

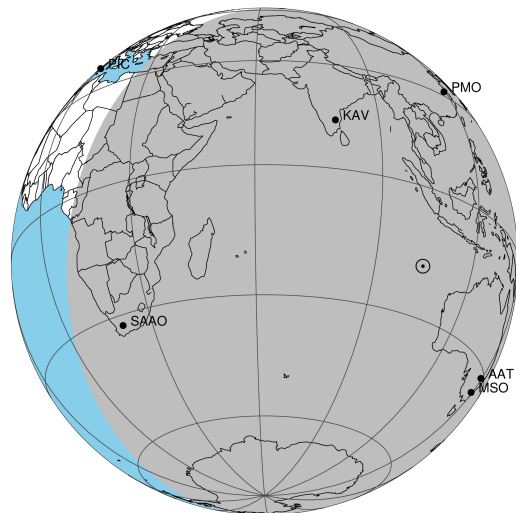
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-30T17:12:54.240
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4070419843056128000
 2Mass ID (if available) : 17520338-2225285

Saturn 2047-07-30T17:12:54 K9.67 G13.23 PgtRgt

ICRS Star Coord at Epoch: 17h 52m 03.36878s -22:25:28.88450s

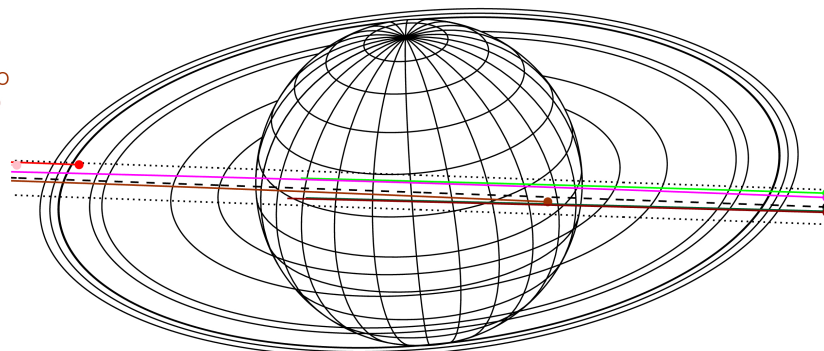
RUWE (>1.4 is poor) : 0.90
 K magnitude : 9.669
 G magnitude : 13.235
 RP magnitude : 12.230
 BP magnitude : 14.266
 DUPflag : 0
 Distance (au) : 9.234
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -13.67
 Sun-Target sep (deg) : 141.32
 Sun-Moon sep (deg) : 41.07
 B (ring opening deg) : 26.73
 PA of pole (deg) : 5.36

Saturn 2047-07-30T17:12:54 K9.67 G13.23
 PgtRgt



2047-07-30T17:12:54.2400 at: 17 52 03.3688 s: -22 25 28.885 C/A 0.5477 PA 357.95 deg v_sky -13.67 km/s D 09.23 AU
 Credit: Styled after SORA/Lucky Star

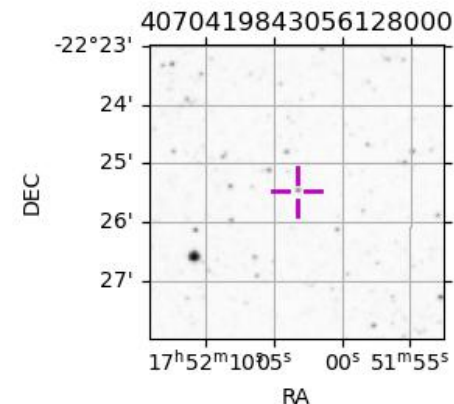
Earth
 PIC
 PMO
 TEN
 KAV
 AAT
 SAAO
 MSO



