

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-23T09:58:10.060
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4117826352042608384
 2Mass ID (if available) : 17274474-2142458

Saturn 2046-03-23T09:58:10 K6.33 G12.28 PgtRgt

ICRS Star Coord at Epoch: 17h 27m 44.73435s -21:42:46.33481s

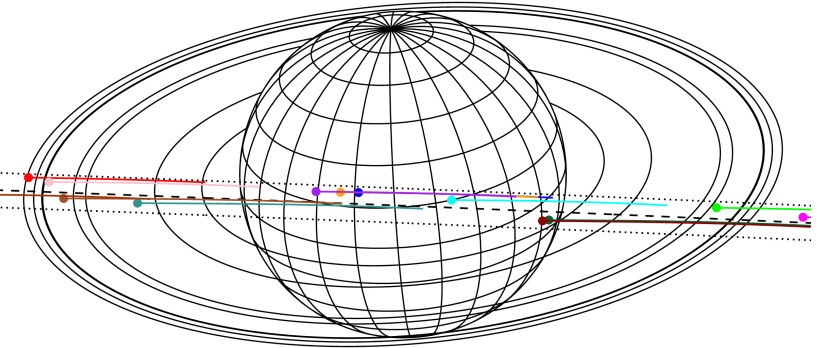
RUWE (>1.4 is poor) : 1.10
 K magnitude : 6.335
 G magnitude : 12.282
 RP magnitude : 10.813
 BP magnitude : 15.242
 DUPflag : 0
 Distance (au) : 9.811
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.53
 Sun-Target sep (deg) : 99.78
 Sun-Moon sep (deg) : 65.97
 B (ring opening deg) : 26.52
 PA of pole (deg) : 4.80

#	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



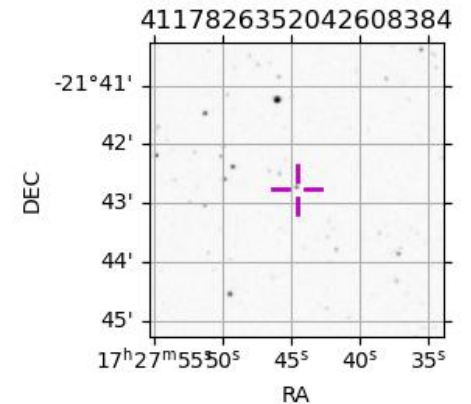
2046-03-23T09:58:10.0600 α: 17 27 44.7344 δ: -21 42 46.335 C/A 1.620° PA 357.69 deg v_sky + 4.53 km/s D 09.81 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PAL
 PMO
 KPNO
 MCD
 TEN
 IRTF
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO

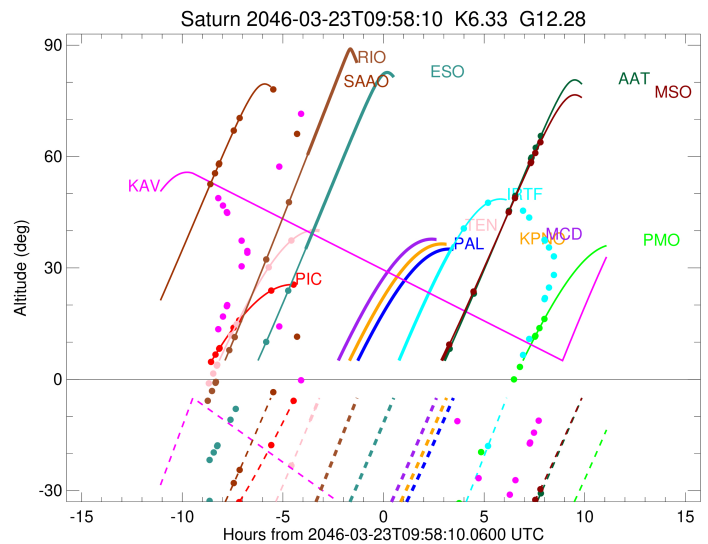
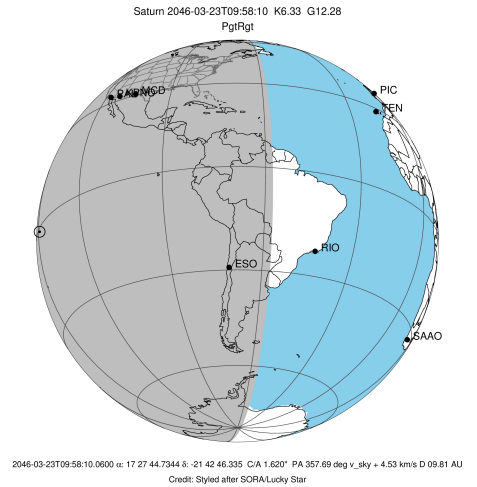


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEncode
PIC	Pic du Midi	42.9	0.1	+	+	+	MAR 23 01:37 - MAR 23 05:30	PnnRin
PAL	Palomar Mt (20	33.4	243.1	+	+	+		PnnRnn
PMO	Purple Mtn Obs	32.1	118.8			+	MAR 23 17:29 - MAR 23 17:57	PnnRne
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	+	+	+	MAR 23 02:23 - MAR 23 06:19	PinRin
IRTF	Mauna Kea/IRTF	19.8	204.5		+	+	MAR 23 13:27 - MAR 23 15:09	PneRne
KAV	Kavalur Observ	12.6	78.8			+		PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+	+	+	MAR 23 02:18 - MAR 23 06:11	PinRin
ESO	European South	-29.3	289.3	+	+	+	MAR 23 04:08 - MAR 23 06:05	PinRin
AAT	Siding Spring	-31.3	149.1		+	+	MAR 23 13:13 - MAR 23 17:47	PneRne
SAAO	So. Afr. Astro	-32.4	20.8	+	+	+	MAR 23 01:21 - MAR 23 02:49	PnnRin
MSO	Mt. Stromlo Ob	-35.3	149.0	+	+	+	MAR 23 13:14 - MAR 23 17:45	PneRne

