

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-28T05:30:33.880
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4069541436347630592
 2Mass ID (if available) : 18010280-2222174

Saturn 2047-06-28T05:30:33 K7.52 G13.50 PgtRgt

ICRS Star Coord at Epoch: 18h 01m 02.79355s -22:22:17.75700s

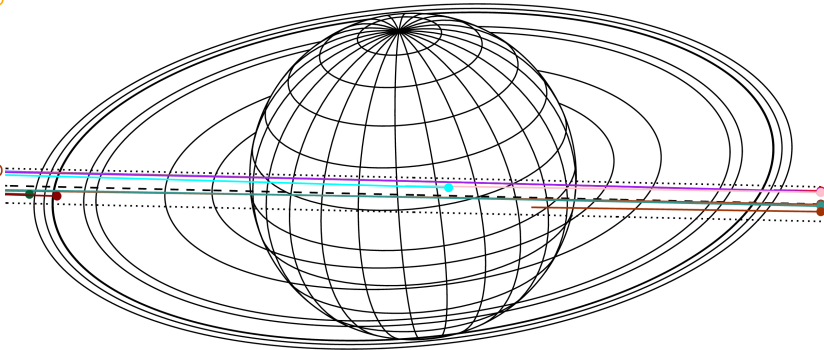
RUWE (>1.4 is poor) : 1.09
 K magnitude : 7.519
 G magnitude : 13.500
 RP magnitude : 12.087
 BP magnitude : 16.064
 DUPflag : 0
 Distance (au) : 9.034
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.04
 Sun-Target sep (deg) : 174.31
 Sun-Moon sep (deg) : 116.71
 B (ring opening deg) : 26.48
 PA of pole (deg) : 5.54

#	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



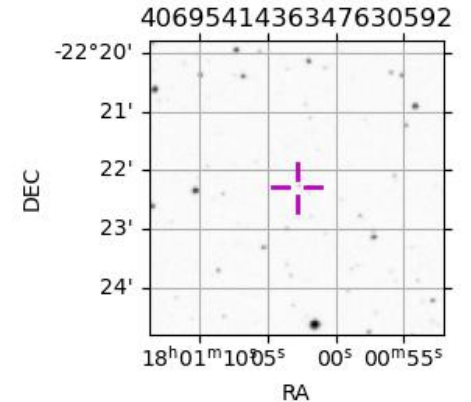
2047-06-28T05:30:33.8800 at: 18 01 02.79355 s: -22 22 17.757 C/A 1.038° PA 358.70 deg v_sky -20.04 km/s D 09.03 AU
 Credit: Styled after SORA/Lucky Star

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

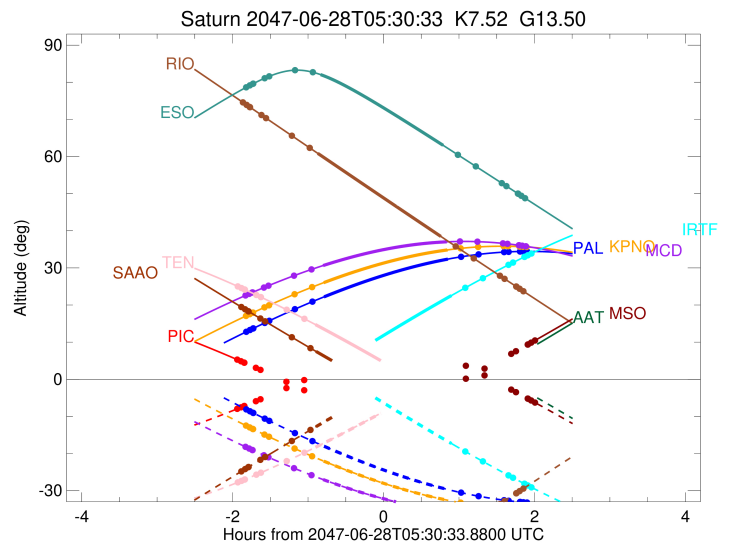
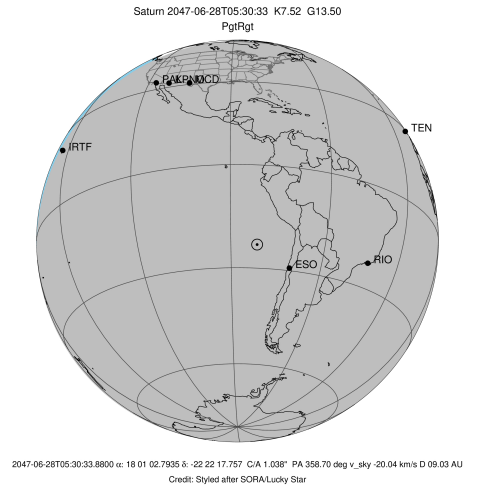


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEncode
PIC	Pic du Midi	42.9	0.1	+			JUN 28 03:34 - JUN 28 03:34	PnnRin
PAL	Palomar Mt (20	33.4	243.1	+ + + + + + +	+ +	+ + + + + + + +	JUN 28 03:41 - JUN 28 07:24	PieRie
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4	+ + + + + + +	+ +	+ + + + + + + +	JUN 28 03:41 - JUN 28 07:24	PieRie
MCD	McDonald Obs.	30.7	256.0	+ + + + + + +	+ +	+ + + + + + + +	JUN 28 03:40 - JUN 28 07:23	PieRie
TEN	Teide Obs./Ten	28.3	343.5	+ + + + + + +	+		JUN 28 03:34 - JUN 28 04:36	PinRin
IRTF	Mauna Kea/IRTF	19.8	204.5		+	+ + + + + + + +	JUN 28 06:24 - JUN 28 07:28	PnnRne
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+ + + + + + +	+ +	+ + + + + + + +	JUN 28 03:38 - JUN 28 07:21	PieRie
ESO	European South	-29.3	289.3	+ + + + + + +	+ +	+ + + + + + + +	JUN 28 03:41 - JUN 28 07:23	PieRie
AAT	Siding Spring	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro	-32.4	20.8	+ + + + + + +	+		JUN 28 03:37 - JUN 28 04:36	PinRin
MSO	Mt. Stromlo Ob	-35.3	149.0			+ + + +	JUN 28 07:25 - JUN 28 07:30	PnnRne