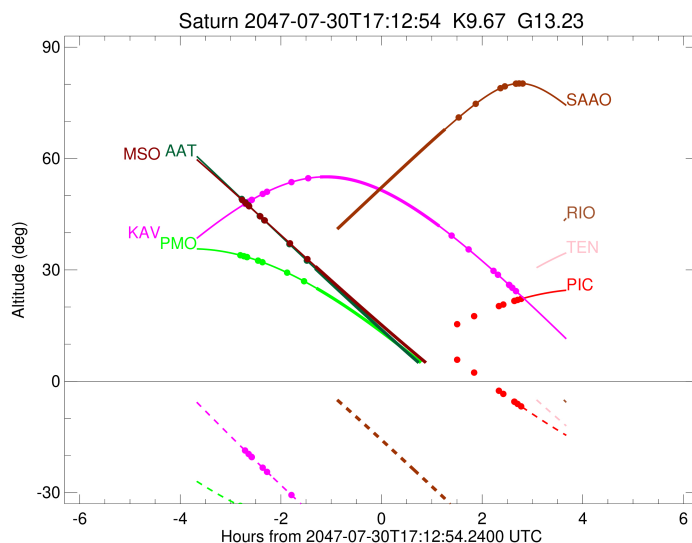
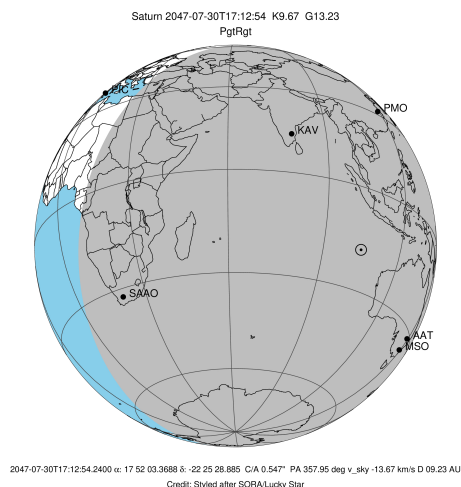
| # | a(km) | ring |
|---|----------|-------------|
| 1 | 74490.6 | C (IER) |
| 2 | 91984.7 | B (IER) |
| 3 | 117571.2 | B (OER) |
| 4 | 122050.4 | A (IER) |
| 5 | 133423.3 | Encke (IEG) |
| 6 | 133744.9 | Encke (OEG) |
| 7 | 136774.4 | A (OER) |
| 8 | 140461.0 | F ring |

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 | | | + | JUL 30 19:51 - JUL 30 19:59 | PnnRne |
| PAL | Palomar Mt (20 | 33.4 | 243.1 | | | | | PnnRnn |
| PMO | Purple Mtn Obs | 32.1 | 118.8 | + | + | | JUL 30 14:24 - JUL 30 15:55 | PinRin |
| 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 | + | + | + | JUL 30 14:30 - JUL 30 19:53 | PieRie |
| RIO | Rio de Janeiro | -22.9 | 316.8 | | | | | PnnRnn |
| ESO | European South | -29.3 | 289.3 | | | | | PnnRnn |
| AAT | Siding Spring | -31.3 | 149.1 | + | + | | JUL 30 14:26 - JUL 30 15:53 | PinRin |
| SAAO | So. Afr. Astro | -32.4 | 20.8 | | + | + | JUL 30 18:28 - JUL 30 20:01 | PneRne |
| MSO | Mt. Stromlo Ob | -35.3 | 149.0 | + | + | + | JUL 30 14:26 - JUL 30 15:54 | PinRin |