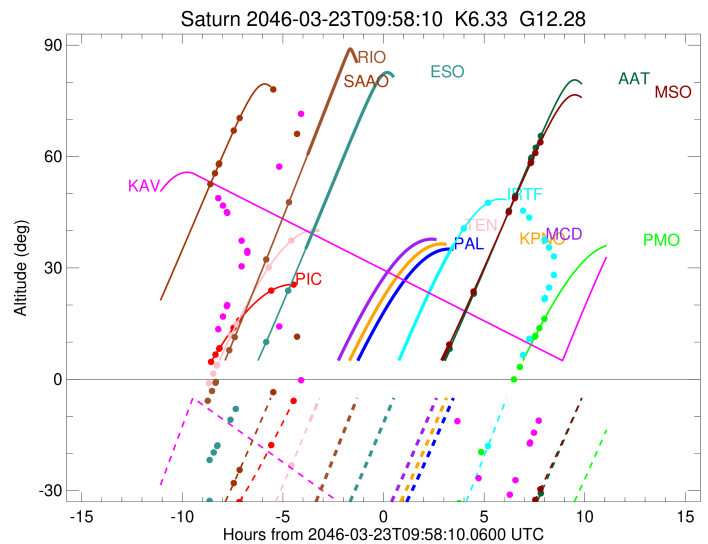
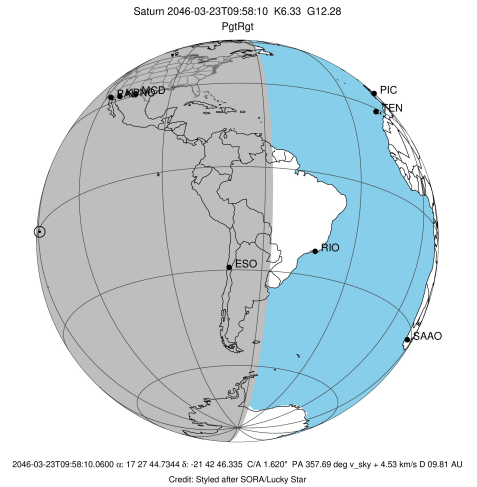


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-23T10:14:33.330
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 4117826352042608384
 2Mass ID (if available) : 17274474-2142458
 ICRS Star Coord at Epoch: 17h 27m 44.73435s -21:42:46.33481s
 RUWE (>1.4 is poor) : 1.10
 K magnitude : 6.335
 G magnitude : 12.282
 RP magnitude : 10.813
 BP magnitude : 15.242
 DUPflag : 0
 Distance (au) : 9.811
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.53
 Sun-Target sep (deg) : 99.78
 Sun-Moon sep (deg) : 66.27
 B (ring opening deg) : 26.52
 PA of pole (deg) : 4.80
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.009
 C/A sky separation (km) : 7182.0
 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_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	2046-03-23T01:24:01.542		4.70x	-42.84	140461.00	-4.62		
A (OER)	I	2046-03-23T01:37:21.097		6.66	-41.64	136774.40	-4.60		
Encke (OEG)	I	2046-03-23T01:48:20.867		8.23	-40.54	133744.89	-4.58		
Encke (IEG)	I	2046-03-23T01:49:31.043		8.40	-40.42	133423.31	-4.58		
A (IER)	I	2046-03-23T02:31:09.944		13.88	-35.41	122050.38	-4.52		
B (OER)	I	2046-03-23T02:47:42.864		15.83	-33.12	117571.16	-4.50		
B (IER)	I	2046-03-23T04:23:36.725		23.90	-17.72	91984.69	-4.40		
C (IER)	I	2046-03-23T05:30:16.757		25.50	-5.78	74490.58	-4.35		
Saturn	I	2046-03-23T06:24:38.061		24.11	4.19x	60267.27		1.28	1.58
Saturn	E	2046-03-23T13:53:28.743		-41.55x	42.01x	60185.71		-13.80	-16.78
C (IER)	E	2046-03-23T14:15:13.782		-45.48x	39.41x	74490.58	4.74		
B (IER)	E	2046-03-23T15:16:18.295		-56.02x	30.64x	91984.69	4.80		
B (OER)	E	2046-03-23T16:44:57.774		-67.44x	15.59x	117571.16	4.81		
A (IER)	E	2046-03-23T17:00:29.247		-68.42x	12.80x	122050.38	4.81		
Encke (IEG)	E	2046-03-23T17:39:59.777		-68.75x	5.61x	133423.31	4.79		
Encke (OEG)	E	2046-03-23T17:41:06.959		-68.71x	5.40x	133744.89	4.79		
A (OER)	E	2046-03-23T17:51:40.380		-68.24x	3.47x	136774.40	4.78		
F ring	E	2046-03-23T18:04:32.544		-67.38x	1.10x	140461.00	4.77		