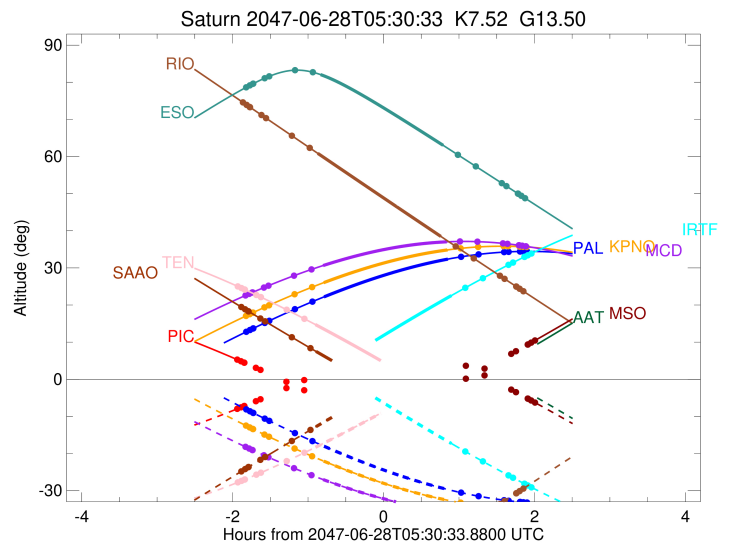
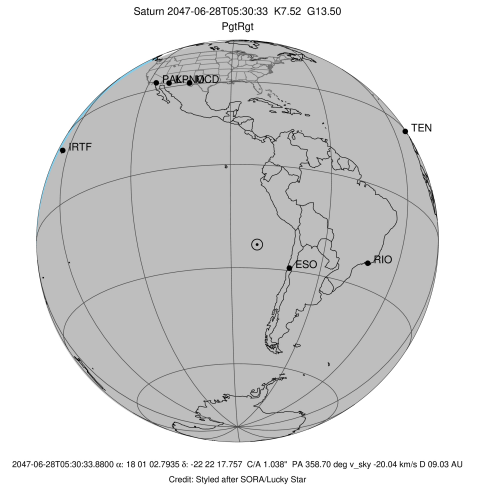
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-28T05:26:34.220
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 4069541436347630592
 2Mass ID (if available) : 18010280-2222174
 ICRS Star Coord at Epoch: 18h 01m 02.79355s -22:22:17.75700s
 RUWE (>1.4 is poor) : 1.09
 K magnitude : 7.519
 G magnitude : 13.500
 RP magnitude : 12.087
 BP magnitude : 16.064
 DUPflag : 0
 Distance (au) : 9.034
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.04
 Sun-Target sep (deg) : 174.31
 Sun-Moon sep (deg) : 116.17
 B (ring opening deg) : 26.48
 PA of pole (deg) : 5.54
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.433
 C/A sky separation (km) : 2839.9
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



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

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-06-28T03:34:18.917		5.29	-7.96	140461.00	-20.71		
A (OER)	I	2047-06-28T03:37:16.960		4.85x	-7.56	136774.40	-20.70		
Encke (OEG)	I	2047-06-28T03:39:43.305		4.49x	-7.22	133744.89	-20.70		
Encke (IEG)	I	2047-06-28T03:39:58.842		4.45x	-7.19	133423.31	-20.70		
A (IER)	I	2047-06-28T03:49:08.551		3.08x	-5.91	122050.38	-20.68		
B (OER)	I	2047-06-28T03:52:45.194		2.53x	-5.39	117571.16	-20.67		
B (IER)	I	2047-06-28T04:13:24.445		-0.69x	-2.37x	91984.69	-20.62		
C (IER)	I	2047-06-28T04:27:33.864		-2.96x	-0.21x	74490.58	-20.57		
Saturn	I	2047-06-28T04:36:39.222		-4.45x	1.20x	60238.87		-8.17	-10.00
Saturn	E	2047-06-28T06:16:41.837		-21.85x	18.03x	60263.11		3.34	4.10
C (IER)	E	2047-06-28T06:27:52.829		-23.88x	20.02x	74490.58	20.38		
B (IER)	E	2047-06-28T06:42:10.852		-26.48x	22.58x	91984.69	20.39		
B (OER)	E	2047-06-28T07:03:05.849		-30.32x	26.36x	117571.16	20.38		
A (IER)	E	2047-06-28T07:06:45.625		-30.99x	27.03x	122050.38	20.38		
Encke (IEG)	E	2047-06-28T07:16:03.783		-32.71x	28.72x	133423.31	20.37		
Encke (OEG)	E	2047-06-28T07:16:19.568		-32.75x	28.77x	133744.89	20.37		
A (OER)	E	2047-06-28T07:18:48.287		-33.21x	29.22x	136774.40	20.37		
F ring	E	2047-06-28T07:21:49.284		-33.77x	29.77x	140461.00	20.37		

