

target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2047-06-08T18:54:46.440  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 4069729457145628032  
 2Mass ID (if available) : 18071097-2220091

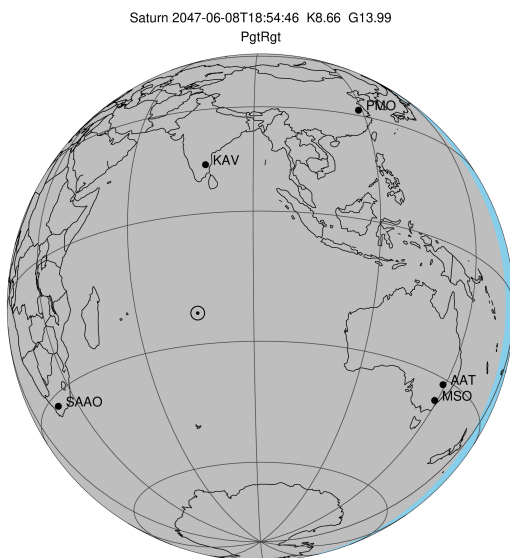
Saturn 2047-06-08T18:54:46 K8.66 G13.99 PgtRgt

ICRS Star Coord at Epoch: 18h 07m 10.97895s -22:20:09.18525s

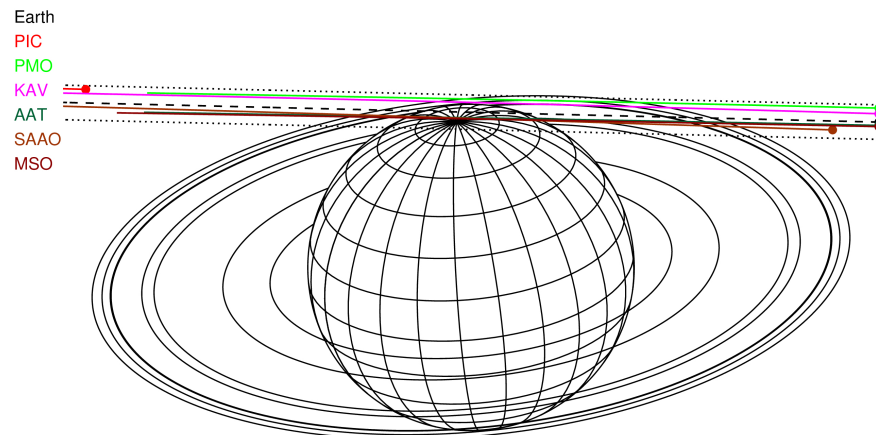
RUWE (>1.4 is poor) : 0.94  
 K magnitude : 8.663  
 G magnitude : 13.992  
 RP magnitude : 12.708  
 BP magnitude : 15.870  
 DUPflag : 0  
 Distance (au) : 9.060  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.23  
 Sun-Target sep (deg) : 165.57  
 Sun-Moon sep (deg) : 5.54  
 B (ring opening deg) : 26.31  
 PA of pole (deg) : 5.65

# 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

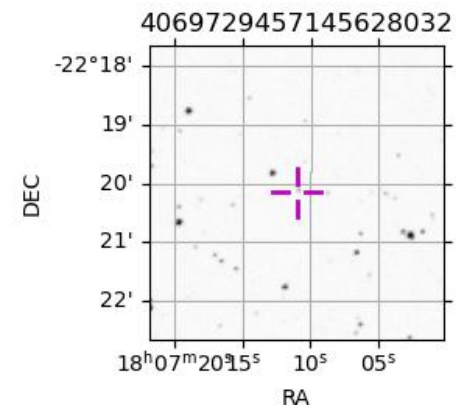


2047-06-08T18:54:46.4400 at: 18 07 10.9790 s: -22 20 09.185 C/A 8.721° PA 178.62 deg v\_sky -19.23 km/s D 09.06 AU  
 Credit: Styled after SORA/Lucky Star

