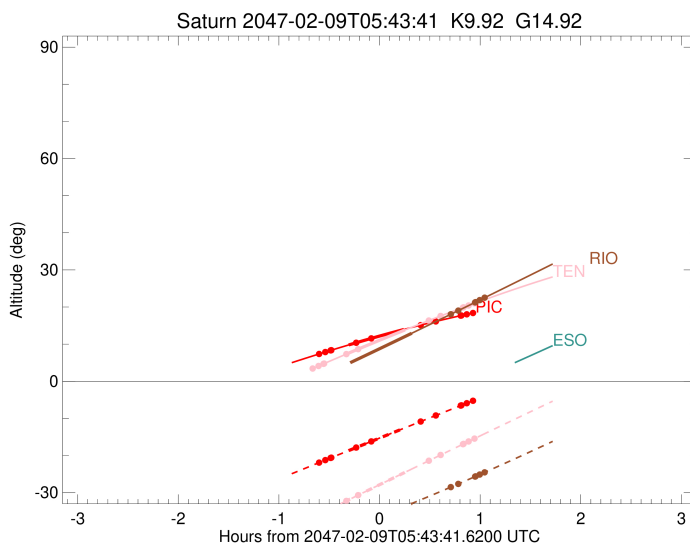
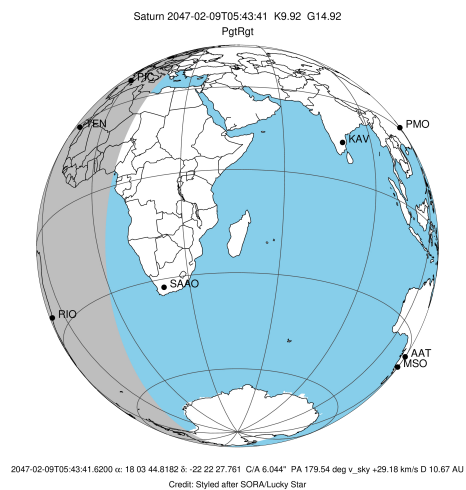




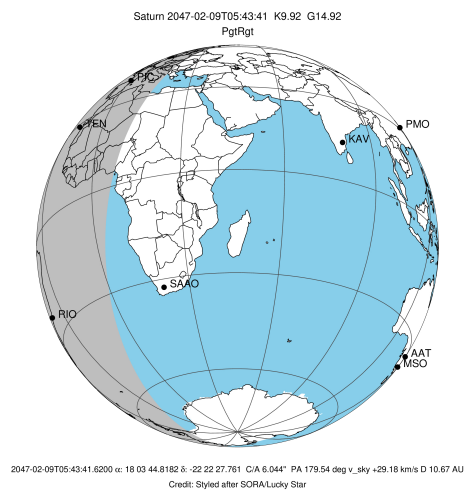
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2047-02-09T05:41:41.460  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PIC  
 Location : Pic du Midi  
 Latitude (deg) : 42.93656  
 E. Longitude (deg) : 0.14231  
 Altitude (km) : 2.890  
 Gaia source ID : 4069858065648142848  
 2Mass ID (if available) : 18034481-2222276  
 ICRS Star Coord at Epoch: 18h 03m 44.81816s -22:22:27.76139s  
 RUWE (>1.4 is poor) : 1.10  
 K magnitude : 9.924  
 G magnitude : 14.924  
 RP magnitude : 13.677  
 BP magnitude : 16.655  
 DUPflag : 0  
 Distance (au) : 10.666  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 29.18  
 Sun-Target sep (deg) : 48.87  
 Sun-Moon sep (deg) : 149.73  
 B (ring opening deg) : 26.43  
 PA of pole (deg) : 5.59  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 6.724  
 C/A sky separation (km) : 52014.7  
 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