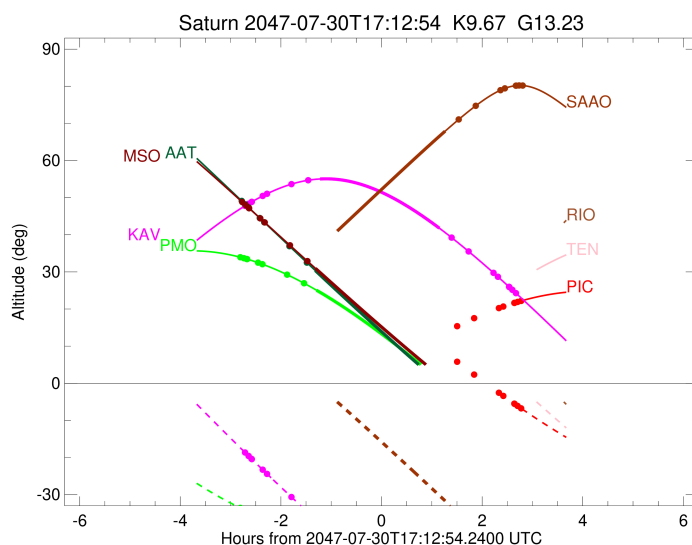
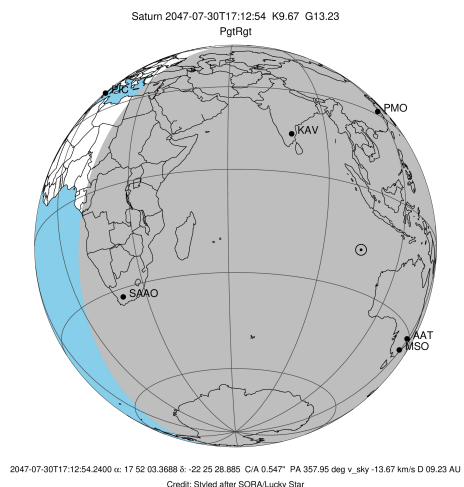
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-30T17:17:37.670
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 4070419843056128000
 2Mass ID (if available) : 17520338-2225285
 ICRS Star Coord at Epoch: 17h 52m 03.36878s -22:25:28.88450s
 RUWE (>1.4 is poor) : 0.90
 K magnitude : 9.669
 G magnitude : 13.235
 RP magnitude : 12.230
 BP magnitude : 14.266
 DUPflag : 0
 Distance (au) : 9.234
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -13.67
 Sun-Target sep (deg) : 141.32
 Sun-Moon sep (deg) : 40.71
 B (ring opening deg) : 26.73
 PA of pole (deg) : 5.36
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.204
 C/A sky separation (km) : 1368.8
 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 | 2047-07-30T14:32:32.852 | | -23.78x | 50.65x | 140461.00 | -14.14 | | |
| A (OER) | I | 2047-07-30T14:36:53.549 | | -22.99x | 49.93x | 136774.40 | -14.14 | | |
| Encke (OEG) | I | 2047-07-30T14:40:27.705 | | -22.35x | 49.34x | 133744.89 | -14.15 | | |
| Encke (IEG) | I | 2047-07-30T14:40:50.433 | | -22.28x | 49.27x | 133423.31 | -14.15 | | |
| A (IER) | I | 2047-07-30T14:54:13.759 | | -19.86x | 47.01x | 122050.38 | -14.17 | | |
| B (OER) | I | 2047-07-30T14:59:29.891 | | -18.92x | 46.10x | 117571.17 | -14.17 | | |
| B (IER) | I | 2047-07-30T15:29:33.078 | | -13.59x | 40.81x | 91984.69 | -14.21 | | |
| C (IER) | I | 2047-07-30T15:50:03.613 | | -10.04x | 37.11x | 74490.58 | -14.23 | | |
| Saturn | I | 2047-07-30T16:04:52.278 | | -7.52x | 34.42x | 60252.60 | | -5.86 | -7.19 |
| Saturn | E | 2047-07-30T18:29:57.834 | | 13.86 | 8.09x | 60238.72 | | 8.10 | 9.91 |
| C (IER) | E | 2047-07-30T18:43:04.552 | | 15.37 | 5.81x | 74490.58 | 14.38 | | |
| B (IER) | E | 2047-07-30T19:03:20.072 | | 17.53 | 2.34x | 91984.69 | 14.40 | | |
| B (OER) | E | 2047-07-30T19:32:56.111 | | 20.25 | -2.56x | 117571.16 | 14.41 | | |
| A (IER) | E | 2047-07-30T19:38:06.889 | | 20.66 | -3.40x | 122050.38 | 14.40 | | |
| Encke (IEG) | E | 2047-07-30T19:51:15.857 | | 21.64 | -5.49 | 133423.31 | 14.42 | | |
| Encke (OEG) | E | 2047-07-30T19:51:38.163 | | 21.66 | -5.55 | 133744.89 | 14.42 | | |
| A (OER) | E | 2047-07-30T19:55:08.307 | | 21.90 | -6.09 | 136774.40 | 14.42 | | |
| F ring | E | 2047-07-30T19:59:24.023 | | 22.18 | -6.75 | 140461.00 | 14.42 | | |

