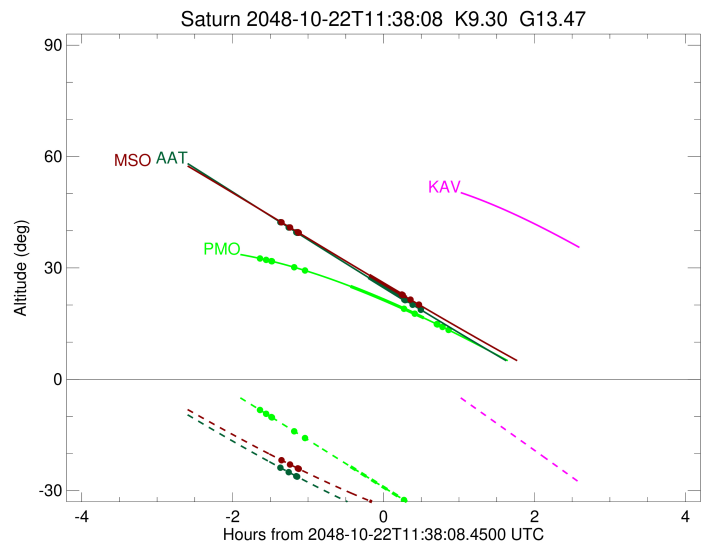
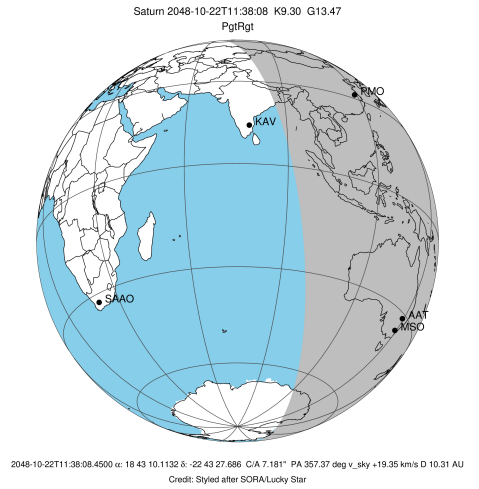




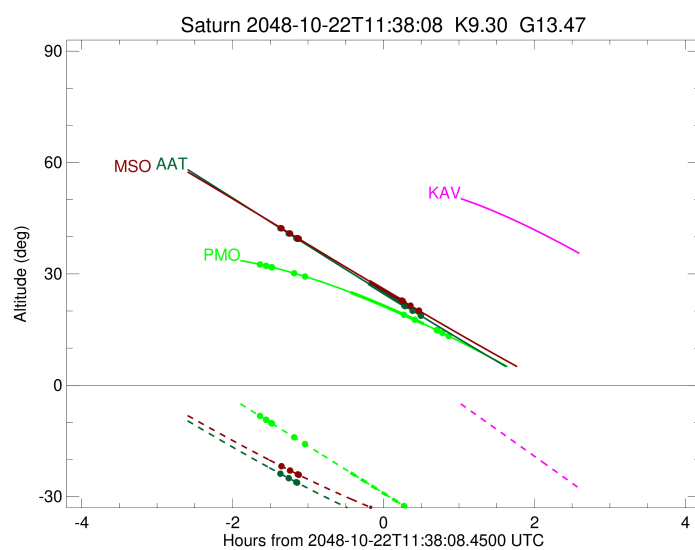
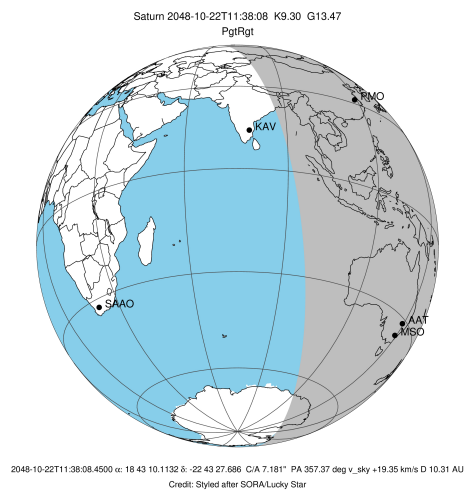
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2048-10-22T11:41:19.300  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PMO  
 Location : Purple Mtn Obs. Nanking  
 Latitude (deg) : 32.06667  
 E. Longitude (deg) : 118.82089  
 Altitude (km) : 0.364  
 Gaia source ID : 4078522109885851392  
 2Mass ID (if available) : 18431011-2243274  
 ICRS Star Coord at Epoch: 18h 43m 10.11323s -22:43:27.68557s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 9.301  
 G magnitude : 13.469  
 RP magnitude : 12.337  
 BP magnitude : 14.814  
 DUPflag : 0  
 Distance (au) : 10.311  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 19.35  
 Sun-Target sep (deg) : 70.88  
 Sun-Moon sep (deg) : 117.92  
 B (ring opening deg) : 25.83  
 PA of pole (deg) : 6.27  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 6.593  
 C/A sky separation (km) : 49305.2  
 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	2048-10-22T09:59:50.900		32.55	-8.26	140461.00	-12.87		
A (OER)	I	2048-10-22T10:04:42.942		32.17	-9.28	136774.40	-12.37		
Encke (OEG)	I	2048-10-22T10:08:52.487		31.83	-10.16	133744.89	-11.91		
Encke (IEG)	I	2048-10-22T10:09:19.556		31.79	-10.25	133423.31	-11.85		
A (IER)	I	2048-10-22T10:26:59.837		30.19	-13.99	122050.38	-9.49		
B (OER)	I	2048-10-22T10:35:27.639		29.33	-15.78	117571.16	-8.12		
Saturn	I	2048-10-22T11:11:53.559		25.04	-23.51	59696.06		-40.75	-46.37
Saturn	E	2048-10-22T12:10:11.060		16.52	-35.83	59376.39		-54.92	-59.92
B (OER)	E	2048-10-22T11:54:28.140	b	18.98	-32.53	117571.16	8.15		