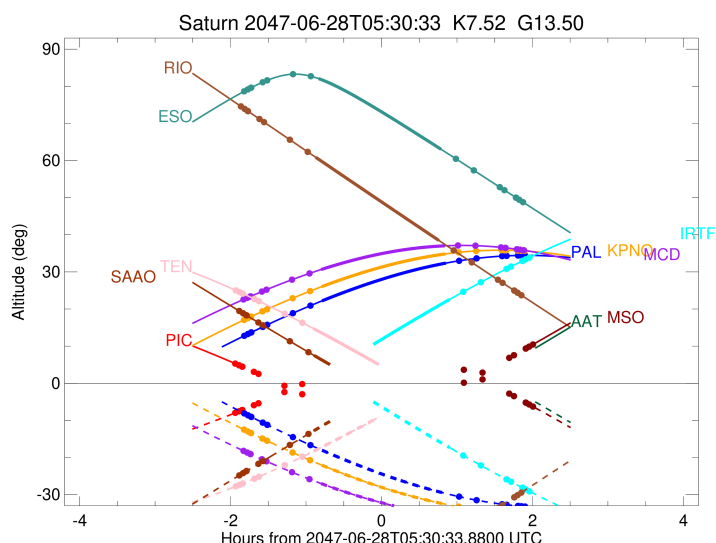
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-28T05:32:33.890
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4069541436347630592
 2Mass ID (if available) : 18010280-2222174
 ICRS Star Coord at Epoch: 18h 01m 02.79355s -22:22:17.75700s
 RUWE (>1.4 is poor) : 1.09
 K magnitude : 7.519
 G magnitude : 13.500
 RP magnitude : 12.087
 BP magnitude : 16.064
 DUPflag : 0
 Distance (au) : 9.034
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.04
 Sun-Target sep (deg) : 174.31
 Sun-Moon sep (deg) : 117.26
 B (ring opening deg) : 26.48
 PA of pole (deg) : 5.54
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.262
 C/A sky separation (km) : 1719.8
 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	2047-06-28T03:41:29.482		12.79	-8.12	140461.00	-20.88		
A (OER)	I	2047-06-28T03:44:26.049		13.28	-8.63	136774.40	-20.88		
Encke (OEG)	I	2047-06-28T03:46:51.126		13.68	-9.04	133744.89	-20.88		
Encke (IEG)	I	2047-06-28T03:47:06.525		13.72	-9.08	133423.31	-20.88		
A (IER)	I	2047-06-28T03:56:11.002		15.18	-10.61	122050.38	-20.89		
B (OER)	I	2047-06-28T03:59:45.387		15.75	-11.21	117571.17	-20.89		
B (IER)	I	2047-06-28T04:20:09.514		18.89	-14.51	91984.69	-20.91		
C (IER)	I	2047-06-28T04:34:06.223		20.92	-16.67	74490.58	-20.91		
Saturn	I	2047-06-28T04:43:16.502		22.20	-18.04	60241.87		-7.73	-9.47
Saturn	E	2047-06-28T06:21:46.701		32.37	-29.71	60258.16		4.74	5.81
C (IER)	E	2047-06-28T06:32:14.573		32.99	-30.54	74490.58	20.97		
B (IER)	E	2047-06-28T06:46:08.668		33.64	-31.49	91984.69	20.98		
B (OER)	E	2047-06-28T07:06:28.046		34.26	-32.58	117571.16	20.99		
A (IER)	E	2047-06-28T07:10:01.486		34.32	-32.73	122050.38	20.99		
Encke (IEG)	E	2047-06-28T07:19:03.418		34.43	-33.05	133423.31	20.99		
Encke (OEG)	E	2047-06-28T07:19:18.742		34.43	-33.06	133744.89	20.99		
A (OER)	E	2047-06-28T07:21:43.104		34.44	-33.13	136774.40	20.99		
F ring	E	2047-06-28T07:24:38.780		34.45	-33.21	140461.00	20.98		

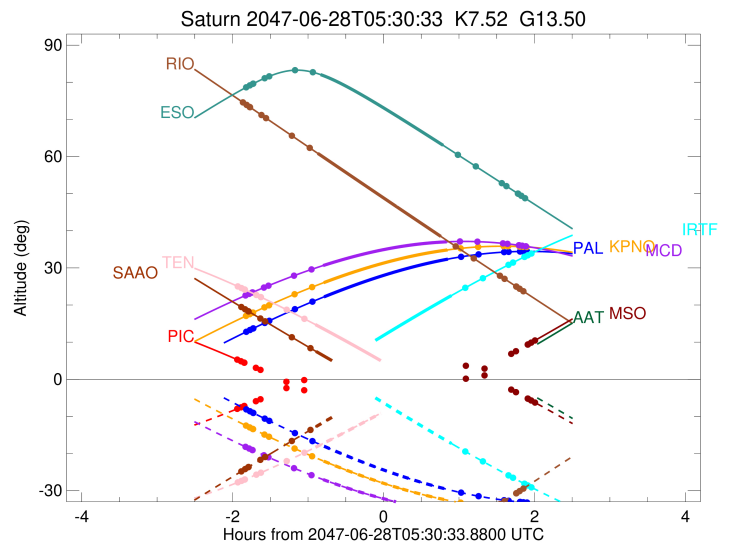
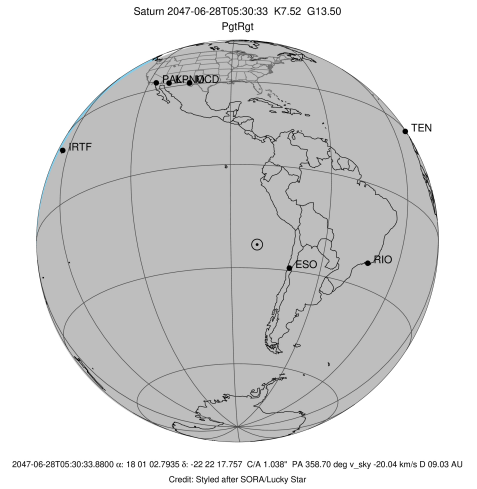
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-28T05:32:13.860
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 4069541436347630592
 2Mass ID (if available) : 18010280-2222174
 ICRS Star Coord at Epoch: 18h 01m 02.79355s -22:22:17.75700s
 RUWE (>1.4 is poor) : 1.09
 K magnitude : 7.519
 G magnitude : 13.500
 RP magnitude : 12.087
 BP magnitude : 16.064
 DUPflag : 0
 Distance (au) : 9.034
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.04
 Sun-Target sep (deg) : 174.31
 Sun-Moon sep (deg) : 117.27
 B (ring opening deg) : 26.48
 PA of pole (deg) : 5.54
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.266
 C/A sky separation (km) : 1741.7
 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	2047-06-28T03:41:17.209		17.07	-12.49	140461.00	-20.91		
A (OER)	I	2047-06-28T03:44:13.528		17.54	-12.98	136774.40	-20.91		
Encke (OEG)	I	2047-06-28T03:46:38.403		17.92	-13.38	133744.89	-20.91		
Encke (IEG)	I	2047-06-28T03:46:53.780		17.96	-13.42	133423.31	-20.91		
A (IER)	I	2047-06-28T03:55:57.517		19.37	-14.91	122050.38	-20.92		
B (OER)	I	2047-06-28T03:59:31.617		19.92	-15.49	117571.17	-20.92		
B (IER)	I	2047-06-28T04:19:54.206		22.91	-18.67	91984.69	-20.93		
C (IER)	I	2047-06-28T04:33:49.954		24.83	-20.74	74490.58	-20.93		
Saturn	I	2047-06-28T04:42:59.930		26.02	-22.04	60241.93		-7.73	-9.46
Saturn	E	2047-06-28T06:21:24.147		34.84	-32.57	60258.36		4.69	5.75
C (IER)	E	2047-06-28T06:31:52.829		35.26	-33.23	74490.58	20.97		
B (IER)	E	2047-06-28T06:45:46.727		35.65	-33.95	91984.69	20.98		
B (OER)	E	2047-06-28T07:06:05.963		35.84	-34.65	117571.16	20.99		
A (IER)	E	2047-06-28T07:09:39.397		35.83	-34.73	122050.38	20.99		
Encke (IEG)	E	2047-06-28T07:18:41.339		35.74	-34.88	133423.31	20.98		
Encke (OEG)	E	2047-06-28T07:18:56.663		35.74	-34.88	133744.89	20.98		
A (OER)	E	2047-06-28T07:21:21.034		35.70	-34.91	136774.40	20.98		
F ring	E	2047-06-28T07:24:16.725		35.64	-34.93	140461.00	20.98		