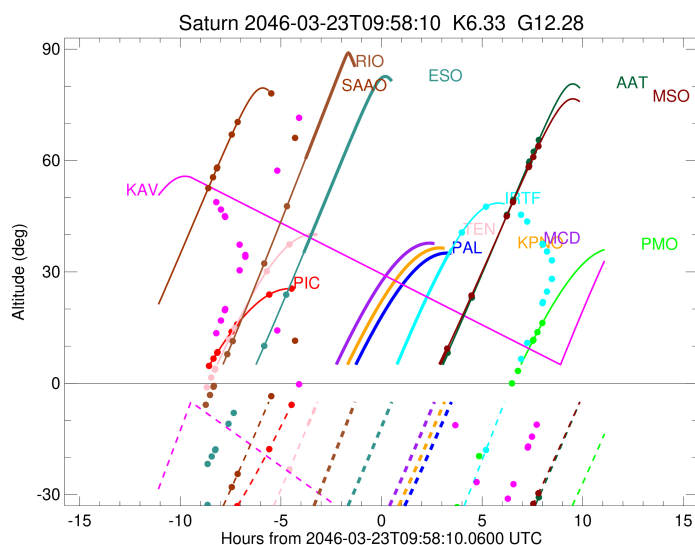
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-23T09:56:24.610
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 4117826352042608384
 2Mass ID (if available) : 17274474-2142458
 ICRS Star Coord at Epoch: 17h 27m 44.73435s -21:42:46.33481s
 RUWE (>1.4 is poor) : 1.10
 K magnitude : 6.335
 G magnitude : 12.282
 RP magnitude : 10.813
 BP magnitude : 15.242
 DUPflag : 0
 Distance (au) : 9.811
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.53
 Sun-Target sep (deg) : 99.78
 Sun-Moon sep (deg) : 65.03
 B (ring opening deg) : 26.52
 PA of pole (deg) : 4.80
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.456
 C/A sky separation (km) : 10357.7
 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	2046-03-23T01:54:44.975		7.44	45.42x	140461.00	-4.67		
A (OER)	I	2046-03-23T02:07:53.236		5.03	47.60x	136774.40	-4.68		
Encke (OEG)	I	2046-03-23T02:18:39.375		3.02x	49.30x	133744.89	-4.69		
Encke (IEG)	I	2046-03-23T02:19:47.876		2.80x	49.47x	133423.31	-4.70		
A (IER)	I	2046-03-23T03:00:00.418		-4.94x	54.88x	122050.38	-4.73		
B (OER)	I	2046-03-23T03:15:45.549		-8.05x	56.50x	117571.16	-4.75		
B (IER)	I	2046-03-23T04:45:05.253		-26.36x	58.17x	91984.69	-4.79		
C (IER)	I	2046-03-23T05:46:02.587		-39.23x	51.94x	74490.58	-4.76		
Saturn	I	2046-03-23T06:35:18.511		-49.71x	44.17x	60265.77		-2.25	-2.76
Saturn	E	2046-03-23T13:21:56.494		-37.94x	-38.07	60180.45		-14.25	-17.31
C (IER)	E	2046-03-23T13:43:14.814		-33.42x	-41.83	74490.58	4.45		
B (IER)	E	2046-03-23T14:48:59.951		-19.66x	-51.58	91984.69	4.41		
B (OER)	E	2046-03-23T16:27:09.899		-0.03x	-56.61	117571.16	4.28		
A (IER)	E	2046-03-23T16:44:40.369		3.29x	-55.88	122050.38	4.25		
Encke (IEG)	E	2046-03-23T17:29:35.113		11.44	-51.96	133423.31	4.19		
Encke (OEG)	E	2046-03-23T17:30:51.877		11.66	-51.81	133744.89	4.19		
A (OER)	E	2046-03-23T17:42:56.564		13.74	-50.31	136774.40	4.17		
F ring	E	2046-03-23T17:57:42.031		16.21	-48.29	140461.00	4.15		

