

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-26T22:12:15.580
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4070232857366607616
 2Mass ID (if available) : 17525380-2225024

Saturn 2047-07-26T22:12:15 K8.03 G10.81 PgtRgt

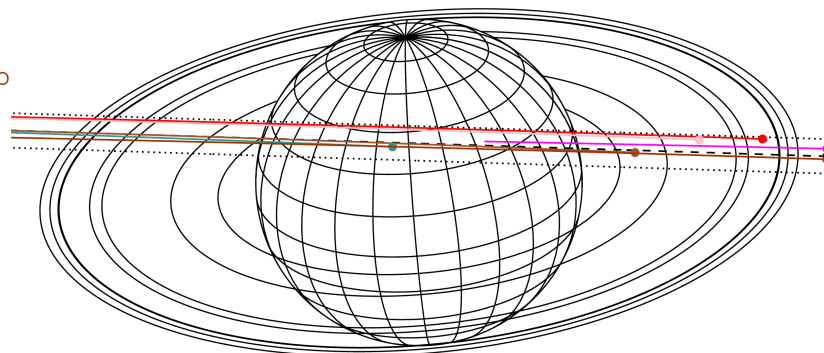
ICRS Star Coord at Epoch: 17h 52m 53.80912s -22:25:02.60573s

RUWE (>1.4 is poor) : 0.78
 K magnitude : 8.028
 G magnitude : 10.813
 RP magnitude : 9.978
 BP magnitude : 11.547
 DUPflag : 0
 Distance (au) : 9.196
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.86
 Sun-Target sep (deg) : 145.14
 Sun-Moon sep (deg) : 94.77
 B (ring opening deg) : 26.71
 PA of pole (deg) : 5.38



2047-07-26T22:12:15.5800 at: 17 52 53.8091 s: -22 25 02.606 C/A 2.162° PA 178.18 deg v_sky -14.86 km/s D 09.20 AU
 Credit: Styled after SORA/Lucky Star

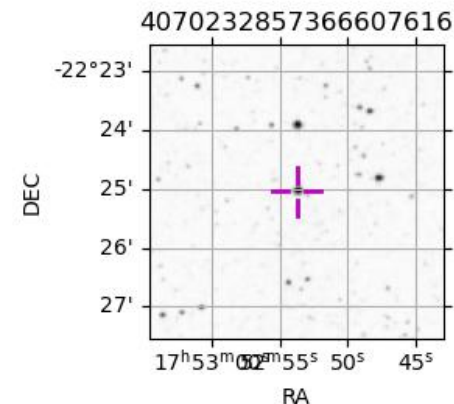
Earth
 PIC
 TEN
 KAV
 RIO
 ESO
 SAAO



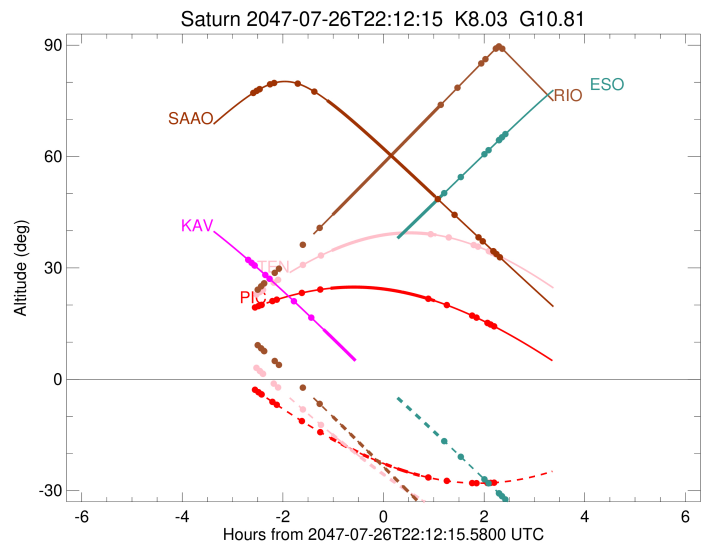
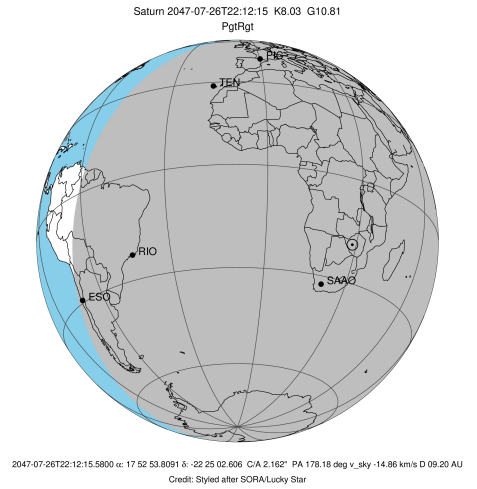
- 1 74490.6 C (IER)
- 2 91984.7 B (IER)
- 3 117571.2 B (OER)
- 4 122050.4 A (IER)
- 5 133423.3 Encke (IEG)
- 6 133744.9 Encke (OEG)
- 7 136774.4 A (OER)
- 8 140461.0 F ring