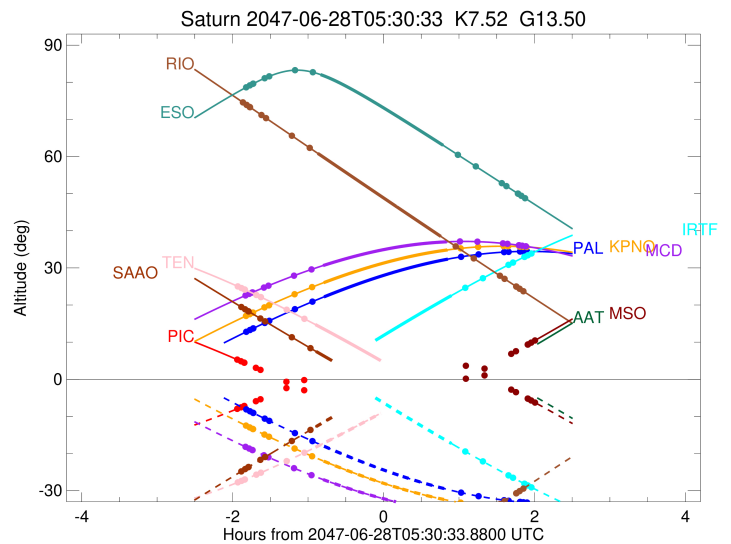
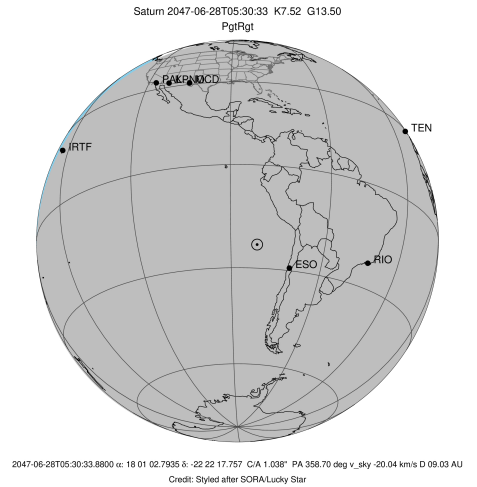
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-28T05:31:41.720
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 4069541436347630592
 2Mass ID (if available) : 18010280-2222174
 ICRS Star Coord at Epoch: 18h 01m 02.79355s -22:22:17.75700s
 RUWE (>1.4 is poor) : 1.09
 K magnitude : 7.519
 G magnitude : 13.500
 RP magnitude : 12.087
 BP magnitude : 16.064
 DUPflag : 0
 Distance (au) : 9.034
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.04
 Sun-Target sep (deg) : 174.31
 Sun-Moon sep (deg) : 117.27
 B (ring opening deg) : 26.48
 PA of pole (deg) : 5.54
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.268
 C/A sky separation (km) : 1756.5
 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	2047-06-28T03:40:53.292		22.58	-18.21	140461.00	-20.94		
A (OER)	I	2047-06-28T03:43:49.307		23.02	-18.67	136774.40	-20.95		
Encke (OEG)	I	2047-06-28T03:46:13.936		23.37	-19.05	133744.89	-20.95		
Encke (IEG)	I	2047-06-28T03:46:29.288		23.41	-19.09	133423.31	-20.95		
A (IER)	I	2047-06-28T03:55:32.129		24.71	-20.48	122050.38	-20.95		
B (OER)	I	2047-06-28T03:59:05.888		25.21	-21.02	117571.16	-20.96		
B (IER)	I	2047-06-28T04:19:26.669		27.91	-23.96	91984.69	-20.96		
C (IER)	I	2047-06-28T04:33:21.321		29.59	-25.84	74490.58	-20.96		
Saturn	I	2047-06-28T04:42:31.668		30.63	-27.01	60242.14		-7.69	-9.42
Saturn	E	2047-06-28T06:20:49.588		37.02	-35.44	60258.61		4.63	5.68
C (IER)	E	2047-06-28T06:31:19.445		37.12	-35.81	74490.58	20.97		
B (IER)	E	2047-06-28T06:45:13.414		37.07	-36.12	91984.69	20.98		
B (OER)	E	2047-06-28T07:05:32.975		36.61	-36.21	117571.16	20.98		
A (IER)	E	2047-06-28T07:09:06.494		36.48	-36.18	122050.38	20.98		
Encke (IEG)	E	2047-06-28T07:18:08.687		36.10	-36.04	133423.31	20.97		
Encke (OEG)	E	2047-06-28T07:18:24.019		36.09	-36.03	133744.89	20.97		
A (OER)	E	2047-06-28T07:20:48.466		35.97	-35.98	136774.40	20.97		
F ring	E	2047-06-28T07:23:44.255		35.83	-35.91	140461.00	20.97		

