 G magnitude : 12.649
 RP magnitude : 11.303
 BP magnitude : 14.767
 DUPflag : 0
 Distance (au) : 9.021
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.12
 Sun-Target sep (deg) : 176.22
 Sun-Moon sep (deg) : 56.24
 B (ring opening deg) : 26.53
 PA of pole (deg) : 4.43
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.400
 C/A sky separation (km) : 9156.7
 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



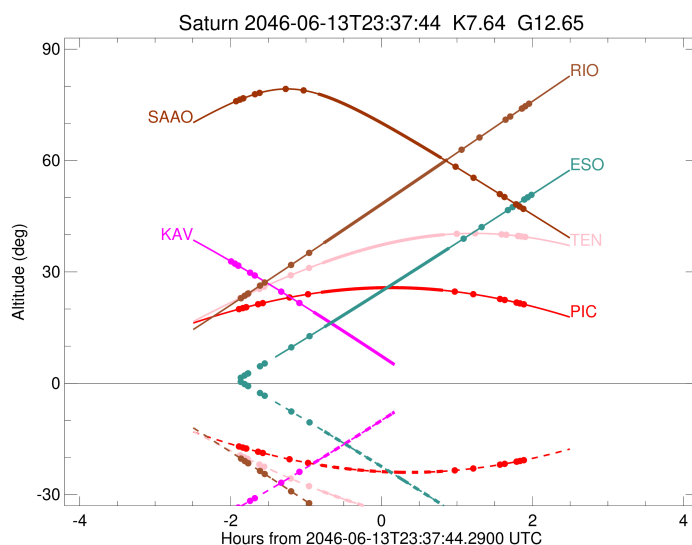
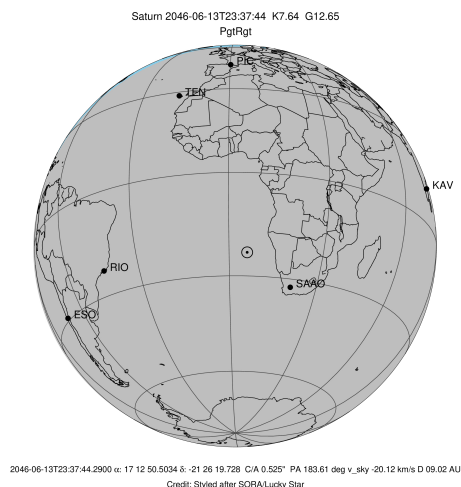
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-06-13T21:44:25.528		19.97	-17.02	140461.00	-20.20		
A (OER)	I	2046-06-13T21:47:28.063		20.25	-17.32	136774.40	-20.19		
Encke (OEG)	I	2046-06-13T21:49:58.134		20.47	-17.56	133744.89	-20.18		
Encke (IEG)	I	2046-06-13T21:50:14.068		20.49	-17.58	133423.31	-20.18		
A (IER)	I	2046-06-13T21:59:38.156		21.29	-18.45	122050.38	-20.14		
B (OER)	I	2046-06-13T22:03:20.678		21.59	-18.77	117571.16	-20.12		
B (IER)	I	2046-06-13T22:24:37.739		23.12	-20.47	91984.69	-19.93		
C (IER)	I	2046-06-13T22:39:21.046		23.99	-21.46	74490.58	-19.65		
Saturn	I	2046-06-13T22:49:36.873		24.49	-22.06	60246.42		7.01	8.59
Saturn	E	2046-06-14T00:26:37.138		25.05	-23.71	60235.91		8.56	10.48
C (IER)	E	2046-06-14T00:35:58.359		24.70	-23.47	74490.58	19.66		
B (IER)	E	2046-06-14T00:50:41.582		24.00	-22.96	91984.69	19.93		
B (OER)	E	2046-06-14T01:11:58.468		22.70	-21.92	117571.16	20.12		
A (IER)	E	2046-06-14T01:15:40.954		22.44	-21.71	122050.38	20.14		
Encke (IEG)	E	2046-06-14T01:25:04.945		21.74	-21.12	133423.31	20.19		
Encke (OEG)	E	2046-06-14T01:25:20.876		21.71	-21.10	133744.89	20.19		
A (OER)	E	2046-06-14T01:27:50.920		21.52	-20.94	136774.40	20.20		
F ring	E	2046-06-14T01:30:53.421		21.27	-20.73	140461.00	20.21		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-13T23:39:23.230
 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 : 4115816792713438208
 2Mass ID (if available) : 17125051-2126196