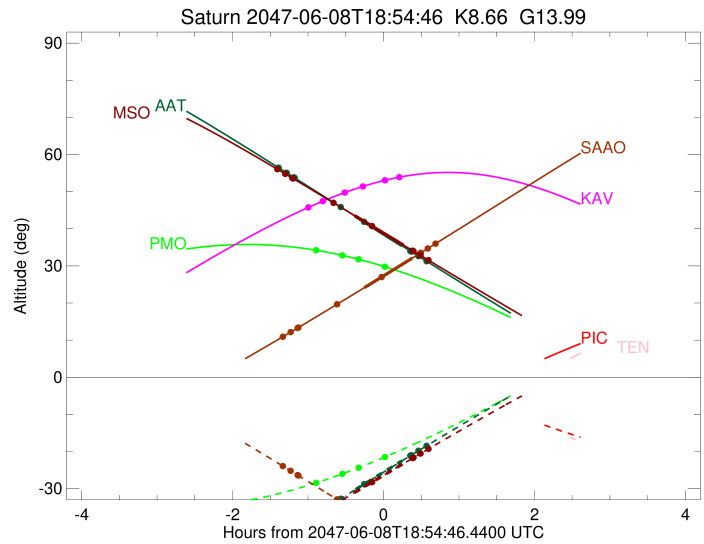
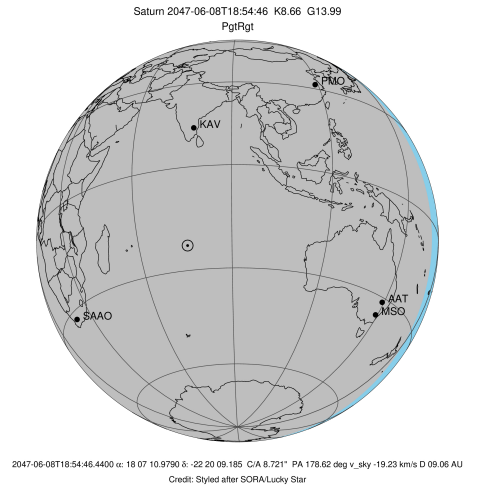


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs	32.1	118.8	+		+	JUN 08 18:00 - JUN 08 18:56	PnnRie
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					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observ	12.6	78.8	+		+	JUN 08 17:54 - JUN 08 19:07	PnnRie
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3					PnnRnn
AAT	Siding Spring	-31.3	149.1	+	+	+	JUN 08 17:31 - JUN 08 19:29	PieRie
SAAO	So. Afr. Astro	-32.4	20.8	+	+	+	JUN 08 17:34 - JUN 08 19:36	PieRie
MSO	Mt. Stromlo Ob	-35.3	149.0	+	+	+	JUN 08 17:30 - JUN 08 19:30	PieRie