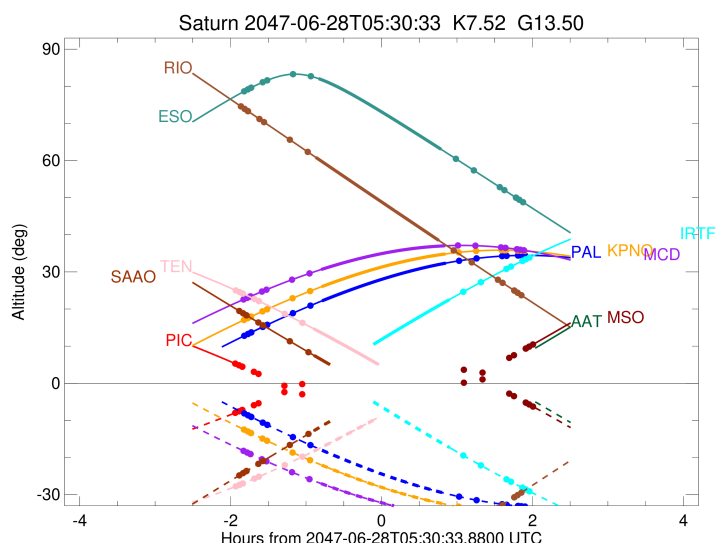
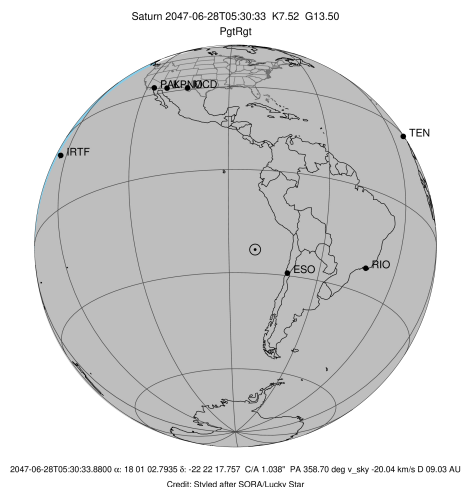
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-28T05:26:03.690
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 4069541436347630592
 2Mass ID (if available) : 18010280-2222174
 ICRS Star Coord at Epoch: 18h 01m 02.79355s -22:22:17.75700s
 RUWE (>1.4 is poor) : 1.09
 K magnitude : 7.519
 G magnitude : 13.500
 RP magnitude : 12.087
 BP magnitude : 16.064
 DUPflag : 0
 Distance (au) : 9.034
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.04
 Sun-Target sep (deg) : 174.31
 Sun-Moon sep (deg) : 116.40
 B (ring opening deg) : 26.48
 PA of pole (deg) : 5.54
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.526
 C/A sky separation (km) : 3445.7
 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	2047-06-28T03:34:44.951		25.01	-27.76	140461.00	-20.83		
A (OER)	I	2047-06-28T03:37:41.942		24.56	-27.36	136774.40	-20.83		
Encke (OEG)	I	2047-06-28T03:40:07.428		24.18	-27.02	133744.89	-20.82		
Encke (IEG)	I	2047-06-28T03:40:22.873		24.14	-26.99	133423.31	-20.82		
A (IER)	I	2047-06-28T03:49:29.392		22.71	-25.69	122050.38	-20.80		
B (OER)	I	2047-06-28T03:53:04.796		22.13	-25.17	117571.16	-20.79		
B (IER)	I	2047-06-28T04:13:37.273		18.72	-22.04	91984.69	-20.73		
C (IER)	I	2047-06-28T04:27:42.542		16.28	-19.78	74490.58	-20.66		
Saturn	I	2047-06-28T04:36:28.864		14.72	-18.33	60235.40		-8.65	-10.58
Saturn	E	2047-06-28T06:15:52.636		-4.43x	-0.03x	60264.66		2.76	3.39
C (IER)	E	2047-06-28T06:27:09.755		-6.74x	2.21x	74490.58	20.44		
B (IER)	E	2047-06-28T06:41:25.105		-9.68x	5.06x	91984.69	20.46		
B (OER)	E	2047-06-28T07:02:16.044		-14.04x	9.31x	117571.16	20.45		
A (IER)	E	2047-06-28T07:05:55.124		-14.80x	10.06x	122050.38	20.44		
Encke (IEG)	E	2047-06-28T07:15:11.556		-16.76x	11.97x	133423.31	20.43		
Encke (OEG)	E	2047-06-28T07:15:27.293		-16.82x	12.02x	133744.89	20.43		
A (OER)	E	2047-06-28T07:17:55.565		-17.34x	12.54x	136774.40	20.43		
F ring	E	2047-06-28T07:20:56.025		-17.98x	13.16x	140461.00	20.43		

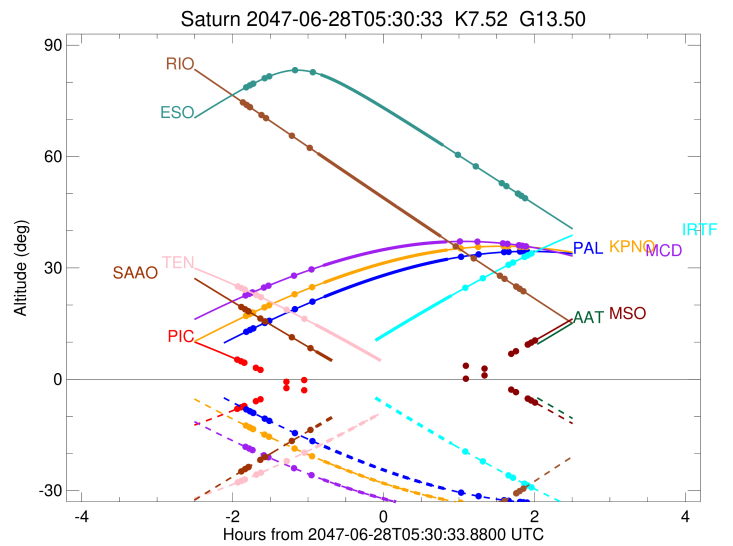
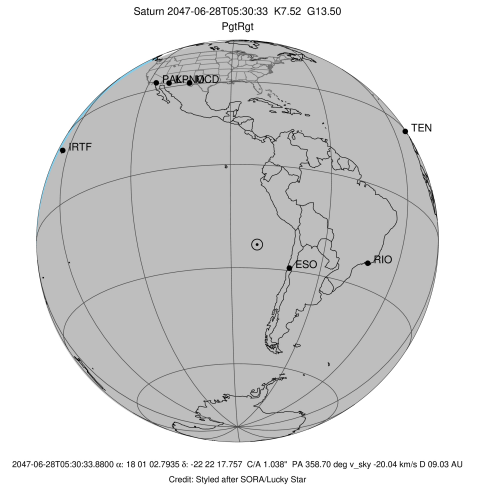
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-28T05:35:05.810
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 4069541436347630592
 2Mass ID (if available) : 18010280-2222174
 ICRS Star Coord at Epoch: 18h 01m 02.79355s -22:22:17.75700s
 RUWE (>1.4 is poor) : 1.09
 K magnitude : 7.519
 G magnitude : 13.500
 RP magnitude : 12.087
 BP magnitude : 16.064
 DUPflag : 0
 Distance (au) : 9.034
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.04
 Sun-Target sep (deg) : 174.31
 Sun-Moon sep (deg) : 117.25
 B (ring opening deg) : 26.48
 PA of pole (deg) : 5.54
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.571
 C/A sky separation (km) : 3743.8
 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	2047-06-28T03:44:01.008	-11.12x	16.70x	140461.00	-20.62			
A (OER)	I	2047-06-28T03:46:59.775	-10.46x	16.04x	136774.40	-20.62			
Encke (OEG)	I	2047-06-28T03:49:26.655	-9.91x	15.49x	133744.89	-20.63			
Encke (IEG)	I	2047-06-28T03:49:42.245	-9.86x	15.44x	133423.31	-20.63			
A (IER)	I	2047-06-28T03:58:53.460	-7.83x	13.40x	122050.38	-20.64			
B (OER)	I	2047-06-28T04:02:30.491	-7.03x	12.61x	117571.16	-20.64			
B (IER)	I	2047-06-28T04:23:09.862	-2.51x	8.07x	91984.69	-20.64			
C (IER)	I	2047-06-28T04:37:17.564	0.55x	5.00x	74490.58	-20.62			
Saturn	I	2047-06-28T04:45:26.360	2.30x	3.24x	60227.39	-9.66		-11.81	
Saturn	E	2047-06-28T06:24:34.599	22.55	-17.31	60263.37	3.25		3.99	
C (IER)	E	2047-06-28T06:35:33.954	24.63	-19.45	74490.58	20.81			
B (IER)	E	2047-06-28T06:49:33.149	27.21	-22.12	91984.69	20.88			
B (OER)	E	2047-06-28T07:09:57.041	30.82	-25.89	117571.17	20.93			
A (IER)	E	2047-06-28T07:13:30.995	31.43	-26.53	122050.38	20.94			
Encke (IEG)	E	2047-06-28T07:22:33.913	32.95	-28.14	133423.31	20.96			
Encke (OEG)	E	2047-06-28T07:22:49.258	33.00	-28.18	133744.89	20.96			
A (OER)	E	2047-06-28T07:25:13.807	33.39	-28.60	136774.40	20.96			
F ring	E	2047-06-28T07:28:09.672	33.87	-29.11	140461.00	20.97			

