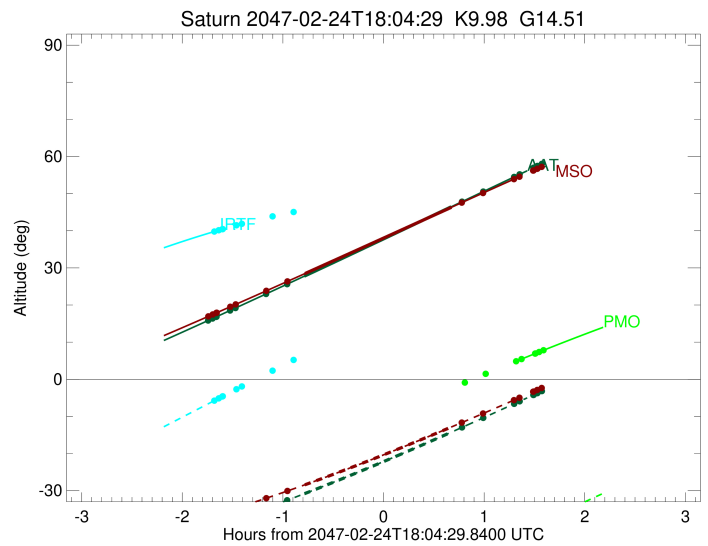
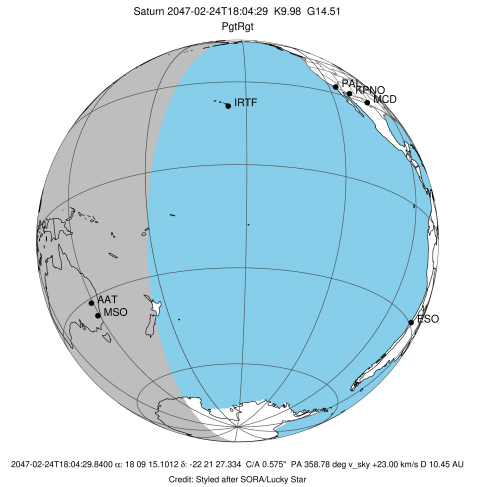


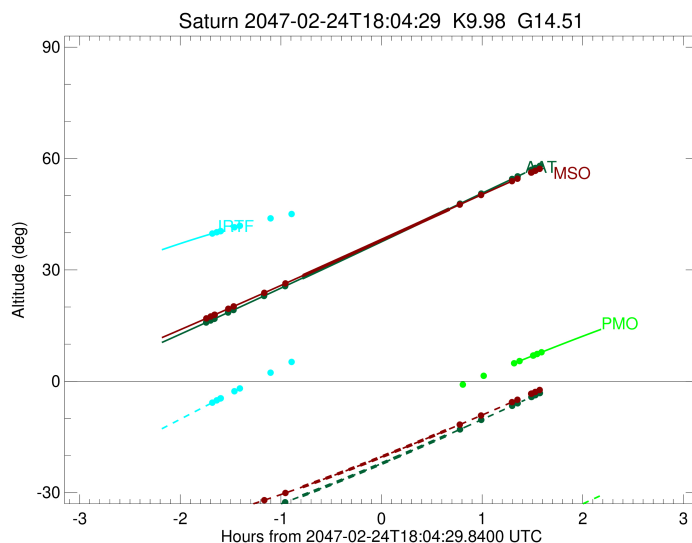
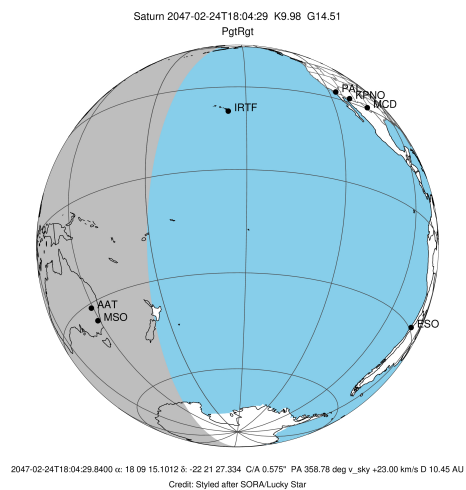
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-02-24T18:00:38.620
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 4069718324590454144
 2Mass ID (if available) : 18091509-2221273
 ICRS Star Coord at Epoch: 18h 09m 15.10124s -22:21:27.33387s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 9.980
 G magnitude : 14.514
 RP magnitude : 13.369
 BP magnitude : 15.904
 DUPflag : 0
 Distance (au) : 10.451
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.00
 Sun-Target sep (deg) : 63.25
 Sun-Moon sep (deg) : 63.25
 B (ring opening deg) : 26.28
 PA of pole (deg) : 5.69
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.143
 C/A sky separation (km) : 1081.4
 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	2047-02-24T16:21:34.005	-31.61x	-67.41	140461.00	-23.80			
A (OER)	I	2047-02-24T16:24:08.914	-31.06x	-67.37	136774.40	-23.80			
Encke (OEG)	I	2047-02-24T16:26:16.240	-30.62x	-67.34	133744.89	-23.79			
Encke (IEG)	I	2047-02-24T16:26:29.757	-30.57x	-67.33	133423.31	-23.79			
A (IER)	I	2047-02-24T16:34:27.984	-28.90x	-67.09	122050.38	-23.77			
B (OER)	I	2047-02-24T16:37:36.433	-28.24x	-66.95	117571.16	-23.77			
B (IER)	I	2047-02-24T16:55:34.042	-24.49x	-65.77	91984.69	-23.72			
C (IER)	I	2047-02-24T17:07:52.042	-21.93x	-64.60	74490.58	-23.69			
Saturn	I	2047-02-24T17:17:03.727	-20.03x	-63.55	60257.59			4.92	6.03
Saturn	E	2047-02-24T18:44:23.293	-2.55x	-49.23	60248.35			-6.76	-8.29
C (IER)	E	2047-02-24T18:52:58.014	-0.90x	-47.57	74490.58	23.47			
B (IER)	E	2047-02-24T19:05:23.646	1.46x	-45.12	91984.69	23.45			
B (OER)	E	2047-02-24T19:23:35.211	4.85x	-41.47	117571.16	23.43			
A (IER)	E	2047-02-24T19:26:46.441	5.44	-40.82	122050.38	23.42			
Encke (IEG)	E	2047-02-24T19:34:52.172	6.91	-39.17	133423.31	23.41			
Encke (OEG)	E	2047-02-24T19:35:05.911	6.95	-39.12	133744.89	23.41			
A (OER)	E	2047-02-24T19:37:15.348	7.34	-38.68	136774.40	23.40			