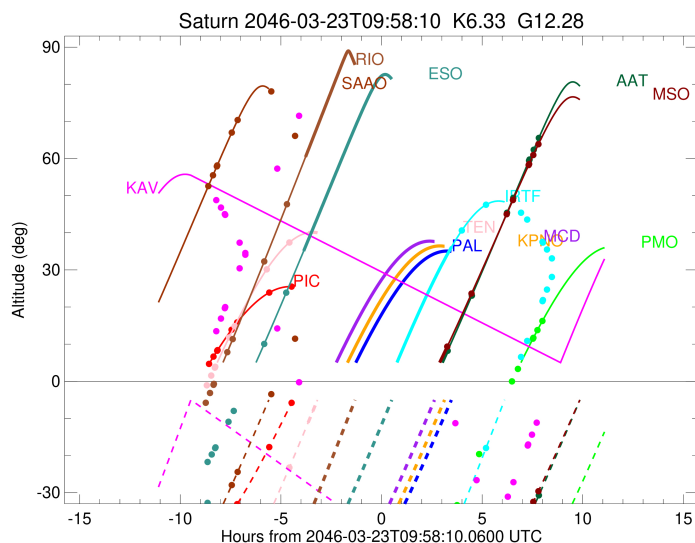
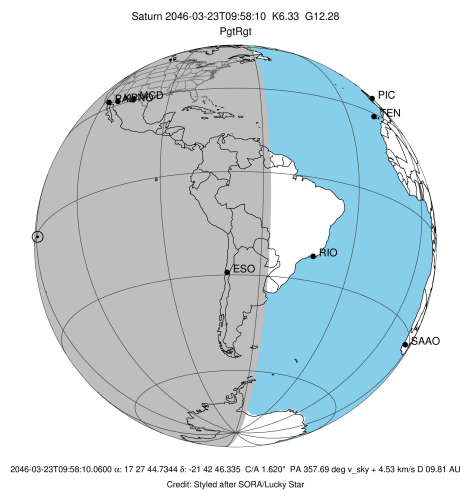
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-23T10:15:00.020
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 4117826352042608384
 2Mass ID (if available) : 17274474-2142458
 ICRS Star Coord at Epoch: 17h 27m 44.73435s -21:42:46.33481s
 RUWE (>1.4 is poor) : 1.10
 K magnitude : 6.335
 G magnitude : 12.282
 RP magnitude : 10.813
 BP magnitude : 15.242
 DUPflag : 0
 Distance (au) : 9.811
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.53
 Sun-Target sep (deg) : 99.78
 Sun-Moon sep (deg) : 66.58
 B (ring opening deg) : 26.52
 PA of pole (deg) : 4.80
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.092
 C/A sky separation (km) : 7770.5
 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	2046-03-23T01:17:26.572	-1.08x	-60.82	140461.00	-4.70			
A (OER)	I	2046-03-23T01:30:33.747	1.55x	-60.52	136774.40	-4.67			
Encke (OEG)	I	2046-03-23T01:41:24.122	3.70x	-60.02	133744.89	-4.65			
Encke (IEG)	I	2046-03-23T01:42:33.344	3.92x	-59.96	133423.31	-4.64			
A (IER)	I	2046-03-23T02:23:44.398	11.81	-56.19	122050.38	-4.56			
B (OER)	I	2046-03-23T02:40:09.795	14.82	-54.04	117571.16	-4.53			
B (IER)	I	2046-03-23T04:16:05.058	30.16	-37.21	91984.69	-4.37			
C (IER)	I	2046-03-23T05:23:34.487	37.39	-23.23	74490.58	-4.27			
Saturn	I	2046-03-23T06:19:19.829	40.01	-11.16	60267.82			0.64	0.78
Saturn	E	2046-03-23T13:58:16.569	-28.52x	60.95x	60175.25			-14.67	-17.81
C (IER)	E	2046-03-23T14:16:50.392	-32.56x	59.00x	74490.58	4.71			
B (IER)	E	2046-03-23T15:18:06.905	-46.03x	49.69x	91984.69	4.80			
B (OER)	E	2046-03-23T16:46:17.183	-65.46x	32.35x	117571.16	4.86			
A (IER)	E	2046-03-23T17:01:38.501	-68.80x	29.11x	122050.38	4.86			
Encke (IEG)	E	2046-03-23T17:40:37.138	-76.95x	20.73x	133423.31	4.86			
Encke (OEG)	E	2046-03-23T17:41:43.295	-77.17x	20.50x	133744.89	4.86			
A (OER)	E	2046-03-23T17:52:06.747	-79.15x	18.24x	136774.40	4.86			
F ring	E	2046-03-23T18:04:46.016	-81.31x	15.47x	140461.00	4.85			

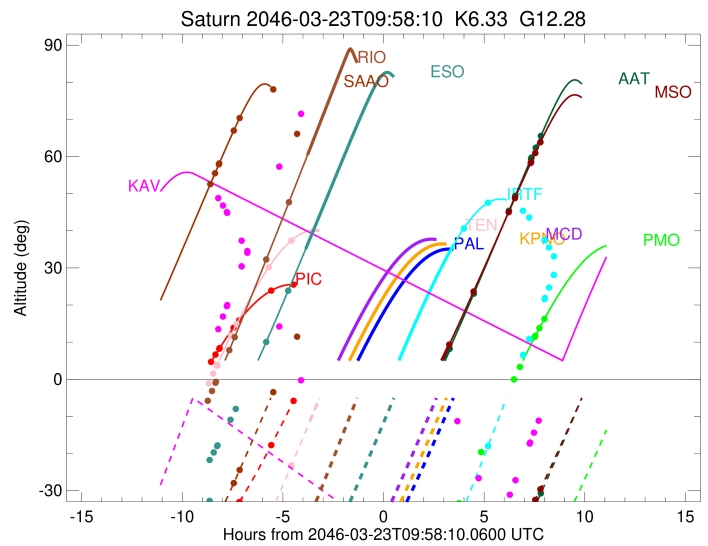
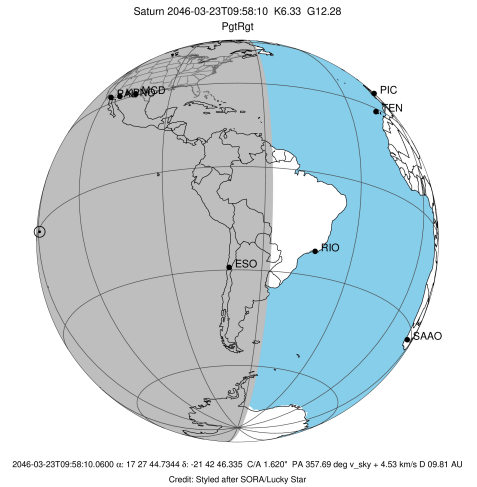
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-23T09:37:41.400
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 4117826352042608384
 2Mass ID (if available) : 17274474-2142458
 ICRS Star Coord at Epoch: 17h 27m 44.73435s -21:42:46.33481s
 RUWE (>1.4 is poor) : 1.10
 K magnitude : 6.335
 G magnitude : 12.282
 RP magnitude : 10.813
 BP magnitude : 15.242
 DUPflag : 0
 Distance (au) : 9.811
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.53
 Sun-Target sep (deg) : 99.78
 Sun-Moon sep (deg) : 65.50
 B (ring opening deg) : 26.52
 PA of pole (deg) : 4.80
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.315
 C/A sky separation (km) : 9359.1
 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