 ICRS Star Coord at Epoch: 17h 12m 50.50342s -21:26:19.72788s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 7.641
 G magnitude : 12.649
 RP magnitude : 11.303
 BP magnitude : 14.767
 DUPflag : 0
 Distance (au) : 9.021
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.12
 Sun-Target sep (deg) : 176.22
 Sun-Moon sep (deg) : 56.23
 B (ring opening deg) : 26.53
 PA of pole (deg) : 4.43
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.236
 C/A sky separation (km) : 8083.6
 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



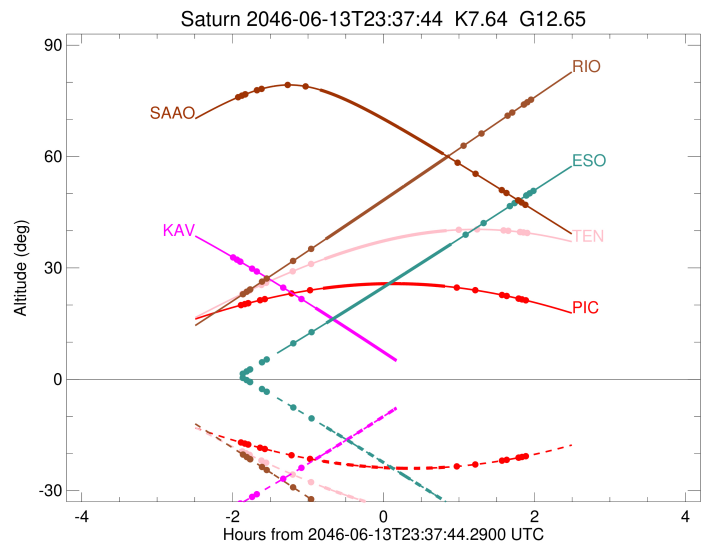
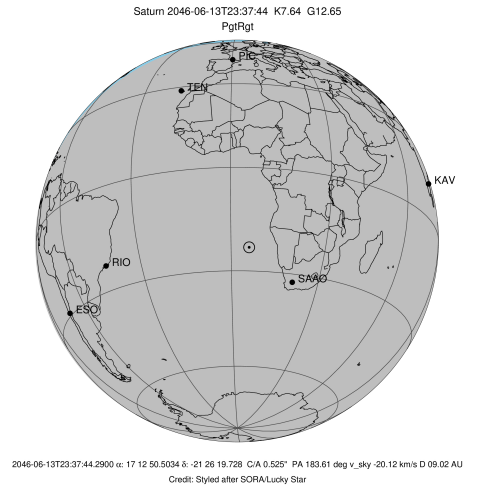
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-06-13T21:45:31.473		23.00	-19.45	140461.00	-20.24		
A (OER)	I	2046-06-13T21:48:33.649		23.49	-19.95	136774.40	-20.23		
Encke (OEG)	I	2046-06-13T21:51:03.395		23.89	-20.35	133744.89	-20.23		
Encke (IEG)	I	2046-06-13T21:51:19.292		23.93	-20.40	133423.31	-20.23		
A (IER)	I	2046-06-13T22:00:41.881		25.41	-21.90	122050.38	-20.20		
B (OER)	I	2046-06-13T22:04:23.684		25.98	-22.48	117571.17	-20.19		
B (IER)	I	2046-06-13T22:25:34.759		29.09	-25.67	91984.69	-20.05		
C (IER)	I	2046-06-13T22:40:11.114		31.07	-27.72	74490.58	-19.85		
Saturn	I	2046-06-13T22:50:49.562		32.41	-29.13	60252.31		5.97	7.32
Saturn	E	2046-06-14T00:27:52.492		40.05	-37.79	60241.67		7.75	9.49
C (IER)	E	2046-06-14T00:37:34.654		40.26	-38.15	74490.58	19.91		
B (IER)	E	2046-06-14T00:52:08.159		40.38	-38.50	91984.69	20.12		
B (OER)	E	2046-06-14T01:13:14.002		40.10	-38.58	117571.16	20.28		
A (IER)	E	2046-06-14T01:16:54.762		40.00	-38.55	122050.38	20.30		
Encke (IEG)	E	2046-06-14T01:26:14.538		39.67	-38.38	133423.31	20.33		
Encke (OEG)	E	2046-06-14T01:26:30.352		39.66	-38.38	133744.89	20.33		
A (OER)	E	2046-06-14T01:28:59.308		39.55	-38.32	136774.40	20.34		
F ring	E	2046-06-14T01:32:00.498		39.42	-38.23	140461.00	20.35		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-13T23:32:52.560
 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 : 4115816792713438208