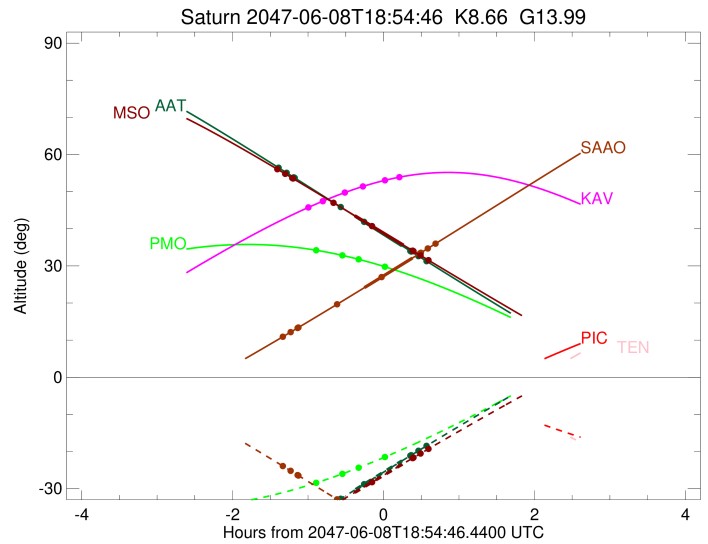
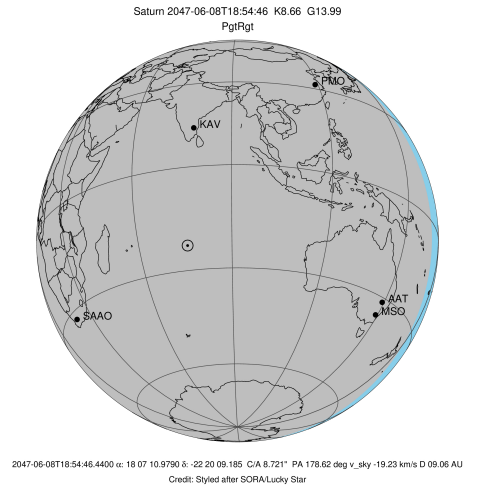
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2047-06-08T18:52:45.710  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PMO  
 Location : Purple Mtn Obs. Nanking  
 Latitude (deg) : 32.06667  
 E. Longitude (deg) : 118.82089  
 Altitude (km) : 0.364  
 Gaia source ID : 4069729457145628032  
 2Mass ID (if available) : 18071097-2220091  
 ICRS Star Coord at Epoch: 18h 07m 10.97895s -22:20:09.18525s  
 RUWE (>1.4 is poor) : 0.94  
 K magnitude : 8.663  
 G magnitude : 13.992  
 RP magnitude : 12.708  
 BP magnitude : 15.870  
 DUPflag : 0  
 Distance (au) : 9.060  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.23  
 Sun-Target sep (deg) : 165.57  
 Sun-Moon sep (deg) : 6.34  
 B (ring opening deg) : 26.31  
 PA of pole (deg) : 5.65  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 9.464  
 C/A sky separation (km) : 62187.6  
 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	2047-06-08T18:00:52.910		34.24	-28.48	140461.00	-4.75		
A (OER)	I	2047-06-08T18:21:00.019		32.92	-26.15	136774.44	-1.31		
No planet occultations									
A (OER)	E	2047-06-08T18:35:49.489		31.71	-24.26	136774.41	1.31		
F ring	E	2047-06-08T18:56:00.135		29.76	-21.48	140461.00	4.73		

target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2047-06-08T18:55:47.730  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : KAV  
 Location : Kavalur Observatory  
 Latitude (deg) : 12.57556  
 E. Longitude (deg) : 78.83167  
 Altitude (km) : 0.722  
 Gaia source ID : 4069729457145628032  
 2Mass ID (if available) : 18071097-2220091  
 ICRS Star Coord at Epoch: 18h 07m 10.97895s -22:20:09.18525s  
 RUWE (>1.4 is poor) : 0.94  
 K magnitude : 8.663  
 G magnitude : 13.992  
 RP magnitude : 12.708  
 BP magnitude : 15.870  
 DUPflag : 0  
 Distance (au) : 9.060  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.23  
 Sun-Target sep (deg) : 165.57  
 Sun-Moon sep (deg) : 5.75  
 B (ring opening deg) : 26.31  
 PA of pole (deg) : 5.65  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 9.273  
 C/A sky separation (km) : 60930.7  
 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