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	+	+	+	JUL 26 19:59 - JUL 27 00:24	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	+	+	+	JUL 26 20:36 - JUL 27 00:25	PieRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observ	12.6	78.8	+	+	+	JUL 26 19:30 - JUL 26 21:00	PinRin
RIO	Rio de Janeiro	-22.9	316.8		+	+	JUL 26 20:56 - JUL 27 00:33	PieRie
ESO	European South	-29.3	289.3		+	+	JUL 26 23:22 - JUL 27 00:37	PneRne
AAT	Siding Spring	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro	-32.4	20.8	+	+	+	JUL 26 19:36 - JUL 27 00:31	PieRie
MSO	Mt. Stromlo Ob	-35.3	149.0					PnnRnn

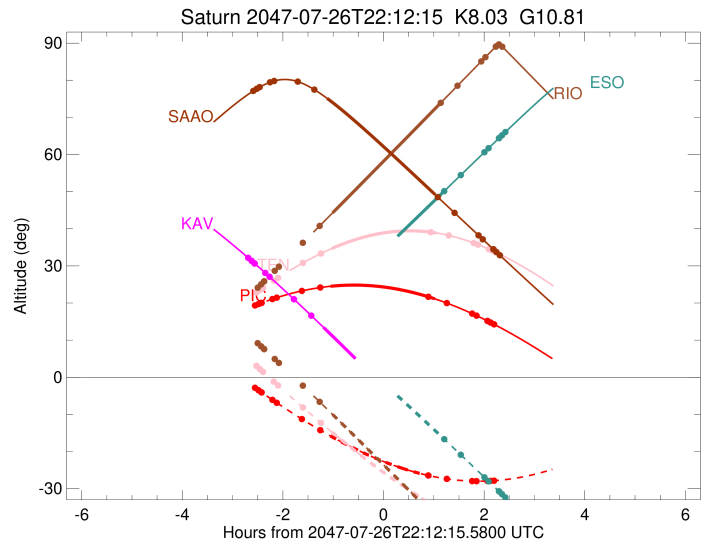
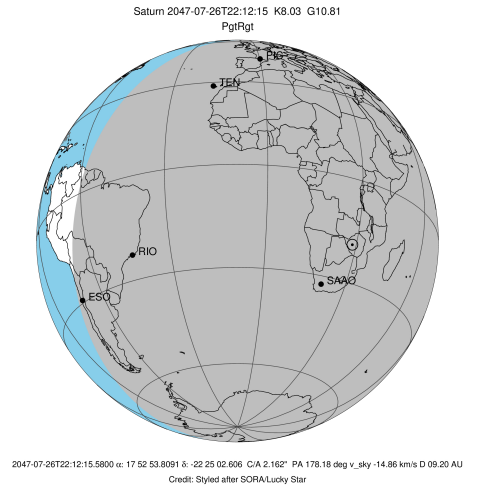


