

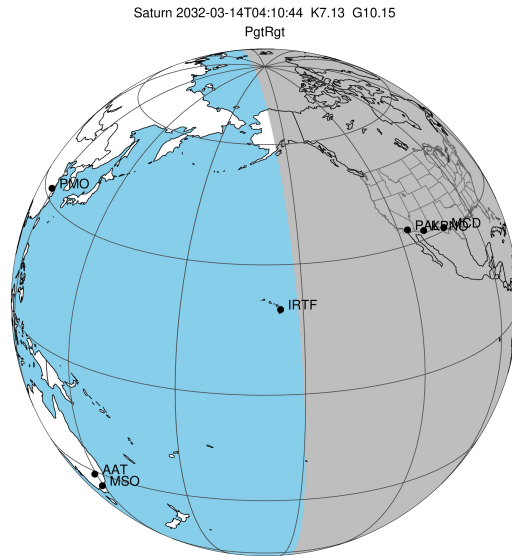
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2032-03-14T04:10:44.160  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3412182058740339712  
 2Mass ID (if available) : 05005702+2127544

Saturn 2032-03-14T04:10:44 K7.13 G10.15 PgtRgt

ICRS Star Coord at Epoch: 05h 00m 57.02047s +21:27:54.29464s

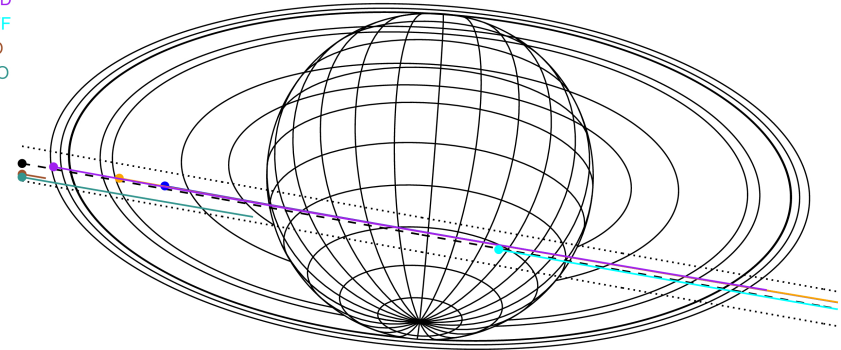
RUWE (>1.4 is poor) : 1.03  
 K magnitude : 7.132  
 G magnitude : 10.149  
 RP magnitude : 9.274  
 BP magnitude : 10.950  
 DUPflag : 0  
 Distance (au) : 9.096  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 13.54  
 Sun-Target sep (deg) : 82.58  
 Sun-Moon sep (deg) : 49.01  
 B (ring opening deg) : -26.76  
 PA of pole (deg) : -4.13

| # | 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      |



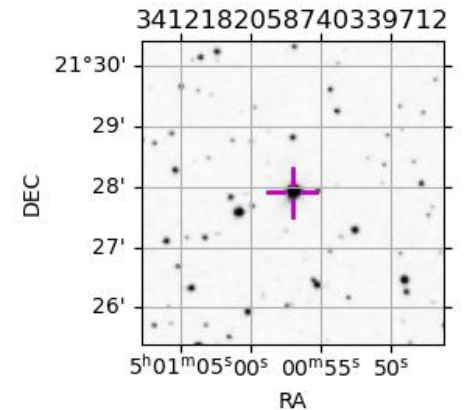
2032-03-14T04:10:44.1600 ex: 05 00 57.0205 s: +21 27 54.295 C/A 3.296° PA 349.89 deg v\_sky +13.54 km/s D 09.10 AU  
 Credit: Styled after SORA/Lucky Star