A (IER)	E	2048-10-22T12:02:54.154	b	17.68	-34.31	122050.38	9.53		
Encke (IEG)	E	2048-10-22T12:20:27.594		14.85	-37.98	133423.31	11.96		
Encke (OEG)	E	2048-10-22T12:20:54.431		14.78	-38.08	133744.89	12.01		
A (OER)	E	2048-10-22T12:25:01.715		14.10	-38.93	136774.40	12.49		
F ring	E	2048-10-22T12:29:50.824		13.29	-39.93	140461.00	13.01		

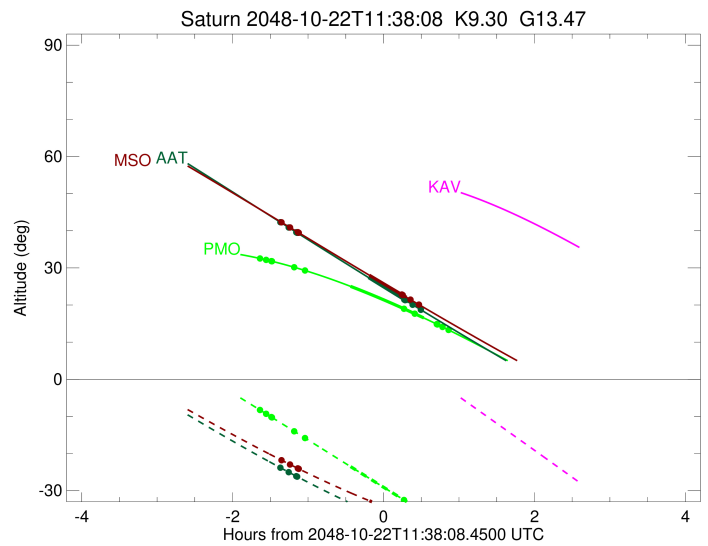
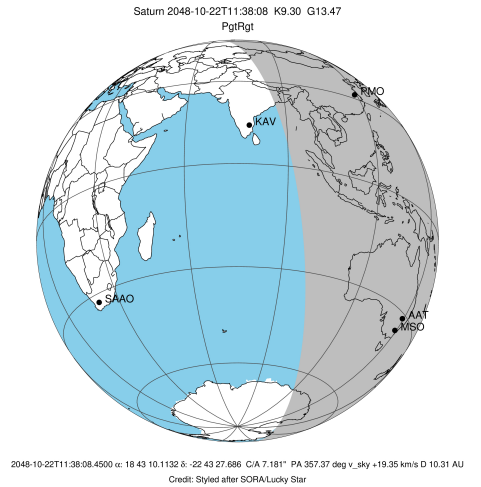
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2048-10-22T11:42:10.390  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : AAT  
 Location : Siding Spring (AAT)  
 Latitude (deg) : -31.27703  
 E. Longitude (deg) : 149.06608  
 Altitude (km) : 1.164  
 Gaia source ID : 4078522109885851392  
 2Mass ID (if available) : 18431011-2243274  
 ICRS Star Coord at Epoch: 18h 43m 10.11323s -22:43:27.68557s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 9.301  
 G magnitude : 13.469  
 RP magnitude : 12.337  
 BP magnitude : 14.814  
 DUPflag : 0  
 Distance (au) : 10.311  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 19.35  
 Sun-Target sep (deg) : 70.88  
 Sun-Moon sep (deg) : 118.00  
 B (ring opening deg) : 25.83  
 PA of pole (deg) : 6.27  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 7.549  
 C/A sky separation (km) : 56456.7  
 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	2048-10-22T10:15:58.998		42.34	-23.79	140461.00	-9.76		
A (OER)	I	2048-10-22T10:22:34.926		40.93	-24.99	136774.40	-8.85		
Encke (OEG)	I	2048-10-22T10:28:35.156		39.64	-26.07	133744.89	-7.96		
Encke (IEG)	I	2048-10-22T10:29:15.827		39.50	-26.19	133423.31	-7.85		
Saturn	I	2048-10-22T11:26:07.558		27.42	-35.58	59417.90		-53.00	-58.15
Saturn	E	2048-10-22T11:57:37.432		20.84	-39.94	59215.56		-62.99	-67.16