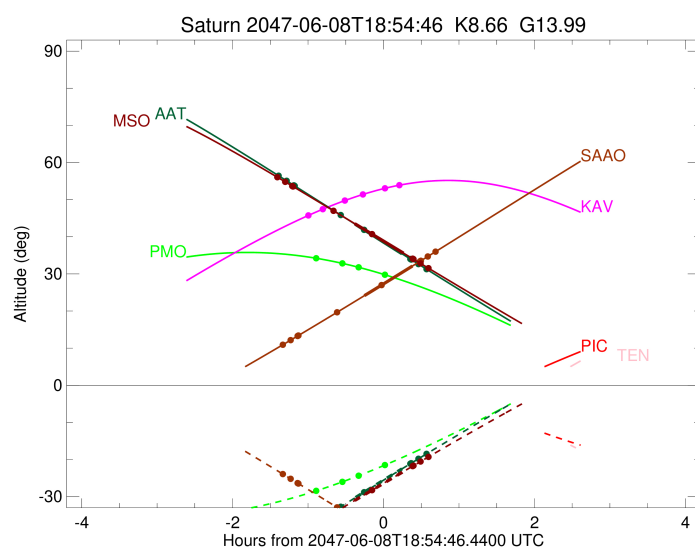
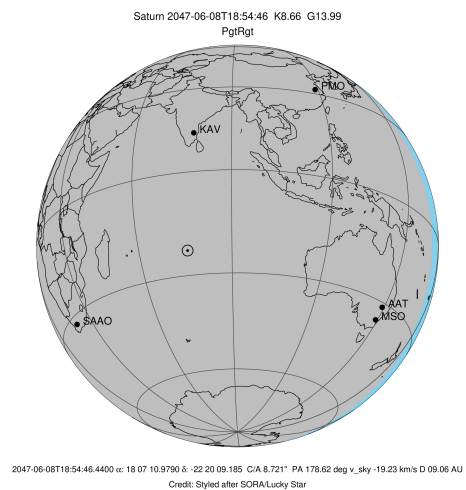
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-06-08T17:54:46.108		45.71	-52.65	140461.00	-6.32		
A (OER)	I	2047-06-08T18:06:08.544		47.38	-53.45	136774.40	-4.46		
Encke (OEG)	I	2047-06-08T18:23:06.503		49.64	-54.26	133744.91	-1.46		

No planet occultations

Encke (OEG)	E	2047-06-08T18:39:04.464		51.48	-54.60	133744.89	1.46		
A (OER)	E	2047-06-08T18:56:03.567		53.07	-54.49	136774.40	4.45		
F ring	E	2047-06-08T19:07:27.028		53.90	-54.15	140461.00	6.31		

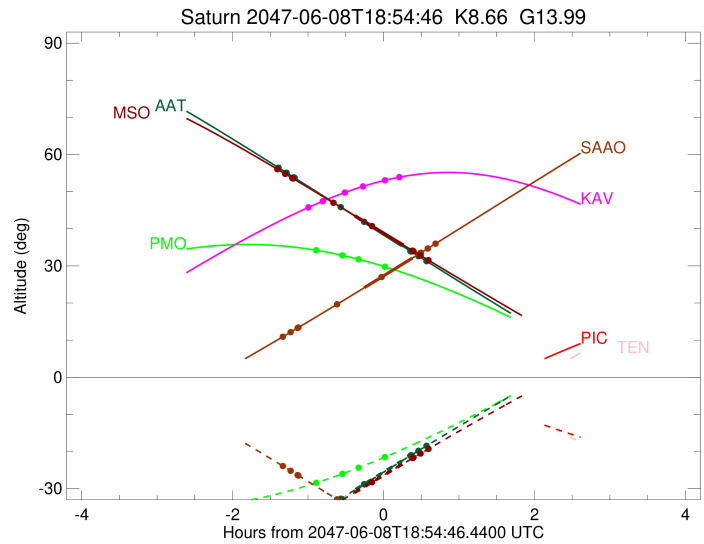
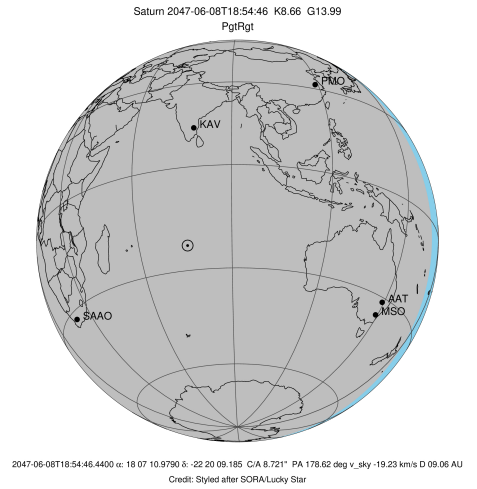
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2047-06-08T18:51:12.400  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : AAT  
 Location : Siding Spring (AAT)  
 Latitude (deg) : -31.27703  
 E. Longitude (deg) : 149.06608  
 Altitude (km) : 1.164  
 Gaia source ID : 4069729457145628032  
 2Mass ID (if available) : 18071097-2220091  
 ICRS Star Coord at Epoch: 18h 07m 10.97895s -22:20:09.18525s  
 RUWE (>1.4 is poor) : 0.94  
 K magnitude : 8.663  
 G magnitude : 13.992  
 RP magnitude : 12.708  
 BP magnitude : 15.870  
 DUPflag : 0  
 Distance (au) : 9.060  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.23  
 Sun-Target sep (deg) : 165.57  
 Sun-Moon sep (deg) : 6.10  
 B (ring opening deg) : 26.31  
 PA of pole (deg) : 5.65  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 8.412  
 C/A sky separation (km) : 55276.5  
 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	2047-06-08T17:31:12.278		56.48	-43.27	140461.00	-10.06		
A (OER)	I	2047-06-08T17:37:34.915		55.12	-41.91	136774.40	-9.20		
Encke (OEG)	I	2047-06-08T17:43:19.485		53.89	-40.68	133744.89	-8.37		
Encke (IEG)	I	2047-06-08T17:43:58.110		53.75	-40.55	133423.31	-8.28		
A (IER)	I	2047-06-08T18:20:13.573		45.97	-32.84	122050.38	-1.90		
Saturn	I	2047-06-08T18:32:34.528		43.32	-30.24	59397.55		52.28	57.48
Saturn	E	2047-06-08T19:09:26.999		35.43	-22.52	59223.73		60.26	64.74
A (IER)	E	2047-06-08T18:39:38.048	b	41.81	-28.75	122050.38	1.90		
Encke (IEG)	E	2047-06-08T19:16:07.284		34.01	-21.14	133423.31	8.21		
Encke (OEG)	E	2047-06-08T19:16:46.244		33.87	-21.00	133744.89	8.30		
A (OER)	E	2047-06-08T19:22:33.883		32.64	-19.80	136774.40	9.12		
F ring	E	2047-06-08T19:29:00.090		31.27	-18.48	140461.00	9.96		