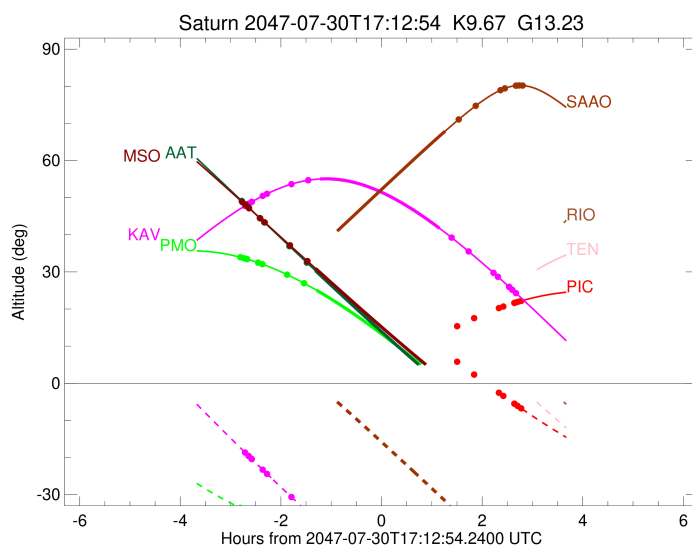
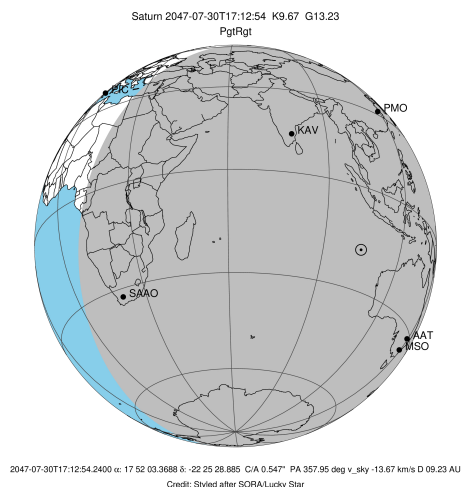
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-30T17:07:17.000
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 4070419843056128000
 2Mass ID (if available) : 17520338-2225285
 ICRS Star Coord at Epoch: 17h 52m 03.36878s -22:25:28.88450s
 RUWE (>1.4 is poor) : 0.90
 K magnitude : 9.669
 G magnitude : 13.235
 RP magnitude : 12.230
 BP magnitude : 14.266
 DUPflag : 0
 Distance (au) : 9.233
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -13.67
 Sun-Target sep (deg) : 141.32
 Sun-Moon sep (deg) : 41.80
 B (ring opening deg) : 26.73
 PA of pole (deg) : 5.36
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.066
 C/A sky separation (km) : 445.0
 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 | 2047-07-30T14:24:35.903 | | 33.95 | -33.58 | 140461.00 | -14.51 | | |
| A (OER) | I | 2047-07-30T14:28:49.969 | | 33.69 | -34.04 | 136774.40 | -14.51 | | |
| Encke (OEG) | I | 2047-07-30T14:32:18.808 | | 33.47 | -34.40 | 133744.89 | -14.50 | | |
| Encke (IEG) | I | 2047-07-30T14:32:40.979 | | 33.44 | -34.43 | 133423.31 | -14.50 | | |
| A (IER) | I | 2047-07-30T14:45:45.475 | | 32.49 | -35.69 | 122050.38 | -14.49 | | |
| B (OER) | I | 2047-07-30T14:50:54.669 | | 32.07 | -36.14 | 117571.16 | -14.48 | | |
| B (IER) | I | 2047-07-30T15:20:23.529 | | 29.25 | -38.25 | 91984.69 | -14.45 | | |
| C (IER) | I | 2047-07-30T15:40:35.874 | | 26.94 | -39.17 | 74490.58 | -14.41 | | |
| Saturn | I | 2047-07-30T15:55:17.100 | | 25.08 | -39.56 | 60253.05 | | -5.78 | -7.09 |
| Saturn | E | 2047-07-30T18:19:53.533 | | 1.29x | -31.02 | 60249.40 | | 6.45 | 7.90 |
| C (IER) | E | 2047-07-30T18:34:27.822 | | -1.48x | -29.12 | 74490.58 | 14.10 | | |
| B (IER) | E | 2047-07-30T18:55:10.056 | | -5.50x | -26.20 | 91984.69 | 14.06 | | |
| B (OER) | E | 2047-07-30T19:25:33.189 | | -11.53x | -21.49 | 117571.16 | 14.01 | | |
| A (IER) | E | 2047-07-30T19:30:53.131 | | -12.60x | -20.62 | 122050.38 | 13.99 | | |
| Encke (IEG) | E | 2047-07-30T19:44:26.530 | | -15.35x | -18.35 | 133423.31 | 13.97 | | |
| Encke (OEG) | E | 2047-07-30T19:44:49.551 | | -15.42x | -18.28 | 133744.89 | 13.97 | | |
| A (OER) | E | 2047-07-30T19:48:26.489 | | -16.16x | -17.67 | 136774.40 | 13.96 | | |
| F ring | E | 2047-07-30T19:52:50.624 | | -17.06x | -16.91 | 140461.00 | 13.95 | | |