 2Mass ID (if available) : 17125051-2126196
 ICRS Star Coord at Epoch: 17h 12m 50.50342s -21:26:19.72788s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 7.641
 G magnitude : 12.649
 RP magnitude : 11.303
 BP magnitude : 14.767
 DUPflag : 0
 Distance (au) : 9.021
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.12
 Sun-Target sep (deg) : 176.22
 Sun-Moon sep (deg) : 56.50
 B (ring opening deg) : 26.53
 PA of pole (deg) : 4.43
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.861
 C/A sky separation (km) : 5635.8
 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



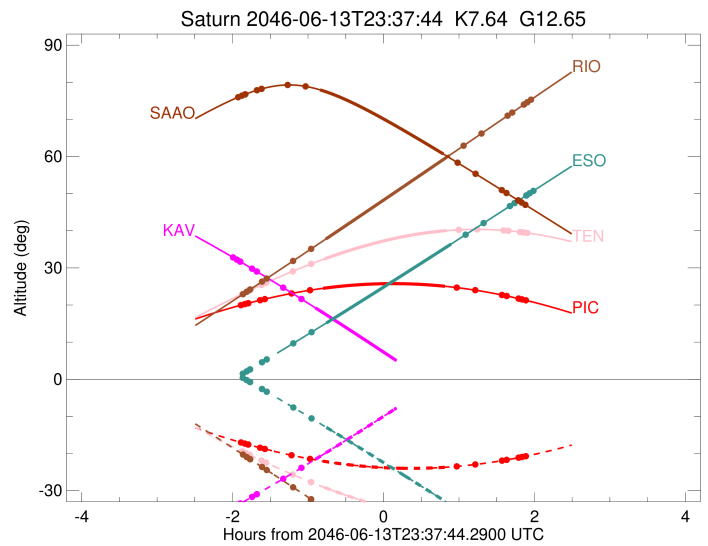
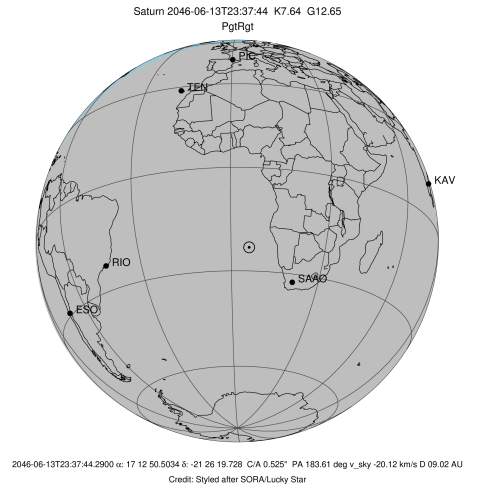
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-06-13T21:38:11.143		32.81	-34.55	140461.00	-20.36		
A (OER)	I	2046-06-13T21:41:12.280		32.22	-33.98	136774.40	-20.35		
Encke (OEG)	I	2046-06-13T21:43:41.194		31.72	-33.52	133744.89	-20.34		
Encke (IEG)	I	2046-06-13T21:43:57.004		31.67	-33.47	133423.31	-20.34		
A (IER)	I	2046-06-13T21:53:16.593		29.79	-31.68	122050.38	-20.31		
B (OER)	I	2046-06-13T21:56:57.244		29.04	-30.97	117571.16	-20.29		
B (IER)	I	2046-06-13T22:18:01.258		24.68	-26.80	91984.69	-20.18		
C (IER)	I	2046-06-13T22:32:30.614		21.61	-23.85	74490.58	-20.05		
Saturn	I	2046-06-13T22:43:36.048		19.24	-21.56	60259.26		4.45	5.47
Saturn	E	2046-06-14T00:22:22.797		-2.75x	-0.15x	60256.50		5.11	6.27
C (IER)	E	2046-06-14T00:33:20.603		-5.26x	2.31x	74490.58	19.83		
B (IER)	E	2046-06-14T00:48:01.021		-8.62x	5.60x	91984.69	19.90		
B (OER)	E	2046-06-14T01:09:25.225		-13.55x	10.44x	117571.16	19.94		
A (IER)	E	2046-06-14T01:13:09.892		-14.41x	11.29x	122050.38	19.94		
Encke (IEG)	E	2046-06-14T01:22:40.307		-16.61x	13.45x	133423.31	19.94		
Encke (OEG)	E	2046-06-14T01:22:56.436		-16.67x	13.51x	133744.89	19.94		
A (OER)	E	2046-06-14T01:25:28.391		-17.26x	14.09x	136774.40	19.94		
F ring	E	2046-06-14T01:28:33.314		-17.97x	14.79x	140461.00	19.94		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-13T23:41:05.320