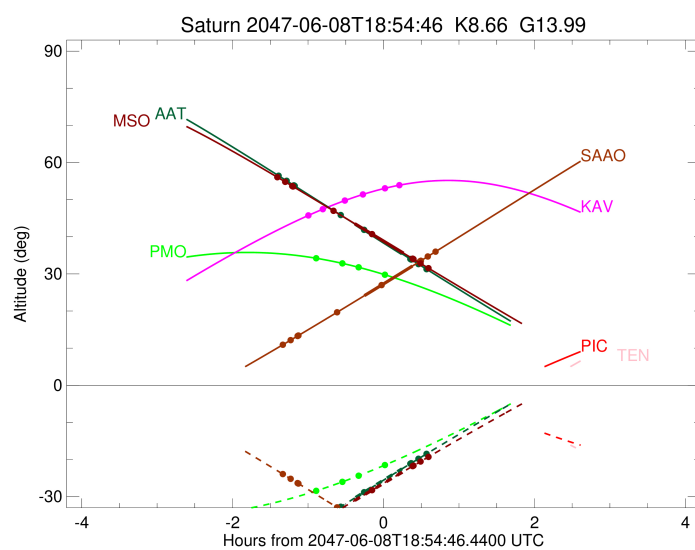
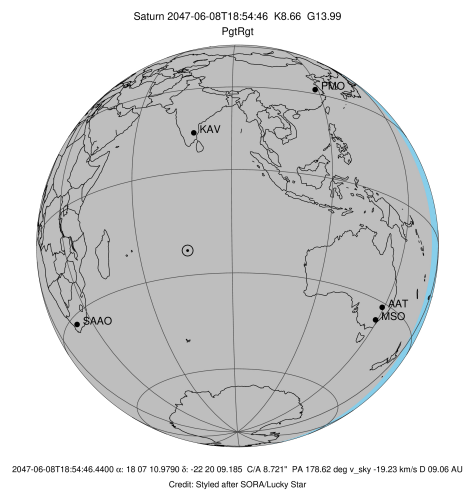
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2047-06-08T18:58:53.250  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : SAAO  
 Location : So. Afr. Astro. Obs. (Sutherland)  
 Latitude (deg) : -32.37953  
 E. Longitude (deg) : 20.81070  
 Altitude (km) : 1.768  
 Gaia source ID : 4069729457145628032  
 2Mass ID (if available) : 18071097-2220091  
 ICRS Star Coord at Epoch: 18h 07m 10.97895s -22:20:09.18525s  
 RUWE (>1.4 is poor) : 0.94  
 K magnitude : 8.663  
 G magnitude : 13.992  
 RP magnitude : 12.708  
 BP magnitude : 15.870  
 DUPflag : 0  
 Distance (au) : 9.060  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.23  
 Sun-Target sep (deg) : 165.57  
 Sun-Moon sep (deg) : 4.70  
 B (ring opening deg) : 26.31  
 PA of pole (deg) : 5.65  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 8.373  
 C/A sky separation (km) : 55020.9  
 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	2047-06-08T17:34:34.331		10.88	-23.89	140461.00	-10.29		
A (OER)	I	2047-06-08T17:40:46.627		12.12	-25.17	136774.40	-9.50		
Encke (OEG)	I	2047-06-08T17:46:18.667		13.24	-26.31	133744.89	-8.74		
Encke (IEG)	I	2047-06-08T17:46:55.653		13.36	-26.44	133423.31	-8.65		
A (IER)	I	2047-06-08T18:17:31.186		19.59	-32.81	122050.38	-3.50		
Saturn	I	2047-06-08T18:39:33.020		24.13	-37.44	59422.02		51.22	56.49
Saturn	E	2047-06-08T19:17:44.063		32.11	-45.50	59222.65		60.31	64.78
A (IER)	E	2047-06-08T18:53:20.959	b	27.01	-40.35	122050.38	3.51		
Encke (IEG)	E	2047-06-08T19:23:52.474		33.40	-46.80	133423.31	8.69		
Encke (OEG)	E	2047-06-08T19:24:29.285		33.53	-46.93	133744.89	8.78		
A (OER)	E	2047-06-08T19:29:59.548		34.69	-48.10	136774.40	9.56		
F ring	E	2047-06-08T19:36:09.413		35.99	-49.40	140461.00	10.37		