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-26T22:11:17.220
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 4070232857366607616
 2Mass ID (if available) : 17525380-2225024
 ICRS Star Coord at Epoch: 17h 52m 53.80912s -22:25:02.60573s
 RUWE (>1.4 is poor) : 0.78
 K magnitude : 8.028
 G magnitude : 10.813
 RP magnitude : 9.978
 BP magnitude : 11.547
 DUPflag : 0
 Distance (au) : 9.196
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.86
 Sun-Target sep (deg) : 145.14
 Sun-Moon sep (deg) : 95.15
 B (ring opening deg) : 26.71
 PA of pole (deg) : 5.38
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.022
 C/A sky separation (km) : 20155.8
 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	2047-07-26T19:39:01.564		19.35	-2.84x	140461.00	-14.88		
A (OER)	I	2047-07-26T19:43:09.634		19.71	-3.49x	136774.40	-14.84		
Encke (OEG)	I	2047-07-26T19:46:34.040		20.01	-4.03x	133744.89	-14.80		
Encke (IEG)	I	2047-07-26T19:46:55.769		20.04	-4.09x	133423.31	-14.80		
A (IER)	I	2047-07-26T19:59:48.599		21.06	-6.09	122050.38	-14.63		
B (OER)	I	2047-07-26T20:04:55.696		21.44	-6.87	117571.17	-14.54		
B (IER)	I	2047-07-26T20:34:55.950		23.27	-11.26	91984.69	-13.79		
C (IER)	I	2047-07-26T20:56:51.495		24.17	-14.25	74490.58	-12.69		
Saturn	I	2047-07-26T21:09:05.496		24.51	-15.82	60213.42		11.10	13.55
Saturn	E	2047-07-26T23:13:23.018		21.13	-26.82	60033.53		23.58	28.12
C (IER)	E	2047-07-26T23:05:39.605	b	21.69	-26.45	74490.58	12.61		
B (IER)	E	2047-07-26T23:27:44.133		19.99	-27.37	91984.69	13.69		
B (OER)	E	2047-07-26T23:57:59.405		17.15	-27.97	117571.16	14.41		
A (IER)	E	2047-07-27T00:03:09.436		16.61	-27.99	122050.38	14.49		
Encke (IEG)	E	2047-07-27T00:16:10.146		15.18	-27.95	133423.31	14.64		
Encke (OEG)	E	2047-07-27T00:16:32.106		15.14	-27.95	133744.89	14.65		
A (OER)	E	2047-07-27T00:19:58.721		14.75	-27.91	136774.40	14.68		
F ring	E	2047-07-27T00:24:09.536		14.26	-27.86	140461.00	14.72		

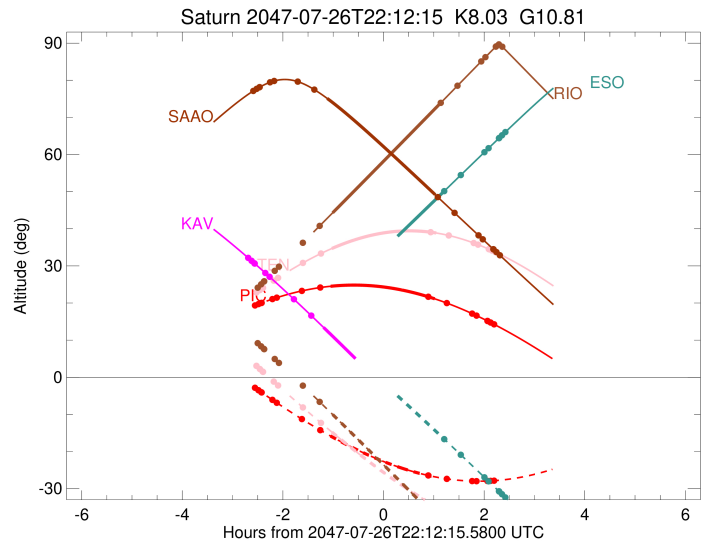
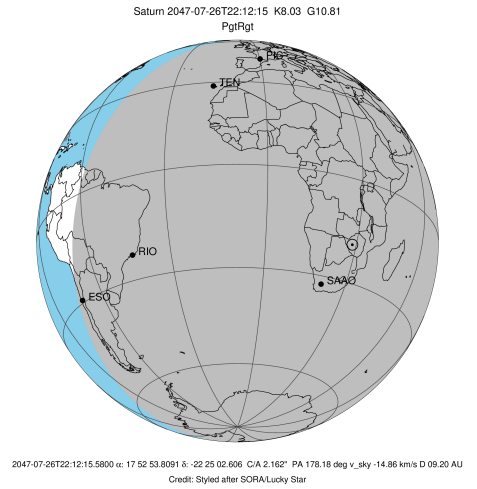
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-26T22:12:53.300
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 4070232857366607616
 2Mass ID (if available) : 17525380-2225024
 ICRS Star Coord at Epoch: 17h 52m 53.80912s -22:25:02.60573s
 RUWE (>1.4 is poor) : 0.78
 K magnitude : 8.028
 G magnitude : 10.813
 RP magnitude : 9.978
 BP magnitude : 11.547
 DUPflag : 0
 Distance (au) : 9.196
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.86
 Sun-Target sep (deg) : 145.14
 Sun-Moon sep (deg) : 95.39
 B (ring opening deg) : 26.71
 PA of pole (deg) : 5.38
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.902
 C/A sky separation (km) : 19352.0
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itr93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