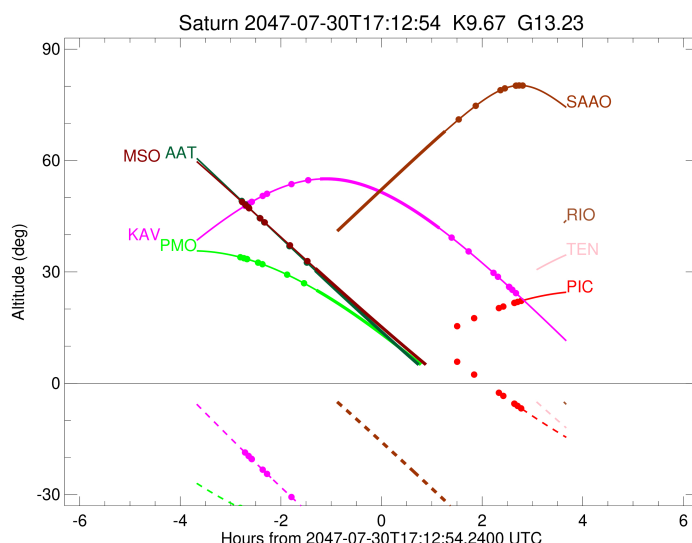
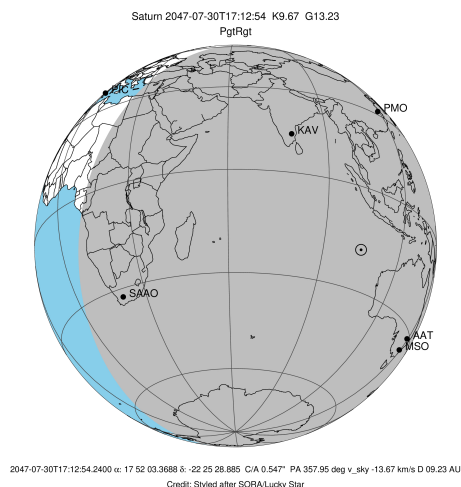
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-30T17:10:37.690
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 4070419843056128000
 2Mass ID (if available) : 17520338-2225285
 ICRS Star Coord at Epoch: 17h 52m 03.36878s -22:25:28.88450s
 RUWE (>1.4 is poor) : 0.90
 K magnitude : 9.669
 G magnitude : 13.235
 RP magnitude : 12.230
 BP magnitude : 14.266
 DUPflag : 0
 Distance (au) : 9.234
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -13.67
 Sun-Target sep (deg) : 141.32
 Sun-Moon sep (deg) : 41.84
 B (ring opening deg) : 26.73
 PA of pole (deg) : 5.36
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.027
 C/A sky separation (km) : 177.6
 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

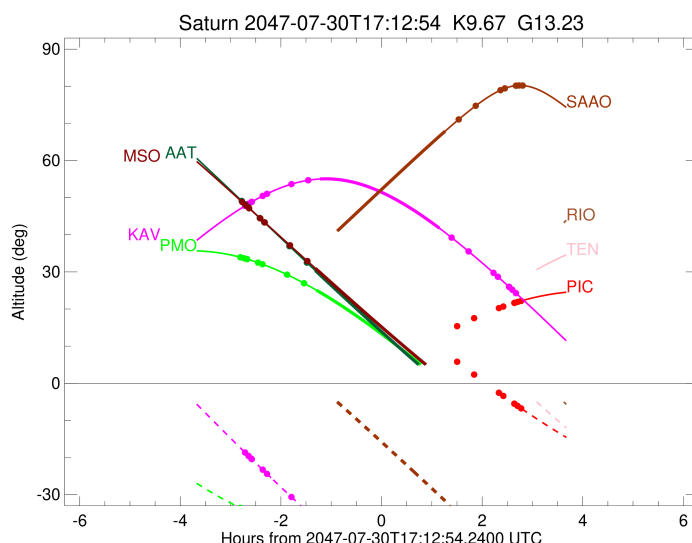
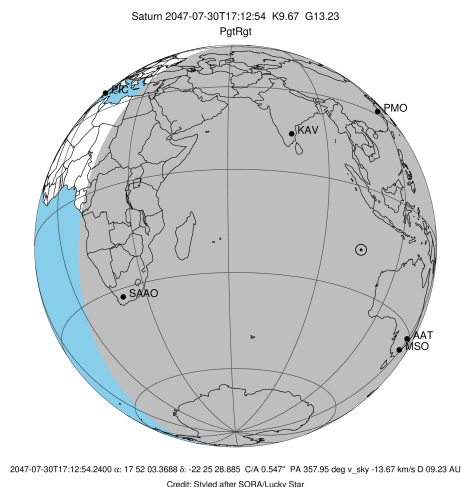
| Ring | I/E | UTC | b? | alt | alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|-------------|-----|-------------------------|----|-------|---------|-----------|--------|---------|--------------|
| F ring | I | 2047-07-30T14:30:14.664 | | 47.80 | -18.67 | 140461.00 | -14.60 | | |
| A (OER) | I | 2047-07-30T14:34:27.124 | | 48.38 | -19.60 | 136774.40 | -14.60 | | |
| Encke (OEG) | I | 2047-07-30T14:37:54.576 | | 48.83 | -20.36 | 133744.89 | -14.60 | | |
| Encke (IEG) | I | 2047-07-30T14:38:16.596 | | 48.88 | -20.44 | 133423.31 | -14.60 | | |
| A (IER) | I | 2047-07-30T14:51:15.332 | | 50.47 | -23.29 | 122050.38 | -14.60 | | |
| B (OER) | I | 2047-07-30T14:56:22.029 | | 51.04 | -24.41 | 117571.16 | -14.60 | | |
| B (IER) | I | 2047-07-30T15:25:34.198 | | 53.65 | -30.66 | 91984.69 | -14.60 | | |
| C (IER) | I | 2047-07-30T15:45:32.822 | | 54.69 | -34.80 | 74490.58 | -14.59 | | |
| Saturn | I | 2047-07-30T15:59:32.744 | | 55.03 | -37.63 | 60248.53 | | -6.59 | -8.08 |
| Saturn | E | 2047-07-30T18:21:59.847 | | 41.76 | -58.31 | 60251.23 | | 6.12 | 7.50 |
| C (IER) | E | 2047-07-30T18:36:28.659 | | 39.25 | -58.92 | 74490.58 | 14.40 | | |
| B (IER) | E | 2047-07-30T18:56:45.127 | | 35.53 | -59.10 | 91984.69 | 14.36 | | |
| B (OER) | E | 2047-07-30T19:26:29.856 | | 29.74 | -57.93 | 117571.16 | 14.31 | | |
| A (IER) | E | 2047-07-30T19:31:43.025 | | 28.69 | -57.55 | 122050.38 | 14.30 | | |
| Encke (IEG) | E | 2047-07-30T19:44:59.203 | | 25.99 | -56.40 | 133423.31 | 14.27 | | |
| Encke (OEG) | E | 2047-07-30T19:45:21.737 | | 25.91 | -56.36 | 133744.89 | 14.27 | | |
| A (OER) | E | 2047-07-30T19:48:54.088 | | 25.18 | -56.01 | 136774.40 | 14.26 | | |
| F ring | E | 2047-07-30T19:53:12.643 | | 24.29 | -55.55 | 140461.00 | 14.25 | | |