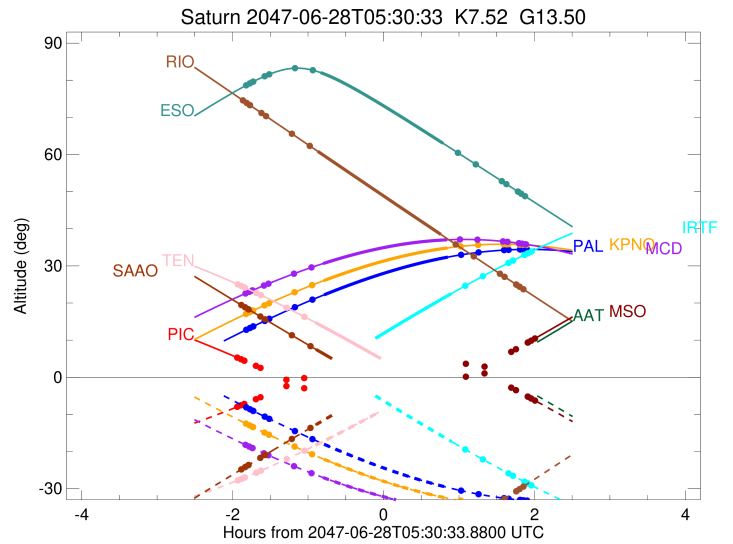
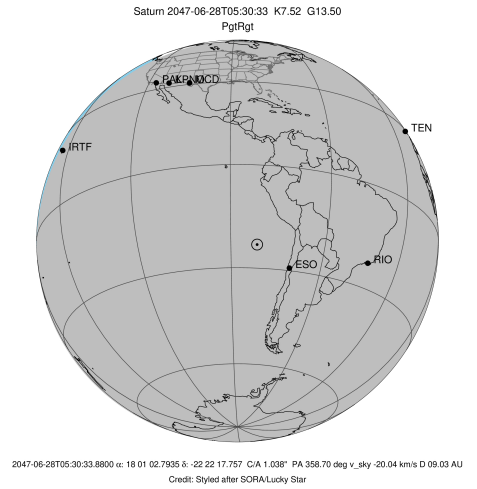
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-28T05:27:09.340
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 4069541436347630592
 2Mass ID (if available) : 18010280-2222174
 ICRS Star Coord at Epoch: 18h 01m 02.79355s -22:22:17.75700s
 RUWE (>1.4 is poor) : 1.09
 K magnitude : 7.519
 G magnitude : 13.500
 RP magnitude : 12.087
 BP magnitude : 16.064
 DUPflag : 0
 Distance (au) : 9.034
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.04
 Sun-Target sep (deg) : 174.31
 Sun-Moon sep (deg) : 117.07
 B (ring opening deg) : 26.48
 PA of pole (deg) : 5.54
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.157
 C/A sky separation (km) : 7578.6
 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	2047-06-28T03:38:50.517		74.58	-80.15	140461.00	-20.86		
A (OER)	I	2047-06-28T03:41:47.308		73.90	-79.47	136774.40	-20.85		
Encke (OEG)	I	2047-06-28T03:44:12.660		73.34	-78.92	133744.89	-20.84		
Encke (IEG)	I	2047-06-28T03:44:28.092		73.28	-78.86	133423.31	-20.84		
A (IER)	I	2047-06-28T03:53:34.428		71.17	-76.77	122050.38	-20.80		
B (OER)	I	2047-06-28T03:57:09.923		70.35	-75.94	117571.16	-20.78		
B (IER)	I	2047-06-28T04:17:45.716		65.59	-71.22	91984.69	-20.62		
C (IER)	I	2047-06-28T04:31:58.118		62.32	-67.96	74490.58	-20.41		
Saturn	I	2047-06-28T04:38:18.377		60.86	-66.51	60202.96		-12.26	-14.94
Saturn	E	2047-06-28T06:16:13.039		38.47	-44.19	60267.77		-0.72	-0.88
C (IER)	E	2047-06-28T06:27:57.166		35.81	-41.54	74490.58	20.23		
B (IER)	E	2047-06-28T06:42:18.047		32.57	-38.30	91984.69	20.39		
B (OER)	E	2047-06-28T07:03:09.473		27.88	-33.62	117571.16	20.48		
A (IER)	E	2047-06-28T07:06:48.087		27.06	-32.80	122050.38	20.49		
Encke (IEG)	E	2047-06-28T07:16:02.843		24.99	-30.74	133423.31	20.51		
Encke (OEG)	E	2047-06-28T07:16:18.524		24.93	-30.68	133744.89	20.51		
A (OER)	E	2047-06-28T07:18:46.244		24.39	-30.13	136774.40	20.51		
F ring	E	2047-06-28T07:21:45.984		23.72	-29.46	140461.00	20.51		