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

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-07-26T19:40:44.389		22.86	3.07x	140461.00	-14.96		
A (OER)	I	2047-07-26T19:44:51.149		23.51	2.22x	136774.40	-14.92		
Encke (OEG)	I	2047-07-26T19:48:14.402		24.03	1.52x	133744.89	-14.89		
Encke (IEG)	I	2047-07-26T19:48:36.004		24.09	1.45x	133423.31	-14.88		
A (IER)	I	2047-07-26T20:01:23.757		26.03	-1.17x	122050.38	-14.73		
B (OER)	I	2047-07-26T20:06:28.499		26.78	-2.20x	117571.17	-14.66		
B (IER)	I	2047-07-26T20:36:09.541		30.81	-8.13	91984.69	-13.99		
C (IER)	I	2047-07-26T20:57:41.158		33.34	-12.30	74490.58	-13.00		
Saturn	I	2047-07-26T21:10:35.964		34.68	-14.74	60221.46		10.24	12.51
Saturn	E	2047-07-26T23:14:58.201		38.87	-34.74	60044.65		22.98	27.44
C (IER)	E	2047-07-26T23:08:29.002	b	39.08	-33.91	74490.58	12.96		
B (IER)	E	2047-07-26T23:30:04.517		38.20	-36.52	91984.69	13.94		
B (OER)	E	2047-07-26T23:59:51.494		36.17	-39.46	117571.17	14.61		
A (IER)	E	2047-07-27T00:04:57.374		35.73	-39.87	122050.38	14.68		
Encke (IEG)	E	2047-07-27T00:17:48.178		34.53	-40.80	133423.31	14.82		
Encke (OEG)	E	2047-07-27T00:18:09.869		34.49	-40.82	133744.89	14.83		
A (OER)	E	2047-07-27T00:21:33.977		34.14	-41.04	136774.40	14.86		
F ring	E	2047-07-27T00:25:41.800		33.71	-41.28	140461.00	14.89		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-26T22:05:26.800
 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 : 4070232857366607616
 2Mass ID (if available) : 17525380-2225024
 ICRS Star Coord at Epoch: 17h 52m 53.80912s -22:25:02.60573s
 RUWE (>1.4 is poor) : 0.78
 K magnitude : 8.028
 G magnitude : 10.813
 RP magnitude : 9.978
 BP magnitude : 11.547
 DUPflag : 0
 Distance (au) : 9.196
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.86
 Sun-Target sep (deg) : 145.14
 Sun-Moon sep (deg) : 94.65
 B (ring opening deg) : 26.71
 PA of pole (deg) : 5.38
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.346
 C/A sky separation (km) : 15643.8
 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_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