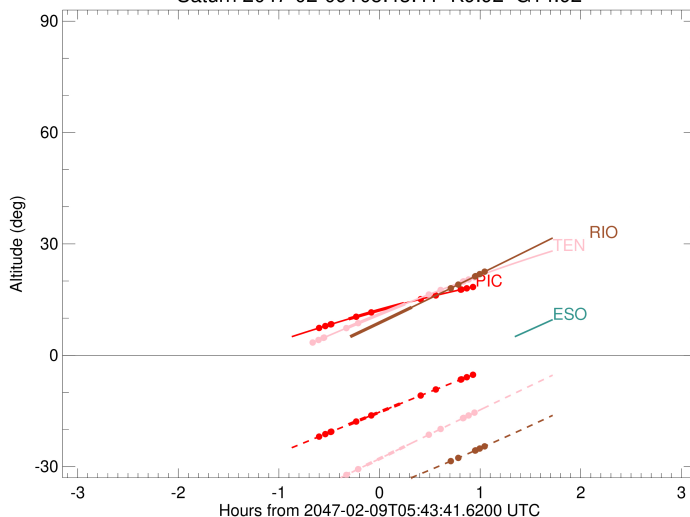
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-02-09T05:07:41.506		7.36	-21.91	140461.00	-17.10		
A (OER)	I	2047-02-09T05:11:23.274		7.88	-21.23	136774.40	-16.14		
Encke (OEG)	I	2047-02-09T05:14:36.349		8.32	-20.64	133744.89	-15.24		
Encke (IEG)	I	2047-02-09T05:14:57.527		8.37	-20.58	133423.31	-15.13		
A (IER)	I	2047-02-09T05:29:49.371	b	10.38	-17.85	122050.38	-10.16		
B (OER)	I	2047-02-09T05:38:41.574	b	11.54	-16.23	117571.16	-6.61		
Saturn	I	2047-02-09T05:25:17.025		9.78	-18.68	59312.87		55.60	60.54
Saturn	E	2047-02-09T05:58:20.576		13.96	-12.64	59507.43		47.27	52.75
B (OER)	E	2047-02-09T06:08:32.771		15.15	-10.79	117571.16	6.63		
A (IER)	E	2047-02-09T06:17:23.765		16.13	-9.19	122050.38	10.18		
Encke (IEG)	E	2047-02-09T06:32:15.321		17.69	-6.53	133423.31	15.12		
Encke (OEG)	E	2047-02-09T06:32:36.524		17.72	-6.47	133744.89	15.22		
A (OER)	E	2047-02-09T06:35:49.896		18.04	-5.89	136774.40	16.11		
F ring	E	2047-02-09T06:39:32.139		18.40	-5.24	140461.00	17.06		

target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2047-02-09T05:40:42.400  
 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 : 4069858065648142848  
 2Mass ID (if available) : 18034481-2222276  
 ICRS Star Coord at Epoch: 18h 03m 44.81816s -22:22:27.76139s  
 RUWE (>1.4 is poor) : 1.10  
 K magnitude : 9.924  
 G magnitude : 14.924  
 RP magnitude : 13.677  
 BP magnitude : 16.655  
 DUPflag : 0  
 Distance (au) : 10.666  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 29.18  
 Sun-Target sep (deg) : 48.87  
 Sun-Moon sep (deg) : 149.95  
 B (ring opening deg) : 26.43  
 PA of pole (deg) : 5.59  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 6.534  
 C/A sky separation (km) : 50547.1  
 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

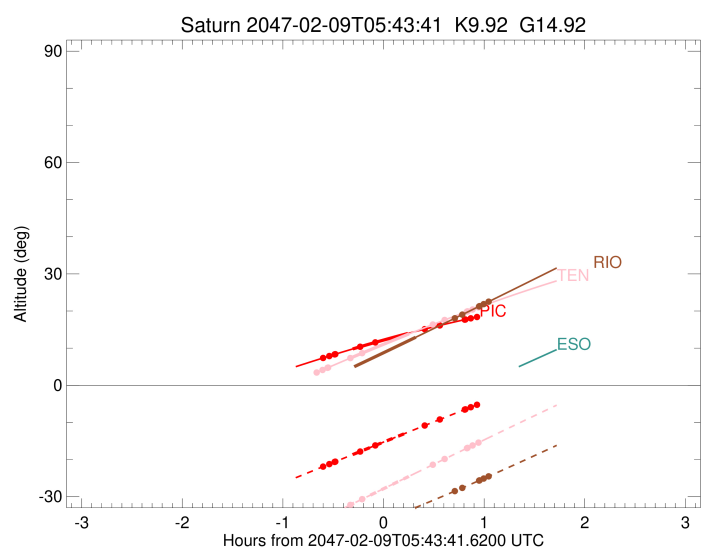
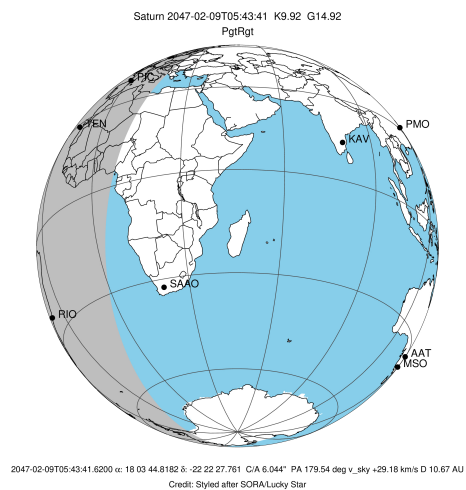