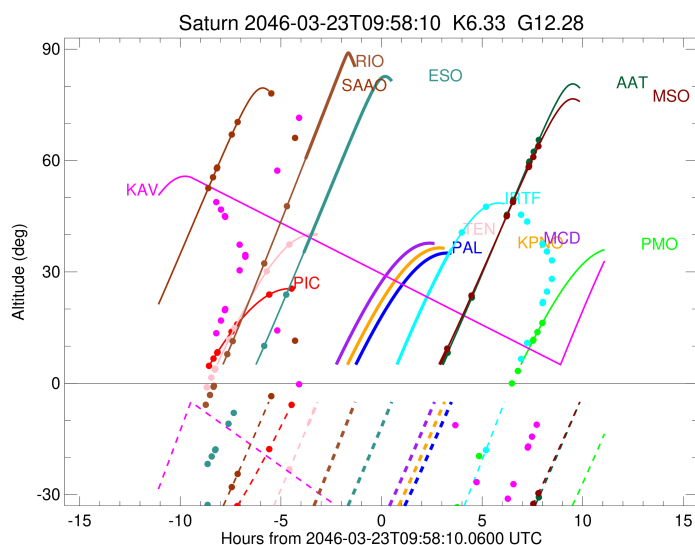
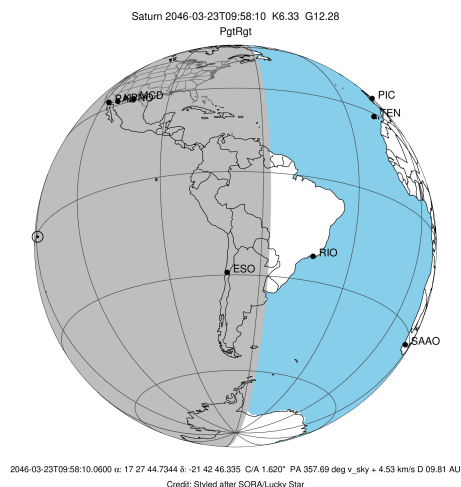
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-03-23T01:45:46.185	-61.07x	38.27x	140461.00	-5.15			
A (OER)	I	2046-03-23T01:57:41.765	-63.85x	35.55x	136774.40	-5.15			
Encke (OEG)	I	2046-03-23T02:07:29.834	-66.13x	33.30x	133744.89	-5.15			
Encke (IEG)	I	2046-03-23T02:08:32.262	-66.37x	33.06x	133423.31	-5.15			
A (IER)	I	2046-03-23T02:45:22.149	-74.94x	24.53x	122050.38	-5.14			
B (OER)	I	2046-03-23T02:59:54.369	-78.30x	21.14x	117571.16	-5.13			
B (IER)	I	2046-03-23T04:23:41.708	-81.62x	1.46x	91984.69	-5.03			
C (IER)	I	2046-03-23T05:22:20.300	-68.05x	-12.31	74490.58	-4.90			
Saturn	I	2046-03-23T06:09:43.288	-57.02x	-23.35	60263.26			-3.28	-4.03
Saturn	E	2046-03-23T13:27:27.014	36.25	-41.36	60197.13			-12.79	-15.57
C (IER)	E	2046-03-23T13:57:21.527	40.59	-34.66	74490.58	4.03			
B (IER)	E	2046-03-23T15:09:33.117	47.54	-18.03	91984.69	4.05			
B (OER)	E	2046-03-23T16:54:12.493	45.41	6.54x	117571.16	4.11			
A (IER)	E	2046-03-23T17:12:20.181	43.58	10.81x	122050.38	4.13			
Encke (IEG)	E	2046-03-23T17:58:00.226	37.59	21.53x	133423.31	4.18			
Encke (OEG)	E	2046-03-23T17:59:17.208	37.40	21.83x	133744.89	4.18			
A (OER)	E	2046-03-23T18:11:21.011	35.53	24.65x	136774.40	4.19			
F ring	E	2046-03-23T18:25:58.225	33.14	28.05x	140461.00	4.21			

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-23T10:06:57.640
 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 : 4117826352042608384
 2Mass ID (if available) : 17274474-2142458
 ICRS Star Coord at Epoch: 17h 27m 44.73435s -21:42:46.33481s
 RUWE (>1.4 is poor) : 1.10
 K magnitude : 6.335
 G magnitude : 12.282
 RP magnitude : 10.813
 BP magnitude : 15.242
 DUPflag : 0
 Distance (au) : 9.811
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.53
 Sun-Target sep (deg) : 99.78
 Sun-Moon sep (deg) : 66.98
 B (ring opening deg) : 26.52
 PA of pole (deg) : 4.80
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.685
 C/A sky separation (km) : 11990.2
 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_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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-03-23T01:14:12.803	-5.79x	-56.46	140461.00	-4.85			
A (OER)	I	2046-03-23T01:26:54.827	-3.14x	-58.74	136774.40	-4.82			
Encke (OEG)	I	2046-03-23T01:37:24.689	-0.94x	-60.53	133744.89	-4.80			
Encke (IEG)	I	2046-03-23T01:38:31.745	-0.70x	-60.71	133423.31	-4.79			
A (IER)	I	2046-03-23T02:18:28.798	7.85	-66.12	122050.38	-4.69			
B (OER)	I	2046-03-23T02:34:27.152	11.33	-67.46	117571.16	-4.65			
B (IER)	I	2046-03-23T04:08:36.167	32.29	-62.56	91984.69	-4.40			
C (IER)	I	2046-03-23T05:16:21.016	47.71	-50.31	74490.58	-4.20			
Saturn	I	2046-03-23T06:11:19.224		60.34	-38.65	60261.53		-3.83	-4.71
Saturn	E	2046-03-23T13:56:38.052		12.98	61.57x	60126.66		-18.23	-21.99
C (IER)	E	2046-03-23T14:00:22.681		12.16	62.04x	74490.58	4.38		
B (IER)	E	2046-03-23T15:05:32.543		-1.85x	65.94x	91984.69	4.56		
B (OER)	E	2046-03-23T16:37:14.009		-20.22x	56.13x	117571.16	4.73		
A (IER)	E	2046-03-23T16:52:59.824		-23.14x	53.32x	122050.38	4.75		
Encke (IEG)	E	2046-03-23T17:32:45.988		-30.03x	45.55x	133423.31	4.78		
Encke (OEG)	E	2046-03-23T17:33:53.194		-30.21x	45.32x	133744.89	4.79		
A (OER)	E	2046-03-23T17:44:25.752		-31.90x	43.14x	136774.40	4.79		
F ring	E	2046-03-23T17:57:14.238		-33.86x	40.44x	140461.00	4.80		