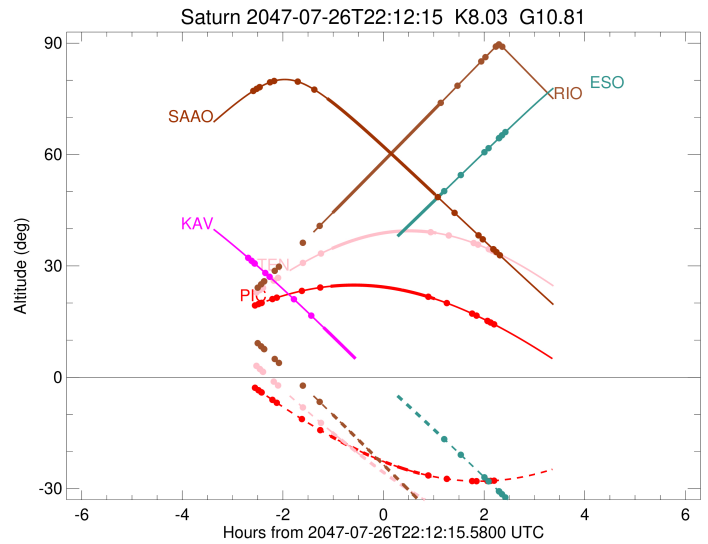
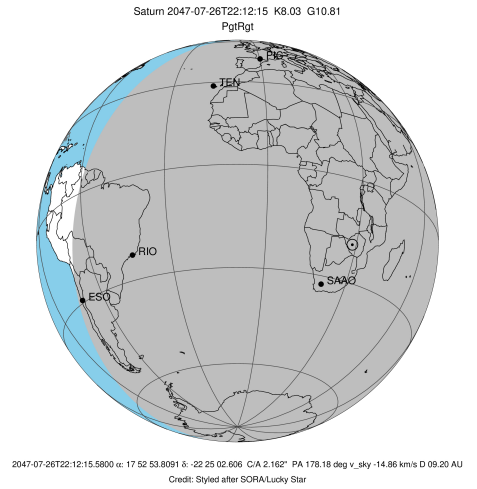


b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-07-26T19:30:55.428		32.16	-56.73	140461.00	-15.12		
A (OER)	I	2047-07-26T19:34:59.444		31.36	-56.42	136774.40	-15.09		
Encke (OEG)	I	2047-07-26T19:38:20.380		30.69	-56.15	133744.89	-15.06		
Encke (IEG)	I	2047-07-26T19:38:41.731		30.62	-56.12	133423.31	-15.06		
A (IER)	I	2047-07-26T19:51:19.985		28.09	-54.93	122050.38	-14.93		
B (OER)	I	2047-07-26T19:56:20.500		27.07	-54.39	117571.16	-14.88		
B (IER)	I	2047-07-26T20:25:26.251		21.02	-50.64	91984.69	-14.38		
C (IER)	I	2047-07-26T20:46:07.749		16.60	-47.44	74490.58	-13.73		
Saturn	I	2047-07-26T21:00:38.876		13.45	-44.98	60242.03		7.63	9.35
Saturn	E	2047-07-26T23:10:42.109		-15.83x	-18.66	60109.36		19.19	23.11
C (IER)	E	2047-07-26T23:10:38.185	b	-15.81x	-18.67	74490.58	13.45		
B (IER)	E	2047-07-26T23:31:48.827		-20.69x	-13.98	91984.69	14.02		
B (OER)	E	2047-07-27T00:01:46.816		-27.62x	-7.23	117571.16	14.39		
A (IER)	E	2047-07-27T00:06:57.639		-28.82x	-6.05	122050.38	14.43		
Encke (IEG)	E	2047-07-27T00:20:03.578		-31.85x	-3.07x	133423.31	14.51		
Encke (OEG)	E	2047-07-27T00:20:25.744		-31.94x	-2.98x	133744.89	14.51		
A (OER)	E	2047-07-27T00:23:54.430		-32.74x	-2.19x	136774.40	14.53		
F ring	E	2047-07-27T00:28:08.078		-33.72x	-1.22x	140461.00	14.54		