Saturn 2047-02-09T05:43:41 K9.92 G14.92



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-02-09T05:03:51.287		3.44x	-36.66	140461.00	-18.04		
A (OER)	I	2047-02-09T05:07:20.561		4.12x	-35.89	136774.40	-17.18		
Encke (OEG)	I	2047-02-09T05:10:21.081		4.71x	-35.23	133744.89	-16.38		
Encke (IEG)	I	2047-02-09T05:10:40.771		4.77x	-35.16	133423.31	-16.29		
A (IER)	I	2047-02-09T05:23:58.090	b	7.33	-32.22	122050.38	-12.06		
B (OER)	I	2047-02-09T05:30:54.231	b	8.65	-30.70	117571.16	-9.42		
Saturn	I	2047-02-09T05:22:49.992		7.11	-32.48	59355.87		53.70	58.79
Saturn	E	2047-02-09T05:58:49.367		13.81	-24.54	59558.77		45.14	50.70
B (OER)	E	2047-02-09T06:13:19.208		16.40	-21.36	117571.16	9.44		
A (IER)	E	2047-02-09T06:20:15.069		17.60	-19.84	122050.38	12.06		
Encke (IEG)	E	2047-02-09T06:33:33.858		19.87	-16.93	133423.31	16.23		
Encke (OEG)	E	2047-02-09T06:33:53.617		19.93	-16.85	133744.89	16.32		
A (OER)	E	2047-02-09T06:36:54.832		20.43	-16.19	136774.40	17.11		
F ring	E	2047-02-09T06:40:25.051		21.01	-15.43	140461.00	17.96		

target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2047-02-09T05:40:10.650  
 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 : 4069858065648142848  
 2Mass ID (if available) : 18034481-2222276  
 ICRS Star Coord at Epoch: 18h 03m 44.81816s -22:22:27.76139s  
 RUWE (>1.4 is poor) : 1.10  
 K magnitude : 9.924  
 G magnitude : 14.924  
 RP magnitude : 13.677  
 BP magnitude : 16.655  
 DUPflag : 0  
 Distance (au) : 10.666  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 29.18  
 Sun-Target sep (deg) : 48.87  
 Sun-Moon sep (deg) : 150.05  
 B (ring opening deg) : 26.43  
 PA of pole (deg) : 5.59  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 5.756  
 C/A sky separation (km) : 44528.5  
 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	2047-02-09T04:53:50.717	-1.86x	-44.30	140461.00	-21.36			
A (OER)	I	2047-02-09T04:56:45.612	-1.25x	-43.89	136774.40	-20.79			
Encke (OEG)	I	2047-02-09T04:59:13.158	-0.73x	-43.54	133744.89	-20.27			
Encke (IEG)	I	2047-02-09T04:59:29.044	-0.68x	-43.50	133423.31	-20.21			
A (IER)	I	2047-02-09T05:09:27.170	1.43x	-42.02	122050.38	-17.71			
B (OER)	I	2047-02-09T05:13:49.789	2.35x	-41.34	117571.16	-16.38			
Saturn	I	2047-02-09T05:17:38.345	3.16x	-40.74	59525.15			46.53	52.04
Saturn	E	2047-02-09T06:02:56.781	12.94	-32.92	59749.05			37.22	42.79
B (OER)	E	2047-02-09T06:26:20.690	18.08	-28.49	117571.16	16.33			
A (IER)	E	2047-02-09T06:30:44.361	19.05	-27.64	122050.38	17.62			
Encke (IEG)	E	2047-02-09T06:40:45.957	21.27	-25.66	133423.31	20.07			
Encke (OEG)	E	2047-02-09T06:41:01.954	21.33	-25.61	133744.89	20.13			
A (OER)	E	2047-02-09T06:43:30.565	21.88	-25.11	136774.40	20.64			
F ring	E	2047-02-09T06:46:26.816	22.53	-24.53	140461.00	21.19			