target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2047-06-08T18:51:22.710  
 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 : 4069729457145628032  
 2Mass ID (if available) : 18071097-2220091  
 ICRS Star Coord at Epoch: 18h 07m 10.97895s -22:20:09.18525s  
 RUWE (>1.4 is poor) : 0.94  
 K magnitude : 8.663  
 G magnitude : 13.992  
 RP magnitude : 12.708  
 BP magnitude : 15.870  
 DUPflag : 0  
 Distance (au) : 9.060  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.23  
 Sun-Target sep (deg) : 165.57  
 Sun-Moon sep (deg) : 6.04  
 B (ring opening deg) : 26.31  
 PA of pole (deg) : 5.65  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 8.353  
 C/A sky separation (km) : 54884.8  
 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	2047-06-08T17:30:12.459		56.08	-43.61	140461.00	-10.26		
A (OER)	I	2047-06-08T17:36:26.410		54.83	-42.34	136774.40	-9.44		
Encke (OEG)	I	2047-06-08T17:42:01.163		53.71	-41.20	133744.89	-8.65		
Encke (IEG)	I	2047-06-08T17:42:38.538		53.58	-41.07	133423.31	-8.56		
A (IER)	I	2047-06-08T18:14:38.294		47.07	-34.55	122050.38	-3.05		
Saturn	I	2047-06-08T18:31:52.051		43.55	-31.05	59414.72		51.53	56.78
Saturn	E	2047-06-08T19:10:30.267		35.63	-23.27	59233.53		59.78	64.31
A (IER)	E	2047-06-08T18:45:46.414	b	40.69	-28.24	122050.38	3.04		
Encke (IEG)	E	2047-06-08T19:17:59.241		34.10	-21.78	133423.31	8.49		
Encke (OEG)	E	2047-06-08T19:18:36.935		33.97	-21.66	133744.89	8.58		
A (OER)	E	2047-06-08T19:24:14.602		32.82	-20.54	136774.40	9.36		
F ring	E	2047-06-08T19:30:31.948		31.54	-19.30	140461.00	10.17		