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-30T17:06:19.890
 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 : 4070419843056128000
 2Mass ID (if available) : 17520338-2225285
 ICRS Star Coord at Epoch: 17h 52m 03.36878s -22:25:28.88450s
 RUWE (>1.4 is poor) : 0.90
 K magnitude : 9.669
 G magnitude : 13.235
 RP magnitude : 12.230
 BP magnitude : 14.266
 DUPflag : 0
 Distance (au) : 9.233
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -13.67
 Sun-Target sep (deg) : 141.32
 Sun-Moon sep (deg) : 41.81
 B (ring opening deg) : 26.73
 PA of pole (deg) : 5.36
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.008
 C/A sky separation (km) : 6750.6
 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



| Ring | I/E | UTC | b? | alt | alt-sun | radius | r-dot | lat-geo | lat-geodetic |
|-------------|-----|-------------------------|----|---------|---------|-----------|--------|---------|--------------|
| F ring | I | 2047-07-30T14:26:18.203 | | 49.10 | -76.80 | 140461.00 | -14.30 | | |
| A (OER) | I | 2047-07-30T14:30:36.064 | | 48.18 | -76.50 | 136774.40 | -14.29 | | |
| Encke (OEG) | I | 2047-07-30T14:34:08.128 | | 47.42 | -76.20 | 133744.89 | -14.28 | | |
| Encke (IEG) | I | 2047-07-30T14:34:30.646 | | 47.34 | -76.17 | 133423.31 | -14.28 | | |
| A (IER) | I | 2047-07-30T14:47:48.204 | | 44.49 | -74.72 | 122050.38 | -14.24 | | |
| B (OER) | I | 2047-07-30T14:53:02.977 | | 43.36 | -74.02 | 117571.16 | -14.22 | | |
| B (IER) | I | 2047-07-30T15:23:09.795 | | 36.92 | -69.18 | 91984.69 | -14.09 | | |
| C (IER) | I | 2047-07-30T15:43:56.932 | | 32.49 | -65.29 | 74490.58 | -13.94 | | |
| Saturn | I | 2047-07-30T15:53:55.099 | | 30.38 | -63.34 | 60206.71 | | -11.76 | -14.34 |
| Saturn | E | 2047-07-30T18:19:34.389 | | 0.65x | -32.68 | 60267.96 | | 0.29 | 0.36 |
| C (IER) | E | 2047-07-30T18:36:59.638 | | -2.67x | -28.96 | 74490.58 | 13.62 | | |
| B (IER) | E | 2047-07-30T18:58:21.167 | | -6.65x | -24.41 | 91984.69 | 13.68 | | |
| B (OER) | E | 2047-07-30T19:29:30.408 | | -12.22x | -17.83 | 117571.16 | 13.69 | | |
| A (IER) | E | 2047-07-30T19:34:57.521 | | -13.17x | -16.68 | 122050.38 | 13.69 | | |
| Encke (IEG) | E | 2047-07-30T19:48:48.216 | | -15.51x | -13.79 | 133423.31 | 13.69 | | |
| Encke (OEG) | E | 2047-07-30T19:49:11.709 | | -15.58x | -13.71 | 133744.89 | 13.69 | | |
| A (OER) | E | 2047-07-30T19:52:53.046 | | -16.19x | -12.94 | 136774.40 | 13.69 | | |
| F ring | E | 2047-07-30T19:57:22.428 | | -16.93x | -12.01 | 140461.00 | 13.68 | | |