F ring	E	2047-02-24T19:39:52.886	7.81	-38.14	140461.00	23.40			

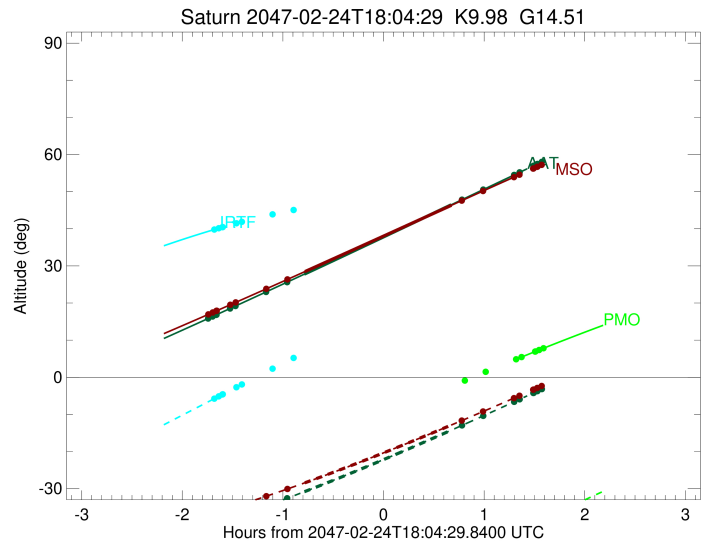
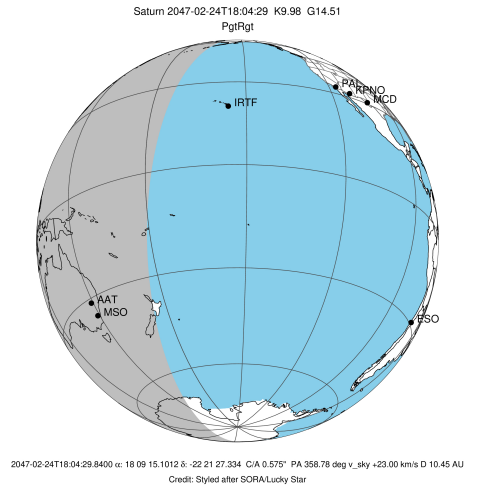
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-02-24T18:04:21.840
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 4069718324590454144
 2Mass ID (if available) : 18091509-2221273
 ICRS Star Coord at Epoch: 18h 09m 15.10124s -22:21:27.33387s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 9.980
 G magnitude : 14.514
 RP magnitude : 13.369
 BP magnitude : 15.904
 DUPflag : 0
 Distance (au) : 10.451
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.00
 Sun-Target sep (deg) : 63.25
 Sun-Moon sep (deg) : 63.67
 B (ring opening deg) : 26.28
 PA of pole (deg) : 5.69
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.011
 C/A sky separation (km) : 80.4
 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	2047-02-24T16:23:38.311		39.80	-5.75	140461.00	-23.27		
A (OER)	I	2047-02-24T16:26:16.718		40.15	-5.14	136774.40	-23.27		
Encke (OEG)	I	2047-02-24T16:28:26.905		40.43	-4.63x	133744.89	-23.27		
Encke (IEG)	I	2047-02-24T16:28:40.724		40.46	-4.58x	133423.31	-23.27		
A (IER)	I	2047-02-24T16:36:49.559		41.49	-2.68x	122050.38	-23.26		
B (OER)	I	2047-02-24T16:40:02.129		41.87	-1.93x	117571.16	-23.26		
B (IER)	I	2047-02-24T16:58:22.601		43.89	2.32x	91984.69	-23.24		
C (IER)	I	2047-02-24T17:10:55.465		45.06	5.22x	74490.58	-23.23		
Saturn	I	2047-02-24T17:19:52.943		45.79	7.28x	60252.12		6.07	7.45
Saturn	E	2047-02-24T18:48:52.789		47.17	27.29x	60251.02		-6.28	-7.70
C (IER)	E	2047-02-24T18:57:45.147		46.71	29.21x	74490.58	23.22		
B (IER)	E	2047-02-24T19:10:18.270		45.87	31.91x	91984.69	23.23		
B (OER)	E	2047-02-24T19:28:39.225		44.31	35.78x	117571.17	23.25		
A (IER)	E	2047-02-24T19:31:51.895		44.00	36.44x	122050.38	23.25		
Encke (IEG)	E	2047-02-24T19:40:01.000		43.15	38.12x	133423.31	23.26		
Encke (OEG)	E	2047-02-24T19:40:14.828		43.13	38.17x	133744.89	23.26		
A (OER)	E	2047-02-24T19:42:25.092		42.89	38.61x	136774.40	23.26		