Encke (IEG)	E	2048-10-22T11:54:37.901	b	21.46	-39.56	133423.31	7.90		
Encke (OEG)	E	2048-10-22T11:55:18.356	b	21.32	-39.64	133744.89	8.00		
A (OER)	E	2048-10-22T12:01:16.429		20.08	-40.39	136774.40	8.91		
F ring	E	2048-10-22T12:07:49.451		18.72	-41.18	140461.00	9.84		

target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2048-10-22T11:41:57.930  
 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 : 4078522109885851392  
 2Mass ID (if available) : 18431011-2243274  
 ICRS Star Coord at Epoch: 18h 43m 10.11323s -22:43:27.68557s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 9.301  
 G magnitude : 13.469  
 RP magnitude : 12.337  
 BP magnitude : 14.814  
 DUPflag : 0  
 Distance (au) : 10.311  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 19.35  
 Sun-Target sep (deg) : 70.88  
 Sun-Moon sep (deg) : 117.99  
 B (ring opening deg) : 25.83  
 PA of pole (deg) : 6.27  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 7.596  
 C/A sky separation (km) : 56810.8  
 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	2048-10-22T10:16:51.712		42.32	-21.78	140461.00	-9.55		
A (OER)	I	2048-10-22T10:23:37.405		40.93	-22.93	136774.40	-8.61		
Encke (OEG)	I	2048-10-22T10:29:49.259		39.66	-23.97	133744.89	-7.67		
Encke (IEG)	I	2048-10-22T10:30:31.461		39.52	-24.09	133423.31	-7.56		
Saturn	I	2048-10-22T11:26:56.556		28.02	-32.73	59399.94		-53.83	-58.91
Saturn	E	2048-10-22T11:56:23.637		22.09	-36.48	59209.92		-63.30	-67.43
Encke (IEG)	E	2048-10-22T11:52:42.536	b	22.83	-36.05	133423.31	7.60		
Encke (OEG)	E	2048-10-22T11:53:24.538	b	22.69	-36.13	133744.89	7.71		
A (OER)	E	2048-10-22T11:59:34.387		21.46	-36.85	136774.40	8.66		
F ring	E	2048-10-22T12:06:17.359		20.12	-37.59	140461.00	9.62		