 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 : 4115816792713438208
 2Mass ID (if available) : 17125051-2126196
 ICRS Star Coord at Epoch: 17h 12m 50.50342s -21:26:19.72788s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 7.641
 G magnitude : 12.649
 RP magnitude : 11.303
 BP magnitude : 14.767
 DUPflag : 0
 Distance (au) : 9.021
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.12
 Sun-Target sep (deg) : 176.22
 Sun-Moon sep (deg) : 56.12
 B (ring opening deg) : 26.53
 PA of pole (deg) : 4.43
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.374
 C/A sky separation (km) : 2444.8
 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



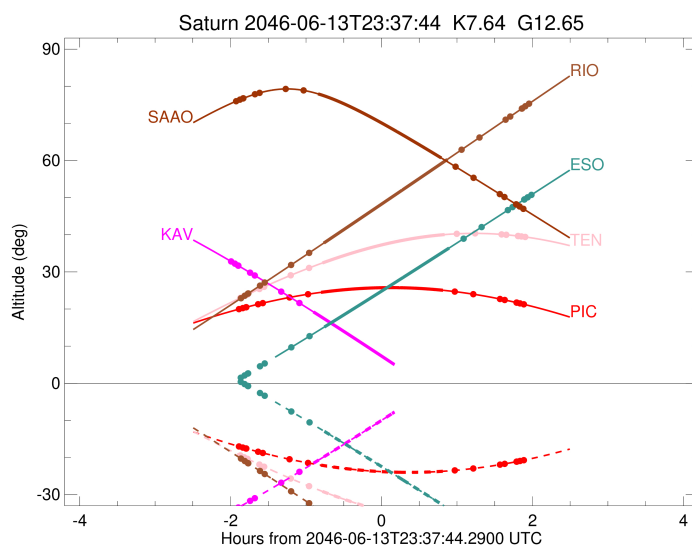
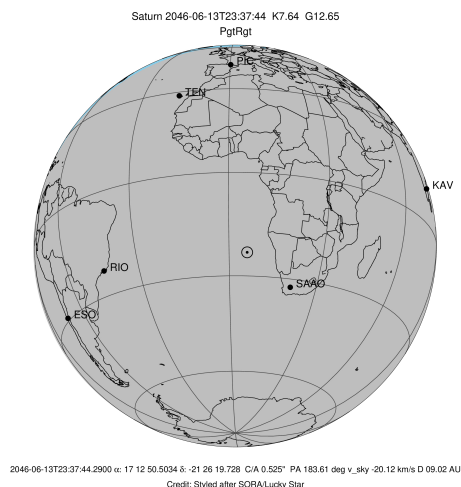
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-06-13T21:46:01.203		22.91	-20.29	140461.00	-20.24		
A (OER)	I	2046-06-13T21:49:03.297		23.59	-20.95	136774.40	-20.25		
Encke (OEG)	I	2046-06-13T21:51:32.907		24.15	-21.50	133744.89	-20.25		
Encke (IEG)	I	2046-06-13T21:51:48.786		24.21	-21.56	133423.31	-20.25		
A (IER)	I	2046-06-13T22:01:10.194		26.31	-23.63	122050.38	-20.26		
B (OER)	I	2046-06-13T22:04:51.212		27.13	-24.44	117571.16	-20.27		
B (IER)	I	2046-06-13T22:25:52.924		31.88	-29.11	91984.69	-20.29		
C (IER)	I	2046-06-13T22:40:15.150		35.13	-32.32	74490.58	-20.29		
Saturn	I	2046-06-13T22:51:51.897		37.77	-34.92	60267.54		1.02	1.25
Saturn	E	2046-06-14T00:30:09.286		60.32	-57.19	60263.79		3.09	3.80
C (IER)	E	2046-06-14T00:41:22.773		62.91	-59.75	74490.58	20.44		
B (IER)	E	2046-06-14T00:55:37.856		66.20	-63.01	91984.69	20.47		
B (OER)	E	2046-06-14T01:16:26.510		71.01	-67.78	117571.16	20.51		
A (IER)	E	2046-06-14T01:20:04.929		71.85	-68.61	122050.38	20.51		
Encke (IEG)	E	2046-06-14T01:29:19.327		73.99	-70.73	133423.31	20.52		
Encke (OEG)	E	2046-06-14T01:29:34.999		74.05	-70.79	133744.89	20.52		
A (OER)	E	2046-06-14T01:32:02.639		74.62	-71.35	136774.40	20.52		