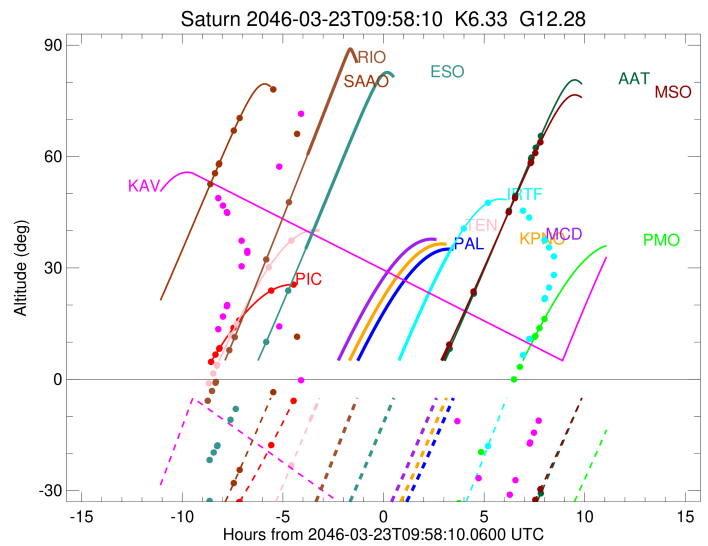
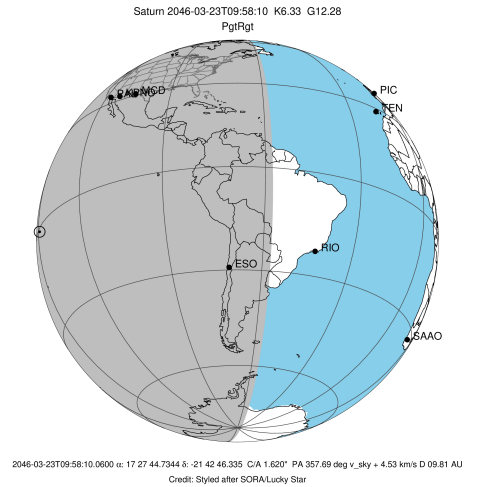
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-23T09:56:49.440
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4117826352042608384
 2Mass ID (if available) : 17274474-2142458
 ICRS Star Coord at Epoch: 17h 27m 44.73435s -21:42:46.33481s
 RUWE (>1.4 is poor) : 1.10
 K magnitude : 6.335
 G magnitude : 12.282
 RP magnitude : 10.813
 BP magnitude : 15.242
 DUPflag : 0
 Distance (au) : 9.811
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.53
 Sun-Target sep (deg) : 99.78
 Sun-Moon sep (deg) : 66.88
 B (ring opening deg) : 26.52
 PA of pole (deg) : 4.80
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.732
 C/A sky separation (km) : 12322.2
 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