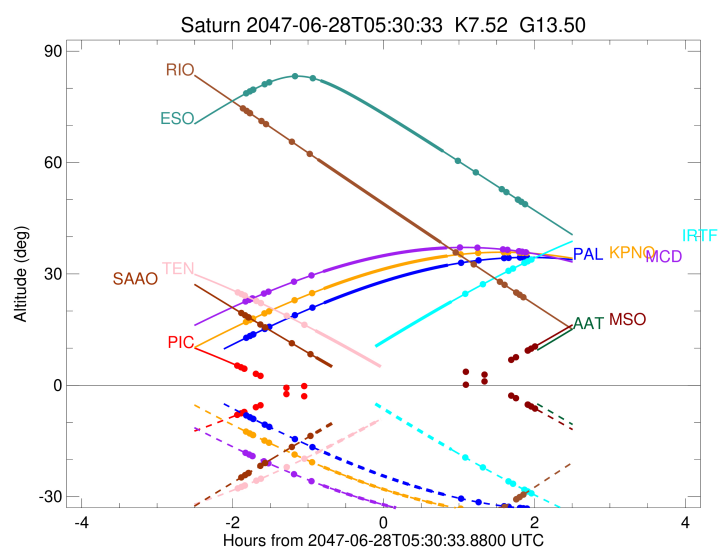
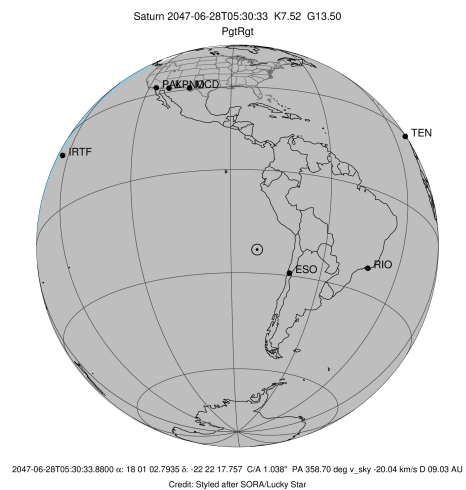
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-28T05:29:13.350
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4069541436347630592
 2Mass ID (if available) : 18010280-2222174
 ICRS Star Coord at Epoch: 18h 01m 02.79355s -22:22:17.75700s
 RUWE (>1.4 is poor) : 1.09
 K magnitude : 7.519
 G magnitude : 13.500
 RP magnitude : 12.087
 BP magnitude : 16.064
 DUPflag : 0
 Distance (au) : 9.034
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.04
 Sun-Target sep (deg) : 174.31
 Sun-Moon sep (deg) : 117.41
 B (ring opening deg) : 26.48
 PA of pole (deg) : 5.54
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.172
 C/A sky separation (km) : 7681.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



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

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-06-28T03:41:24.309		78.65	-74.38	140461.00	-20.88		
A (OER)	I	2047-06-28T03:44:20.903		79.18	-74.99	136774.40	-20.87		
Encke (OEG)	I	2047-06-28T03:46:46.077		79.60	-75.49	133744.89	-20.86		
Encke (IEG)	I	2047-06-28T03:47:01.490		79.64	-75.54	133423.31	-20.86		
A (IER)	I	2047-06-28T03:56:07.037		81.10	-77.37	122050.38	-20.83		
B (OER)	I	2047-06-28T03:59:42.171		81.61	-78.08	117571.16	-20.81		
B (IER)	I	2047-06-28T04:20:15.379		83.26	-81.78	91984.69	-20.67		
C (IER)	I	2047-06-28T04:34:25.565		82.71	-83.62	74490.58	-20.47		
Saturn	I	2047-06-28T04:40:32.047		82.07	-84.05	60200.21		-12.52	-15.25
Saturn	E	2047-06-28T06:18:01.951		63.00	-68.62	60267.81		-0.65	-0.79
C (IER)	E	2047-06-28T06:29:41.712		60.47	-66.10	74490.58	20.37		
B (IER)	E	2047-06-28T06:43:56.439		57.36	-63.01	91984.69	20.54		
B (OER)	E	2047-06-28T07:04:38.091		52.83	-58.51	117571.16	20.65		
A (IER)	E	2047-06-28T07:08:14.913		52.03	-57.72	122050.38	20.66		
Encke (IEG)	E	2047-06-28T07:17:25.024		50.02	-55.72	133423.31	20.68		
Encke (OEG)	E	2047-06-28T07:17:40.572		49.97	-55.66	133744.89	20.68		
A (OER)	E	2047-06-28T07:20:07.031		49.43	-55.13	136774.40	20.69		
F ring	E	2047-06-28T07:23:05.225		48.78	-54.48	140461.00	20.69		