F ring	E	2046-06-14T01:35:02.280		75.31	-72.04	140461.00	20.52		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-13T23:41:59.810
 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 : 4115816792713438208
 2Mass ID (if available) : 17125051-2126196
 ICRS Star Coord at Epoch: 17h 12m 50.50342s -21:26:19.72788s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 7.641
 G magnitude : 12.649
 RP magnitude : 11.303
 BP magnitude : 14.767
 DUPflag : 0
 Distance (au) : 9.021
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.12
 Sun-Target sep (deg) : 176.22
 Sun-Moon sep (deg) : 55.74
 B (ring opening deg) : 26.53
 PA of pole (deg) : 4.43
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.136
 C/A sky separation (km) : 891.5
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-06-13T21:45:51.603		1.49x	0.37x	140461.00	-20.06		
A (OER)	I	2046-06-13T21:48:55.384		2.11x	-0.23x	136774.40	-20.06		
Encke (OEG)	I	2046-06-13T21:51:26.373		2.62x	-0.72x	133744.89	-20.07		
Encke (IEG)	I	2046-06-13T21:51:42.398		2.67x	-0.77x	133423.31	-20.07		
A (IER)	I	2046-06-13T22:01:08.928		4.58x	-2.63x	122050.38	-20.08		
B (OER)	I	2046-06-13T22:04:51.935		5.33	-3.36x	117571.17	-20.09		
B (IER)	I	2046-06-13T22:26:04.550		9.69	-7.61	91984.69	-20.12		
C (IER)	I	2046-06-13T22:40:33.514		12.70	-10.55	74490.58	-20.14		
Saturn	I	2046-06-13T22:52:16.829		15.15	-12.95	60267.95		-0.34	-0.42
Saturn	E	2046-06-14T00:31:30.565		36.44	-33.89	60266.50		1.84	2.26
C (IER)	E	2046-06-14T00:43:00.862		38.94	-36.37	74490.58	20.34		
B (IER)	E	2046-06-14T00:57:20.268		42.07	-39.47	91984.69	20.37		
B (OER)	E	2046-06-14T01:18:15.433		46.65	-44.01	117571.16	20.40		
A (IER)	E	2046-06-14T01:21:54.970		47.45	-44.81	122050.38	20.41		
Encke (IEG)	E	2046-06-14T01:31:12.143		49.49	-46.83	133423.31	20.42		
Encke (OEG)	E	2046-06-14T01:31:27.893		49.54	-46.89	133744.89	20.42		
A (OER)	E	2046-06-14T01:33:56.254		50.09	-47.43	136774.40	20.42		