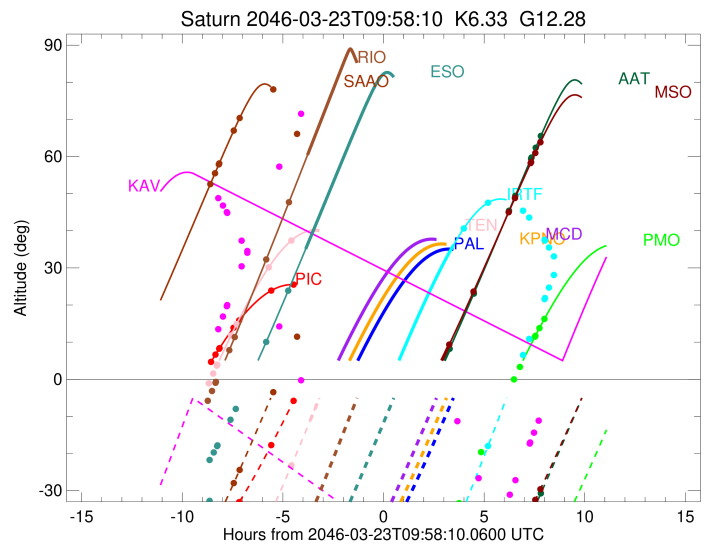
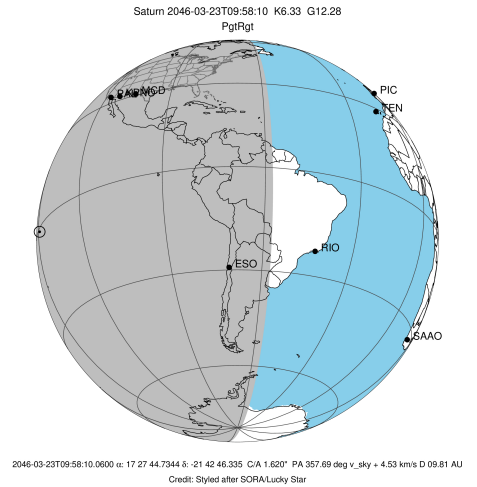
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-03-23T01:19:39.929		-21.73x	-32.77	140461.00	-4.99		
A (OER)	I	2046-03-23T01:32:01.235		-19.71x	-35.30	136774.40	-4.96		
Encke (OEG)	I	2046-03-23T01:42:13.341		-17.99x	-37.36	133744.89	-4.94		
Encke (IEG)	I	2046-03-23T01:43:18.474		-17.80x	-37.57	133423.31	-4.94		
A (IER)	I	2046-03-23T02:22:03.198		-10.90x	-45.07	122050.38	-4.85		
B (OER)	I	2046-03-23T02:37:30.967		-8.01x	-47.88	117571.16	-4.81		
B (IER)	I	2046-03-23T04:08:31.163		10.07	-60.33	91984.69	-4.55		
C (IER)	I	2046-03-23T05:14:08.168		23.88	-61.38	74490.58	-4.32		
Saturn	I	2046-03-23T06:05:50.145		35.03	-56.61	60256.95		-5.01	-6.15
Saturn	E	2046-03-23T13:52:27.825		39.35	38.00x	60131.99		-17.87	-21.57
C (IER)	E	2046-03-23T13:58:10.928		38.10	39.10x	74490.58	4.19		
B (IER)	E	2046-03-23T15:06:08.037		23.42	50.89x	91984.69	4.38		
B (OER)	E	2046-03-23T16:41:13.299		3.61x	59.56x	117571.16	4.58		
A (IER)	E	2046-03-23T16:57:28.991		0.35x	59.55x	122050.38	4.60		
Encke (IEG)	E	2046-03-23T17:38:22.452		-7.59x	57.41x	133423.31	4.66		
Encke (OEG)	E	2046-03-23T17:39:31.378		-7.81x	57.31x	133744.89	4.67		
A (OER)	E	2046-03-23T17:50:19.622		-9.84x	56.27x	136774.40	4.68		
F ring	E	2046-03-23T18:03:25.946		-12.25x	54.80x	140461.00	4.70		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-23T09:47:16.580
 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 : 4117826352042608384
 2Mass ID (if available) : 17274474-2142458
 ICRS Star Coord at Epoch: 17h 27m 44.73435s -21:42:46.33481s
 RUWE (>1.4 is poor) : 1.10
 K magnitude : 6.335
 G magnitude : 12.282
 RP magnitude : 10.813
 BP magnitude : 15.242
 DUPflag : 0
 Distance (au) : 9.811
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.53
 Sun-Target sep (deg) : 99.78
 Sun-Moon sep (deg) : 65.33
 B (ring opening deg) : 26.52
 PA of pole (deg) : 4.80
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.263
 C/A sky separation (km) : 16106.0
 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_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	2046-03-23T01:53:23.391		6.58	57.61x	140461.00	-4.74		
A (OER)	I	2046-03-23T02:06:19.854		4.01x	57.84x	136774.40	-4.75		
Encke (OEG)	I	2046-03-23T02:16:57.269		1.92x	57.81x	133744.89	-4.75		
Encke (IEG)	I	2046-03-23T02:18:04.899		1.70x	57.79x	133423.31	-4.76		
A (IER)	I	2046-03-23T02:57:54.628		-5.90x	55.90x	122050.38	-4.76		
B (OER)	I	2046-03-23T03:13:35.723		-8.79x	54.49x	117571.16	-4.76		
B (IER)	I	2046-03-23T04:43:50.828		-23.71x	41.38x	91984.69	-4.67		
C (IER)	I	2046-03-23T05:47:32.067		-31.65x	29.29x	74490.58	-4.46		
Saturn	I	2046-03-23T06:31:10.816		-35.27x	20.39x	60239.95		-8.00	-9.80
Saturn	E	2046-03-23T13:13:40.629		7.88	-57.27	60119.00		-18.74	-22.58
C (IER)	E	2046-03-23T13:15:04.935		8.16	-57.40	74490.58	3.99		
B (IER)	E	2046-03-23T14:27:20.755		23.02	-59.86	91984.69	4.06		
B (OER)	E	2046-03-23T16:12:25.723		45.39	-48.45	117571.16	4.04		
A (IER)	E	2046-03-23T16:30:54.323		49.36	-45.31	122050.38	4.04		
Encke (IEG)	E	2046-03-23T17:17:57.164		59.40	-36.57	133423.31	4.02		
Encke (OEG)	E	2046-03-23T17:19:17.130		59.68	-36.31	133744.89	4.02		
A (OER)	E	2046-03-23T17:31:50.797		62.32	-33.84	136774.40	4.02		
F ring	E	2046-03-23T17:47:08.610		65.50	-30.77	140461.00	4.02		