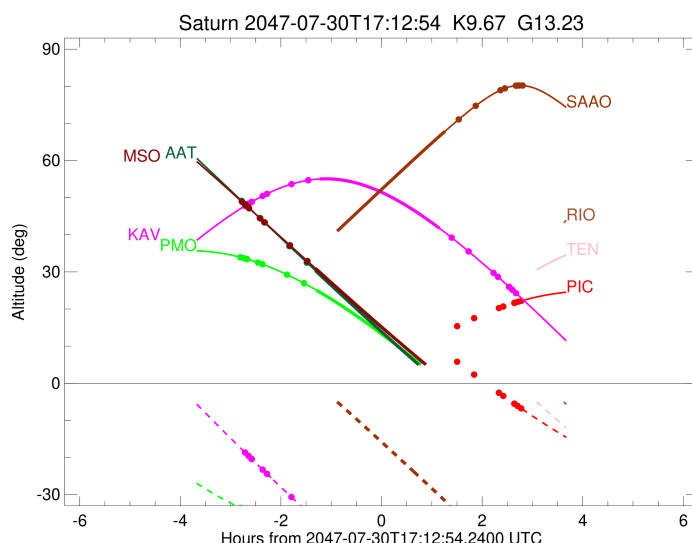
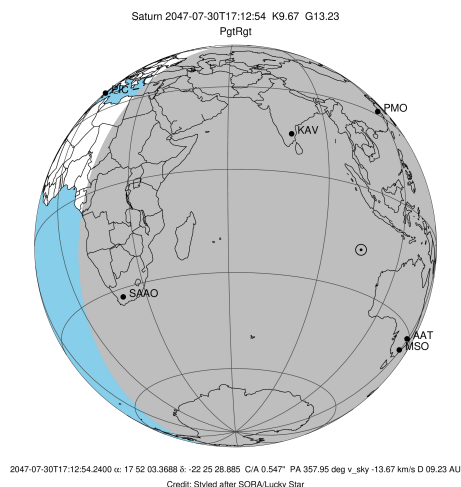
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-30T17:17:16.180
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : SAAO
 Location : So. Afr. Astro. Obs. (Sutherland)
 Latitude (deg) : -32.37953
 E. Longitude (deg) : 20.81070
 Altitude (km) : 1.768
 Gaia source ID : 4070419843056128000
 2Mass ID (if available) : 17520338-2225285
 ICRS Star Coord at Epoch: 17h 52m 03.36878s -22:25:28.88450s
 RUWE (>1.4 is poor) : 0.90
 K magnitude : 9.669
 G magnitude : 13.235
 RP magnitude : 12.230
 BP magnitude : 14.266
 DUPflag : 0
 Distance (au) : 9.234
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -13.67
 Sun-Target sep (deg) : 141.32
 Sun-Moon sep (deg) : 41.15
 B (ring opening deg) : 26.73
 PA of pole (deg) : 5.36
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.760
 C/A sky separation (km) : 5086.9
 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 | 2047-07-30T14:38:11.493 | | 19.67 | 14.36x | 140461.00 | -14.25 | | |
| A (OER) | I | 2047-07-30T14:42:30.094 | | 20.56 | 13.59x | 136774.40 | -14.26 | | |
| Encke (OEG) | I | 2047-07-30T14:46:02.554 | | 21.29 | 12.96x | 133744.89 | -14.26 | | |
| Encke (IEG) | I | 2047-07-30T14:46:25.103 | | 21.37 | 12.89x | 133423.31 | -14.26 | | |
| A (IER) | I | 2047-07-30T14:59:42.331 | | 24.11 | 10.48x | 122050.38 | -14.27 | | |
| B (OER) | I | 2047-07-30T15:04:56.200 | | 25.20 | 9.52x | 117571.16 | -14.27 | | |
| B (IER) | I | 2047-07-30T15:34:48.774 | | 31.44 | 3.88x | 91984.69 | -14.27 | | |
| C (IER) | I | 2047-07-30T15:55:15.906 | | 35.75 | -0.10x | 74490.58 | -14.24 | | |
| Saturn | I | 2047-07-30T16:05:32.021 | | 37.91 | -2.12x | 60211.56 | | -11.28 | -13.76 |
| Saturn | E | 2047-07-30T18:28:45.109 | | 67.91 | -31.67 | 60265.18 | | 2.51 | 3.08 |
| C (IER) | E | 2047-07-30T18:44:56.851 | | 71.06 | -35.09 | 74490.58 | 14.34 | | |
| B (IER) | E | 2047-07-30T19:05:14.193 | | 74.74 | -39.38 | 91984.69 | 14.39 | | |
| B (OER) | E | 2047-07-30T19:34:49.219 | | 78.95 | -45.62 | 117571.16 | 14.43 | | |
| A (IER) | E | 2047-07-30T19:39:59.636 | | 79.44 | -46.71 | 122050.38 | 14.43 | | |
| Encke (IEG) | E | 2047-07-30T19:53:07.613 | | 80.17 | -49.46 | 133423.31 | 14.43 | | |
| Encke (OEG) | E | 2047-07-30T19:53:29.891 | | 80.18 | -49.53 | 133744.89 | 14.43 | | |
| A (OER) | E | 2047-07-30T19:56:59.767 | | 80.22 | -50.26 | 136774.40 | 14.43 | | |
| F ring | E | 2047-07-30T20:01:15.160 | | 80.20 | -51.15 | 140461.00 | 14.44 | | |