F ring	E	2046-06-14T01:36:56.763		50.75	-48.08	140461.00	20.43		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-13T23:36:16.060
 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 : 4115816792713438208
 2Mass ID (if available) : 17125051-2126196
 ICRS Star Coord at Epoch: 17h 12m 50.50342s -21:26:19.72788s
 RUWE (>1.4 is poor) : 0.94
 K magnitude : 7.641
 G magnitude : 12.649
 RP magnitude : 11.303
 BP magnitude : 14.767
 DUPflag : 0
 Distance (au) : 9.021
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.12
 Sun-Target sep (deg) : 176.22
 Sun-Moon sep (deg) : 56.79
 B (ring opening deg) : 26.53
 PA of pole (deg) : 4.43
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.344
 C/A sky separation (km) : 2252.6
 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	2046-06-13T21:42:10.741		75.98	-74.96	140461.00	-20.50		
A (OER)	I	2046-06-13T21:45:10.533		76.40	-75.48	136774.40	-20.50		
Encke (OEG)	I	2046-06-13T21:47:38.280		76.73	-75.91	133744.89	-20.50		
Encke (IEG)	I	2046-06-13T21:47:53.963		76.77	-75.95	133423.31	-20.50		
A (IER)	I	2046-06-13T21:57:08.632		77.86	-77.45	122050.38	-20.50		
B (OER)	I	2046-06-13T22:00:47.103		78.22	-78.00	117571.17	-20.50		
B (IER)	I	2046-06-13T22:21:35.420		79.28	-80.43	91984.69	-20.49		
C (IER)	I	2046-06-13T22:35:49.614		78.89	-81.05	74490.58	-20.47		
Saturn	I	2046-06-13T22:47:19.522		77.96	-80.76	60267.34		1.22	1.50
Saturn	E	2046-06-14T00:25:16.202		60.69	-64.51	60265.16		2.54	3.12
C (IER)	E	2046-06-14T00:36:37.514		58.34	-62.16	74490.58	20.40		
B (IER)	E	2046-06-14T00:50:54.836		55.35	-59.19	91984.69	20.41		
B (OER)	E	2046-06-14T01:11:48.870		50.95	-54.79	117571.16	20.40		
A (IER)	E	2046-06-14T01:15:28.479		50.18	-54.02	122050.38	20.39		
Encke (IEG)	E	2046-06-14T01:24:46.219		48.21	-52.06	133423.31	20.39		
Encke (OEG)	E	2046-06-14T01:25:01.992		48.16	-52.00	133744.89	20.39		
A (OER)	E	2046-06-14T01:27:30.603		47.63	-51.48	136774.40	20.38		
F ring	E	2046-06-14T01:30:31.469		46.99	-50.84	140461.00	20.38		