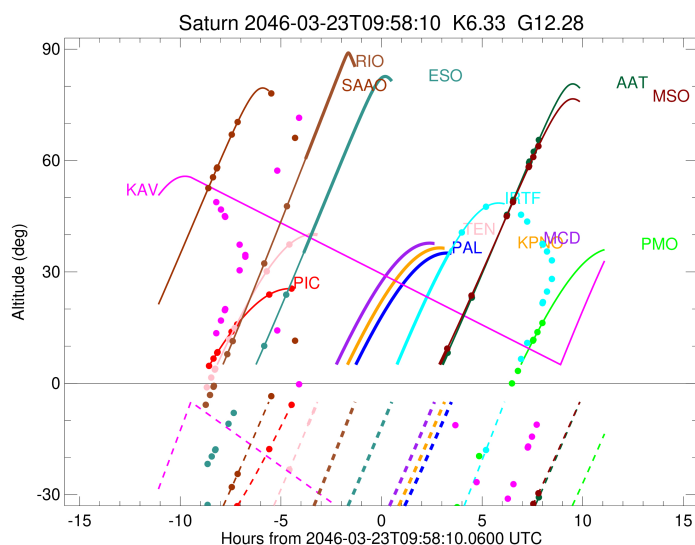
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-23T10:15:39.740
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : SAAO
 Location : So. Afr. Astro. Obs. (Sutherland)
 Latitude (deg) : -32.37953
 E. Longitude (deg) : 20.81070
 Altitude (km) : 1.768
 Gaia source ID : 4117826352042608384
 2Mass ID (if available) : 17274474-2142458
 ICRS Star Coord at Epoch: 17h 27m 44.73435s -21:42:46.33481s
 RUWE (>1.4 is poor) : 1.10
 K magnitude : 6.335
 G magnitude : 12.282
 RP magnitude : 10.813
 BP magnitude : 15.242
 DUPflag : 0
 Distance (au) : 9.811
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.53
 Sun-Target sep (deg) : 99.78
 Sun-Moon sep (deg) : 66.50
 B (ring opening deg) : 26.52
 PA of pole (deg) : 4.80
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.113
 C/A sky separation (km) : 15032.3
 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	2046-03-23T01:21:55.638		52.58	-41.37	140461.00	-4.44		
A (OER)	I	2046-03-23T01:35:47.418		55.50	-38.84	136774.40	-4.42		
Encke (OEG)	I	2046-03-23T01:47:14.115		57.90	-36.69	133744.89	-4.40		
Encke (IEG)	I	2046-03-23T01:48:27.172		58.15	-36.46	133423.31	-4.40		
A (IER)	I	2046-03-23T02:31:50.983		67.01	-27.95	122050.38	-4.34		
B (OER)	I	2046-03-23T02:49:06.948		70.34	-24.46	117571.16	-4.31		
B (IER)	I	2046-03-23T04:29:36.600		78.07	-3.46x	91984.69	-4.17		
C (IER)	I	2046-03-23T05:40:31.573		66.09	11.48x	74490.58	-4.04		
Saturn	I	2046-03-23T06:35:32.240		54.75	22.82x	60256.71		-5.06	-6.21
Saturn	E	2046-03-23T13:43:08.066		-26.61x	35.92x	60091.42		-20.48	-24.59
C (IER)	E	2046-03-23T13:35:50.161	b	-25.67x	37.26x	74490.58	4.42		
B (IER)	E	2046-03-23T14:40:17.513		-32.60x	24.86x	91984.69	4.60		
B (OER)	E	2046-03-23T16:11:57.500		-35.99x	5.90x	117571.16	4.68		
A (IER)	E	2046-03-23T16:27:54.650		-35.69x	2.53x	122050.38	4.68		
Encke (IEG)	E	2046-03-23T17:08:27.470		-33.74x	-6.05	133423.31	4.67		
Encke (OEG)	E	2046-03-23T17:09:36.380		-33.66x	-6.30	133744.89	4.67		
A (OER)	E	2046-03-23T17:20:26.051		-32.86x	-8.58	136774.40	4.66		
F ring	E	2046-03-23T17:33:37.972		-31.74x	-11.37	140461.00	4.65		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-23T09:47:41.930
 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 : 4117826352042608384
 2Mass ID (if available) : 17274474-2142458
 ICRS Star Coord at Epoch: 17h 27m 44.73435s -21:42:46.33481s
 RUWE (>1.4 is poor) : 1.10
 K magnitude : 6.335
 G magnitude : 12.282
 RP magnitude : 10.813
 BP magnitude : 15.242
 DUPflag : 0
 Distance (au) : 9.811
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.53
 Sun-Target sep (deg) : 99.78
 Sun-Moon sep (deg) : 65.39
 B (ring opening deg) : 26.52
 PA of pole (deg) : 4.80
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.302
 C/A sky separation (km) : 16383.1
 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	2046-03-23T01:52:32.223		8.25	53.58x	140461.00	-4.73		
A (OER)	I	2046-03-23T02:05:30.507		5.78	53.80x	136774.40	-4.74		
Encke (OEG)	I	2046-03-23T02:16:09.556		3.77x	53.79x	133744.89	-4.74		
Encke (IEG)	I	2046-03-23T02:17:17.367		3.56x	53.78x	133423.31	-4.74		
A (IER)	I	2046-03-23T02:57:14.393		-3.73x	52.19x	122050.38	-4.74		
B (OER)	I	2046-03-23T03:12:58.852		-6.49x	50.96x	117571.16	-4.74		
B (IER)	I	2046-03-23T04:43:39.278		-20.65x	39.11x	91984.69	-4.64		
C (IER)	I	2046-03-23T05:47:46.496		-28.09x	27.75x	74490.58	-4.43		
Saturn	I	2046-03-23T06:31:12.075		-31.39x	19.38x	60238.35		-8.23	-10.07
Saturn	E	2046-03-23T13:14:11.305		9.34	-53.65	60114.32		-19.05	-22.94
C (IER)	E	2046-03-23T13:13:57.188	b	9.29	-53.63	74490.58	3.97		
B (IER)	E	2046-03-23T14:26:22.580		23.59	-55.90	91984.69	4.06		
B (OER)	E	2046-03-23T16:11:23.037		45.01	-45.96	117571.16	4.05		
A (IER)	E	2046-03-23T16:29:49.299		48.77	-43.12	122050.38	4.05		
Encke (IEG)	E	2046-03-23T17:16:44.751		58.20	-35.07	133423.31	4.03		
Encke (OEG)	E	2046-03-23T17:18:04.482		58.46	-34.83	133744.89	4.03		
A (OER)	E	2046-03-23T17:30:35.888		60.91	-32.53	136774.40	4.03		
F ring	E	2046-03-23T17:45:50.829		63.81	-29.66	140461.00	4.03		