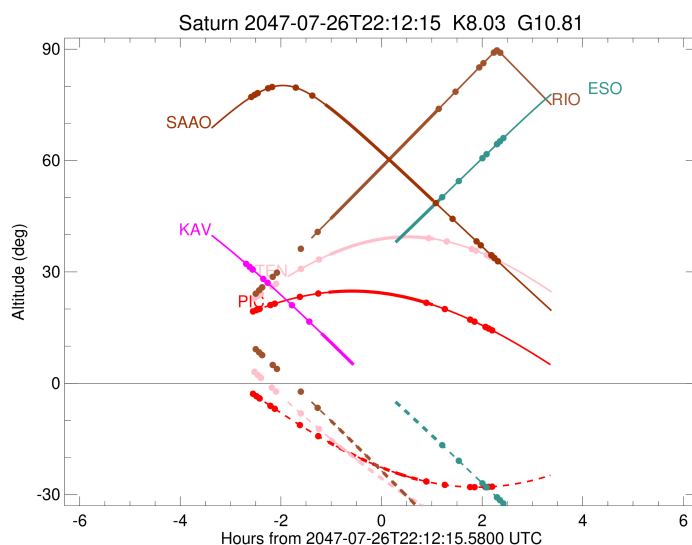
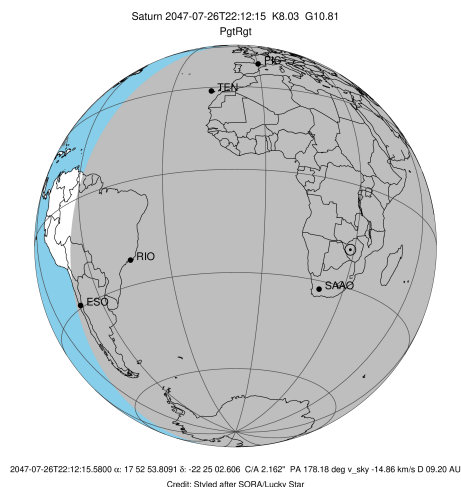
```

target                : Saturn
target radius (km)   : 60268.00
C/A epoch            : 2047-07-26T22:15:50.720
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       : 4070232857366607616
2Mass ID (if available) : 17525380-2225024
ICRS Star Coord at Epoch: 17h 52m 53.80912s -22:25:02.60573s
RUWE (>1.4 is poor) : 0.78
K magnitude           : 8.028
G magnitude           : 10.813
RP magnitude          : 9.978
BP magnitude          : 11.547
DUPflag              : 0
Distance (au)         : 9.196
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -14.86
Sun-Target sep (deg) : 145.14
Sun-Moon sep (deg)   : 95.65
B (ring opening deg) : 26.71
PA of pole (deg)     : 5.38
Pole direction: RA (deg): 40.60000
Dec (deg): 83.50000
C/A sky separation (") : 2.119
C/A sky separation (km) : 14130.9
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl1.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
  