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-30T17:06:38.870
 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 : 4070419843056128000
 2Mass ID (if available) : 17520338-2225285
 ICRS Star Coord at Epoch: 17h 52m 03.36878s -22:25:28.88450s
 RUWE (>1.4 is poor) : 0.90
 K magnitude : 9.669
 G magnitude : 13.235
 RP magnitude : 12.230
 BP magnitude : 14.266
 DUPflag : 0
 Distance (au) : 9.233
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -13.67
 Sun-Target sep (deg) : 141.32
 Sun-Moon sep (deg) : 41.79
 B (ring opening deg) : 26.73
 PA of pole (deg) : 5.36
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.059
 C/A sky separation (km) : 7095.2
 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 | 2047-07-30T14:26:51.195 | | 48.81 | -72.89 | 140461.00 | -14.28 | | |
| A (OER) | I | 2047-07-30T14:31:09.404 | | 47.93 | -72.66 | 136774.40 | -14.27 | | |
| Encke (OEG) | I | 2047-07-30T14:34:41.756 | | 47.21 | -72.43 | 133744.89 | -14.26 | | |
| Encke (IEG) | I | 2047-07-30T14:35:04.305 | | 47.13 | -72.41 | 133423.31 | -14.26 | | |
| A (IER) | I | 2047-07-30T14:48:22.979 | | 44.41 | -71.27 | 122050.38 | -14.22 | | |
| B (OER) | I | 2047-07-30T14:53:38.209 | | 43.33 | -70.72 | 117571.16 | -14.20 | | |
| B (IER) | I | 2047-07-30T15:23:47.983 | | 37.15 | -66.67 | 91984.69 | -14.07 | | |
| C (IER) | I | 2047-07-30T15:44:37.798 | | 32.89 | -63.25 | 74490.58 | -13.92 | | |
| Saturn | I | 2047-07-30T15:54:15.852 | | 30.93 | -61.56 | 60203.41 | | -12.08 | -14.72 |
| Saturn | E | 2047-07-30T18:19:49.996 | | 2.41x | -32.78 | 60268.00 | | 0.02 | 0.03 |
| C (IER) | E | 2047-07-30T18:37:17.711 | | -0.77x | -29.21 | 74490.58 | 13.60 | | |
| B (IER) | E | 2047-07-30T18:58:40.536 | | -4.57x | -24.85 | 91984.69 | 13.67 | | |
| B (OER) | E | 2047-07-30T19:29:50.249 | | -9.86x | -18.54 | 117571.16 | 13.69 | | |
| A (IER) | E | 2047-07-30T19:35:17.331 | | -10.75x | -17.44 | 122050.38 | 13.69 | | |
| Encke (IEG) | E | 2047-07-30T19:49:07.830 | | -12.96x | -14.67 | 133423.31 | 13.69 | | |
| Encke (OEG) | E | 2047-07-30T19:49:31.315 | | -13.03x | -14.59 | 133744.89 | 13.69 | | |
| A (OER) | E | 2047-07-30T19:53:12.574 | | -13.60x | -13.85 | 136774.40 | 13.69 | | |
| F ring | E | 2047-07-30T19:57:41.849 | | -14.30x | -12.96 | 140461.00 | 13.69 | | |