F ring	E	2047-02-24T19:45:03.596		42.60	39.14x	140461.00	23.26		

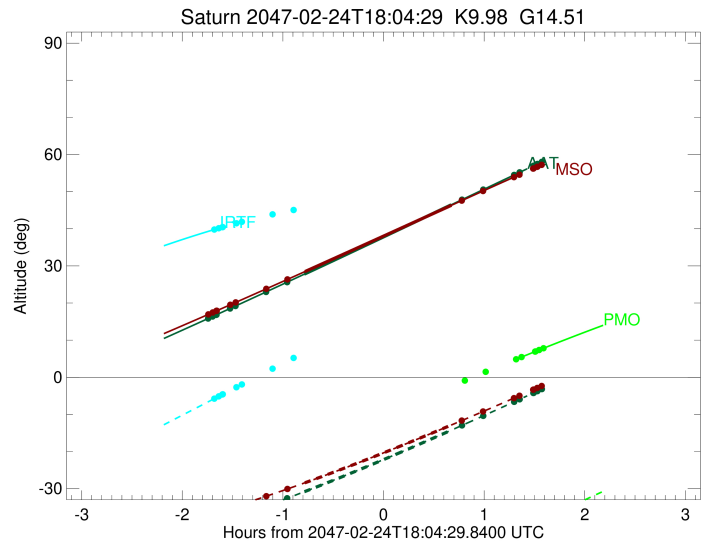
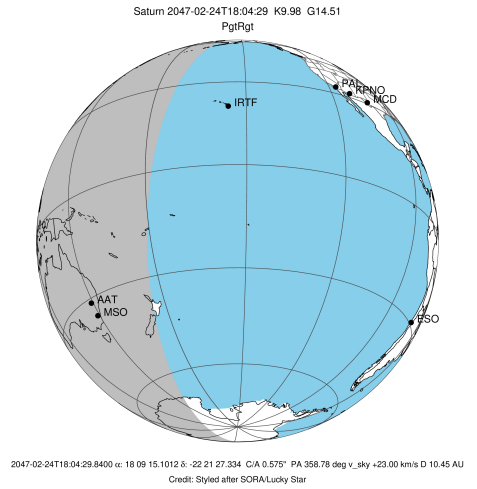
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-02-24T18:01:05.510
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 4069718324590454144
 2Mass ID (if available) : 18091509-2221273
 ICRS Star Coord at Epoch: 18h 09m 15.10124s -22:21:27.33387s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 9.980
 G magnitude : 14.514
 RP magnitude : 13.369
 BP magnitude : 15.904
 DUPflag : 0
 Distance (au) : 10.451
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.00
 Sun-Target sep (deg) : 63.25
 Sun-Moon sep (deg) : 63.87
 B (ring opening deg) : 26.28
 PA of pole (deg) : 5.69
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.819
 C/A sky separation (km) : 6211.5
 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_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	2047-02-24T16:19:57.326		15.83	-39.95	140461.00	-23.49		
A (OER)	I	2047-02-24T16:22:34.341		16.37	-39.58	136774.40	-23.47		
Encke (OEG)	I	2047-02-24T16:24:43.430		16.81	-39.27	133744.89	-23.46		
Encke (IEG)	I	2047-02-24T16:24:57.136		16.86	-39.23	133423.31	-23.46		
A (IER)	I	2047-02-24T16:33:02.282		18.53	-38.04	122050.38	-23.42		
B (OER)	I	2047-02-24T16:36:13.602		19.19	-37.56	117571.17	-23.40		
B (IER)	I	2047-02-24T16:54:29.903		22.99	-34.68	91984.69	-23.26		
C (IER)	I	2047-02-24T17:07:04.392		25.63	-32.59	74490.58	-23.10		
Saturn	I	2047-02-24T17:17:20.505		27.79	-30.82	60267.86		0.57	0.70
Saturn	E	2047-02-24T18:44:57.271		46.47	-14.25	60214.50		-11.21	-13.67
C (IER)	E	2047-02-24T18:51:15.641		47.83	-12.98	74490.58	22.92		
B (IER)	E	2047-02-24T19:03:56.530		50.55	-10.41	91984.69	23.05		
B (OER)	E	2047-02-24T19:22:24.431		54.50	-6.62	117571.16	23.13		
A (IER)	E	2047-02-24T19:25:38.057		55.19	-5.95	122050.38	23.14		
Encke (IEG)	E	2047-02-24T19:33:49.419		56.94	-4.25x	133423.31	23.15		
Encke (OEG)	E	2047-02-24T19:34:03.308		56.99	-4.20x	133744.89	23.15		