```



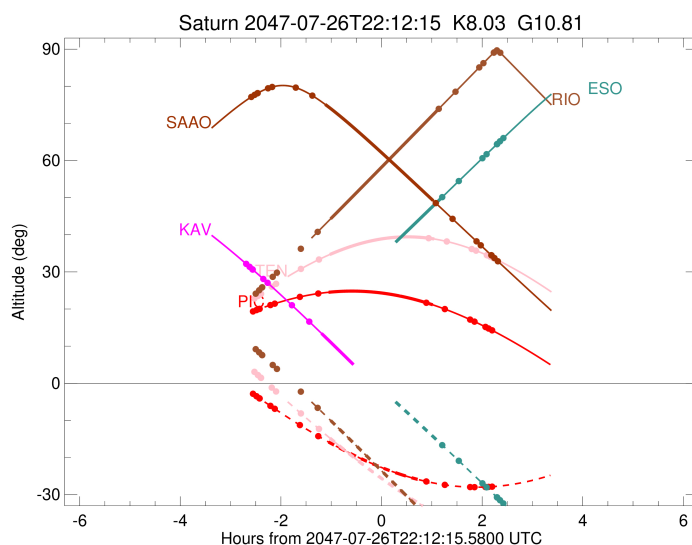
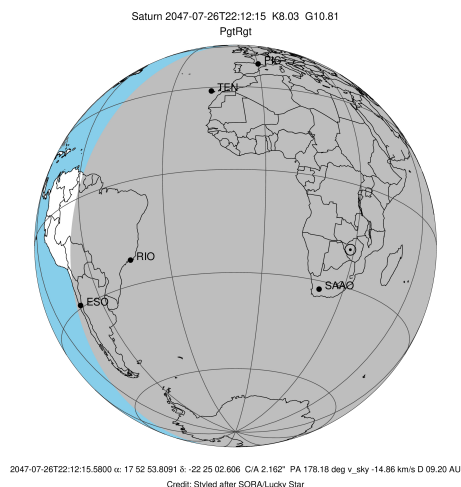
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-07-26T19:42:17.309		24.14	9.17x	140461.00	-15.18		
A (OER)	I	2047-07-26T19:46:20.299		25.04	8.33x	136774.40	-15.16		
Encke (OEG)	I	2047-07-26T19:49:40.168		25.79	7.63x	133744.89	-15.15		
Encke (IEG)	I	2047-07-26T19:50:01.394		25.87	7.56x	133423.31	-15.15		
A (IER)	I	2047-07-26T20:02:33.652		28.67	4.92x	122050.38	-15.08		
B (OER)	I	2047-07-26T20:07:30.919		29.79	3.87x	117571.16	-15.05		
B (IER)	I	2047-07-26T20:36:06.331		36.23	-2.27x	91984.69	-14.74		
C (IER)	I	2047-07-26T20:56:10.389		40.78	-6.64	74490.58	-14.27		
Saturn	I	2047-07-26T21:11:34.291		44.29	-10.02	60255.00		5.39	6.61
Saturn	E	2047-07-26T23:19:44.899		73.74	-38.91	60117.87		18.65	22.48
C (IER)	E	2047-07-26T23:20:29.582		73.91	-39.08	74490.58	14.33		
B (IER)	E	2047-07-26T23:40:27.305		78.53	-43.65	91984.69	14.83		
B (OER)	E	2047-07-27T00:08:50.696		85.09	-50.18	117571.16	15.17		
A (IER)	E	2047-07-27T00:13:45.562		86.22	-51.31	122050.38	15.21		
Encke (IEG)	E	2047-07-27T00:26:11.356		89.05	-54.17	133423.31	15.29		
Encke (OEG)	E	2047-07-27T00:26:32.392		89.13	-54.25	133744.89	15.29		
A (OER)	E	2047-07-27T00:29:50.449		89.67	-55.01	136774.40	15.30		
F ring	E	2047-07-27T00:33:51.186		89.05	-55.94	140461.00	15.32		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-26T22:17:39.420
 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 : 4070232857366607616
 2Mass ID (if available) : 17525380-2225024
 ICRS Star Coord at Epoch: 17h 52m 53.80912s -22:25:02.60573s
 RUWE (>1.4 is poor) : 0.78
 K magnitude : 8.028
 G magnitude : 10.813
 RP magnitude : 9.978
 BP magnitude : 11.547
 DUPflag : 0
 Distance (au) : 9.196
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.86
 Sun-Target sep (deg) : 145.14
 Sun-Moon sep (deg) : 95.39
 B (ring opening deg) : 26.71
 PA of pole (deg) : 5.38
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.916
 C/A sky separation (km) : 12777.9
 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	2047-07-26T19:42:21.160		2.89x	26.11x	140461.00	-15.06		
A (OER)	I	2047-07-26T19:46:26.034		3.70x	25.47x	136774.40	-15.05		
Encke (OEG)	I	2047-07-26T19:49:47.394		4.38x	24.93x	133744.89	-15.04		
Encke (IEG)	I	2047-07-26T19:50:08.776		4.45x	24.87x	133423.31	-15.04		
A (IER)	I	2047-07-26T20:02:46.073		7.00	22.80x	122050.38	-14.99		
B (OER)	I	2047-07-26T20:07:45.054		8.02	21.96x	117571.16	-14.97		
B (IER)	I	2047-07-26T20:36:25.888		13.93	16.95x	91984.69	-14.73		
C (IER)	I	2047-07-26T20:56:26.224		18.12	13.28x	74490.58	-14.37		