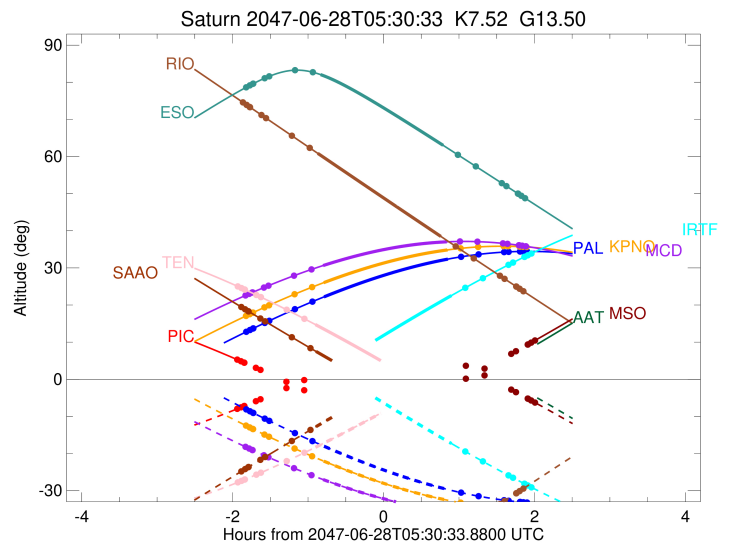
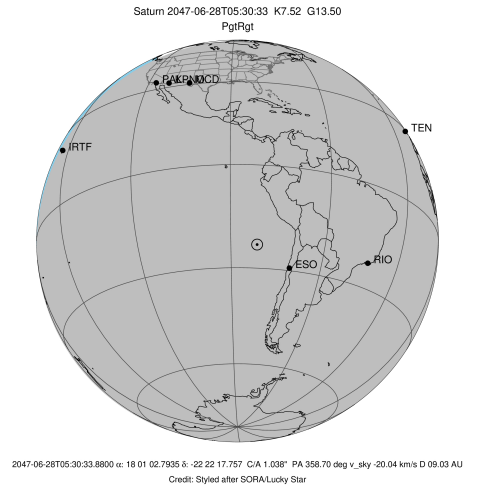
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-28T05:26:19.020
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : SAAO
 Location : So. Afr. Astro. Obs. (Sutherland)
 Latitude (deg) : -32.37953
 E. Longitude (deg) : 20.81070
 Altitude (km) : 1.768
 Gaia source ID : 4069541436347630592
 2Mass ID (if available) : 18010280-2222174
 ICRS Star Coord at Epoch: 18h 01m 02.79355s -22:22:17.75700s
 RUWE (>1.4 is poor) : 1.09
 K magnitude : 7.519
 G magnitude : 13.500
 RP magnitude : 12.087
 BP magnitude : 16.064
 DUPflag : 0
 Distance (au) : 9.034
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.04
 Sun-Target sep (deg) : 174.31
 Sun-Moon sep (deg) : 116.34
 B (ring opening deg) : 26.48
 PA of pole (deg) : 5.54
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.634
 C/A sky separation (km) : 10704.5
 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	2047-06-28T03:37:33.590		19.46	-24.81	140461.00	-20.31		
A (OER)	I	2047-06-28T03:40:35.206		18.84	-24.19	136774.40	-20.29		
Encke (OEG)	I	2047-06-28T03:43:04.600		18.33	-23.68	133744.89	-20.27		
Encke (IEG)	I	2047-06-28T03:43:20.466		18.27	-23.62	133423.31	-20.27		
A (IER)	I	2047-06-28T03:52:42.699		16.36	-21.70	122050.38	-20.19		
B (OER)	I	2047-06-28T03:56:24.792		15.61	-20.94	117571.16	-20.15		
B (IER)	I	2047-06-28T04:17:43.352		11.31	-16.61	91984.69	-19.84		
C (IER)	I	2047-06-28T04:32:33.049		8.36	-13.64	74490.58	-19.45		
Saturn	I	2047-06-28T04:36:51.965		7.51	-12.77	60173.42		-14.85	-18.02
Saturn	E	2047-06-28T06:16:03.020		-10.97x	6.07x	60262.88		-3.41	-4.19
C (IER)	E	2047-06-28T06:28:00.748		-13.01x	8.19x	74490.58	19.27		
B (IER)	E	2047-06-28T06:42:59.442		-15.49x	10.77x	91984.69	19.62		
B (OER)	E	2047-06-28T07:04:34.631		-18.91x	14.36x	117571.16	19.86		
A (IER)	E	2047-06-28T07:08:20.041		-19.48x	14.96x	122050.38	19.88		
Encke (IEG)	E	2047-06-28T07:17:51.216		-20.90x	16.47x	133423.31	19.94		
Encke (OEG)	E	2047-06-28T07:18:07.345		-20.94x	16.51x	133744.89	19.94		
A (OER)	E	2047-06-28T07:20:39.253		-21.31x	16.91x	136774.40	19.95		
F ring	E	2047-06-28T07:23:43.997		-21.75x	17.38x	140461.00	19.96		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-06-28T05:34:23.800
 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 : 4069541436347630592
 2Mass ID (if available) : 18010280-2222174
 ICRS Star Coord at Epoch: 18h 01m 02.79355s -22:22:17.75700s
 RUWE (>1.4 is poor) : 1.09
 K magnitude : 7.519
 G magnitude : 13.500
 RP magnitude : 12.087
 BP magnitude : 16.064
 DUPflag : 0
 Distance (au) : 9.034
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.04
 Sun-Target sep (deg) : 174.31
 Sun-Moon sep (deg) : 116.86
 B (ring opening deg) : 26.48
 PA of pole (deg) : 5.54
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.697
 C/A sky separation (km) : 11120.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_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	2047-06-28T03:45:38.465	-25.57x	27.09x	140461.00	-19.99			
A (OER)	I	2047-06-28T03:48:42.911	-25.24x	26.82x	136774.40	-19.98			
Encke (OEG)	I	2047-06-28T03:51:14.579	-24.96x	26.59x	133744.89	-19.97			
Encke (IEG)	I	2047-06-28T03:51:30.684	-24.93x	26.56x	133423.31	-19.97			
A (IER)	I	2047-06-28T04:01:01.023	-23.84x	25.65x	122050.38	-19.91			
B (OER)	I	2047-06-28T04:04:46.136	-23.40x	25.27x	117571.16	-19.88			
B (IER)	I	2047-06-28T04:26:20.205	-20.67x	22.92x	91984.69	-19.63			
C (IER)	I	2047-06-28T04:41:19.202	-18.63x	21.11x	74490.58	-19.25			
Saturn	I	2047-06-28T04:44:38.696	-18.16x	20.69x	60160.17	-15.88		-19.24	
Saturn	E	2047-06-28T06:24:03.874	-2.01x	5.70x	60263.81	-3.09		-3.79	
C (IER)	E	2047-06-28T06:36:02.177	0.15x	3.64x	74490.58	19.43			
B (IER)	E	2047-06-28T06:50:51.912	2.87x	1.04x	91984.69	19.85			
B (OER)	E	2047-06-28T07:12:09.358	6.85	-2.80x	117571.16	20.17			
A (IER)	E	2047-06-28T07:15:51.180	7.55	-3.47x	122050.38	20.21			
Encke (IEG)	E	2047-06-28T07:25:12.666	9.34	-5.20	133423.31	20.30			
Encke (OEG)	E	2047-06-28T07:25:28.510	9.39	-5.25	133744.89	20.30			
A (OER)	E	2047-06-28T07:27:57.693	9.87	-5.71	136774.40	20.32			
F ring	E	2047-06-28T07:30:59.049	10.45	-6.27	140461.00	20.34			