A (OER)	E	2047-02-24T19:36:14.144		57.46	-3.75x	136774.40	23.16		
F ring	E	2047-02-24T19:38:53.335		58.02	-3.19x	140461.00	23.16		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-02-24T18:01:14.230
 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 : 4069718324590454144
 2Mass ID (if available) : 18091509-2221273
 ICRS Star Coord at Epoch: 18h 09m 15.10124s -22:21:27.33387s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 9.980
 G magnitude : 14.514
 RP magnitude : 13.369
 BP magnitude : 15.904
 DUPflag : 0
 Distance (au) : 10.451
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.00
 Sun-Target sep (deg) : 63.25
 Sun-Moon sep (deg) : 63.86
 B (ring opening deg) : 26.28
 PA of pole (deg) : 5.69
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.872
 C/A sky separation (km) : 6612.1
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-02-24T16:20:04.086		16.94	-36.88	140461.00	-23.48		
A (OER)	I	2047-02-24T16:22:41.169		17.46	-36.54	136774.40	-23.46		
Encke (OEG)	I	2047-02-24T16:24:50.316		17.89	-36.26	133744.89	-23.45		
Encke (IEG)	I	2047-02-24T16:25:04.028		17.93	-36.23	133423.31	-23.45		
A (IER)	I	2047-02-24T16:33:09.428		19.53	-35.14	122050.38	-23.41		
B (OER)	I	2047-02-24T16:36:20.865		20.17	-34.69	117571.16	-23.39		
B (IER)	I	2047-02-24T16:54:38.118		23.83	-32.03	91984.69	-23.24		
C (IER)	I	2047-02-24T17:07:13.753		26.37	-30.09	74490.58	-23.05		
Saturn	I	2047-02-24T17:17:32.002		28.45	-28.44	60267.98		0.24	0.30
Saturn	E	2047-02-24T18:45:02.700		46.33	-12.84	60211.12		-11.56	-14.10
C (IER)	E	2047-02-24T18:51:07.217		47.58	-11.68	74490.58	22.88		
B (IER)	E	2047-02-24T19:03:49.022		50.17	-9.23	91984.69	23.03		
B (OER)	E	2047-02-24T19:22:17.445		53.91	-5.62	117571.16	23.12		
A (IER)	E	2047-02-24T19:25:31.101		54.56	-4.99x	122050.38	23.13		
Encke (IEG)	E	2047-02-24T19:33:42.485		56.21	-3.37x	133423.31	23.15		
Encke (OEG)	E	2047-02-24T19:33:56.374		56.25	-3.32x	133744.89	23.15		
A (OER)	E	2047-02-24T19:36:07.203		56.69	-2.89x	136774.40	23.16		
F ring	E	2047-02-24T19:38:46.380		57.22	-2.36x	140461.00	23.16		