Saturn	I	2047-07-26T21:12:18.455		21.48	10.28x	60260.60		4.06	4.99
Saturn	E	2047-07-26T23:22:29.513		49.66	-16.20	60132.63		17.68	21.34
C (IER)	E	2047-07-26T23:24:37.601		50.13	-16.66	74490.58	14.53		
B (IER)	E	2047-07-26T23:44:23.629		54.46	-20.88	91984.69	14.93		
B (OER)	E	2047-07-27T00:12:38.060		60.63	-26.96	117571.16	15.23		
A (IER)	E	2047-07-27T00:17:31.796		61.70	-28.02	122050.38	15.27		
Encke (IEG)	E	2047-07-27T00:29:54.990		64.39	-30.70	133423.31	15.34		
Encke (OEG)	E	2047-07-27T00:30:15.956		64.46	-30.78	133744.89	15.34		
A (OER)	E	2047-07-27T00:33:33.364		65.18	-31.49	136774.40	15.35		
F ring	E	2047-07-27T00:37:33.326		66.04	-32.36	140461.00	15.37		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-26T22:09:29.120
 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 : 4070232857366607616
 2Mass ID (if available) : 17525380-2225024
 ICRS Star Coord at Epoch: 17h 52m 53.80912s -22:25:02.60573s
 RUWE (>1.4 is poor) : 0.78
 K magnitude : 8.028
 G magnitude : 10.813
 RP magnitude : 9.978
 BP magnitude : 11.547
 DUPflag : 0
 Distance (au) : 9.196
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -14.86
 Sun-Target sep (deg) : 145.14
 Sun-Moon sep (deg) : 95.59
 B (ring opening deg) : 26.71
 PA of pole (deg) : 5.38
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.948
 C/A sky separation (km) : 12991.5
 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	2047-07-26T19:36:59.433		77.13	-46.48	140461.00	-15.41		
A (OER)	I	2047-07-26T19:40:58.752		77.69	-47.32	136774.40	-15.40		
Encke (OEG)	I	2047-07-26T19:44:15.640		78.12	-48.01	133744.89	-15.38		
Encke (IEG)	I	2047-07-26T19:44:36.552		78.16	-48.09	133423.31	-15.38		
A (IER)	I	2047-07-26T19:56:57.884		79.46	-50.68	122050.38	-15.30		
B (OER)	I	2047-07-26T20:01:50.931		79.82	-51.69	117571.16	-15.27		
B (IER)	I	2047-07-26T20:30:02.107		79.64	-57.52	91984.69	-14.95		
C (IER)	I	2047-07-26T20:49:47.061		77.48	-61.50	74490.58	-14.53		
Saturn	I	2047-07-26T21:05:06.229		75.12	-64.50	60257.05		4.95	6.07
Saturn	E	2047-07-26T23:14:01.101		49.16	-75.34	60140.43		17.14	20.72
C (IER)	E	2047-07-26T23:16:56.363		48.54	-75.02	74490.58	14.35		
B (IER)	E	2047-07-26T23:36:57.372		44.30	-72.33	91984.69	14.73		
B (OER)	E	2047-07-27T00:05:37.384		38.22	-67.46	117571.16	14.98		
A (IER)	E	2047-07-27T00:10:36.138		37.17	-66.53	122050.38	15.00		
Encke (IEG)	E	2047-07-27T00:23:12.832		34.51	-64.14	133423.31	15.05		
Encke (OEG)	E	2047-07-27T00:23:34.196		34.44	-64.07	133744.89	15.05		
A (OER)	E	2047-07-27T00:26:55.395		33.73	-63.41	136774.40	15.06		
F ring	E	2047-07-27T00:31:00.075		32.87	-62.62	140461.00	15.07		