Earth  
 PAL  
 KPNO  
 MCD  
 IRTF  
 RIO  
 ESO

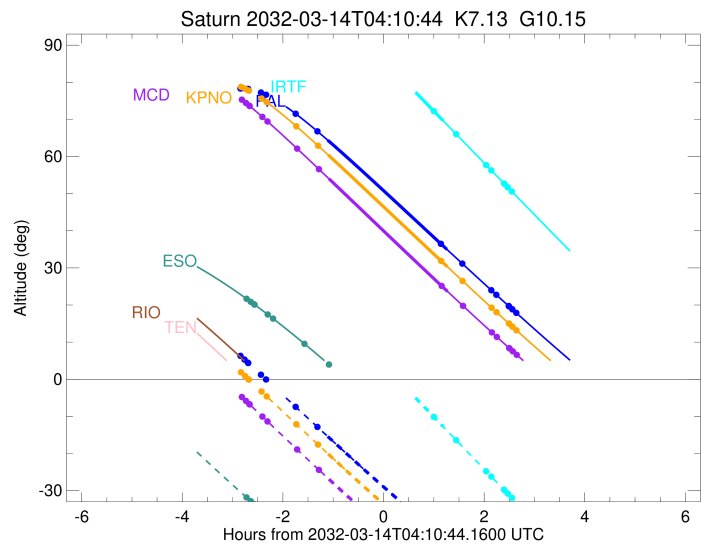
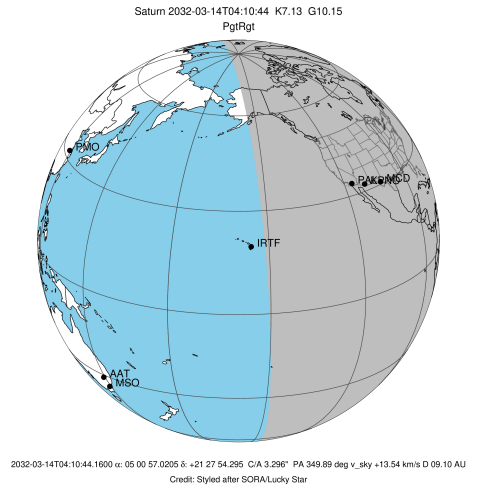


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

| Obs  | Location       | lat   | Elon  | Rings I | Planet | Rings E | Observed Events Interval    | OEncode |
|------|----------------|-------|-------|---------|--------|---------|-----------------------------|---------|
| PIC  | Pic du Midi    | 42.9  | 0.1   |         |        |         |                             | PnnRnn  |
| PAL  | Palomar Mt (20 | 33.4  | 243.1 | ++      | ++     | +++++   | MAR 14 02:26 - MAR 14 06:49 | PieRie  |
| PMO  | Purple Mtn Obs | 32.1  | 118.8 |         |        | +++++   | MAR 14 02:26 - MAR 14 06:49 | PnnRnn  |
| KPNO | Kitt Peak Natl | 32.0  | 248.4 | ++      | ++     | +++++   | MAR 14 02:26 - MAR 14 06:49 | PieRie  |
| MCD  | McDonald Obs.  | 30.7  | 256.0 | +++++   | ++     | +++++   | MAR 14 01:26 - MAR 14 06:49 | PieRie  |
| TEN  | Teide Obs./Ten | 28.3  | 343.5 |         |        |         |                             | PnnRnn  |
| IRTF | Mauna Kea/IRTF | 19.8  | 204.5 |         | +      | +++++   | MAR 14 05:22 - MAR 14 06:43 | PneRne  |
| KAV  | Kavalur Observ | 12.6  | 78.8  |         |        |         |                             | PnnRnn  |
| RIO  | Rio de Janeiro | -22.9 | 316.8 |         |        |         |                             | PnnRnn  |
| ESO  | European South | -29.3 | 289.3 | +++++   |        |         | MAR 14 01:27 - MAR 14 02:36 | PnnRin  |
| AAT  | Siding Spring  | -31.3 | 149.1 |         |        |         |                             | PnnRnn  |
| SAAO | So. Afr. Astro | -32.4 | 20.8  |         |        |         |                             | PnnRnn  |
| MSO  | Mt. Stromlo Ob | -35.3 | 149.0 |         |        |         |                             | PnnRnn  |

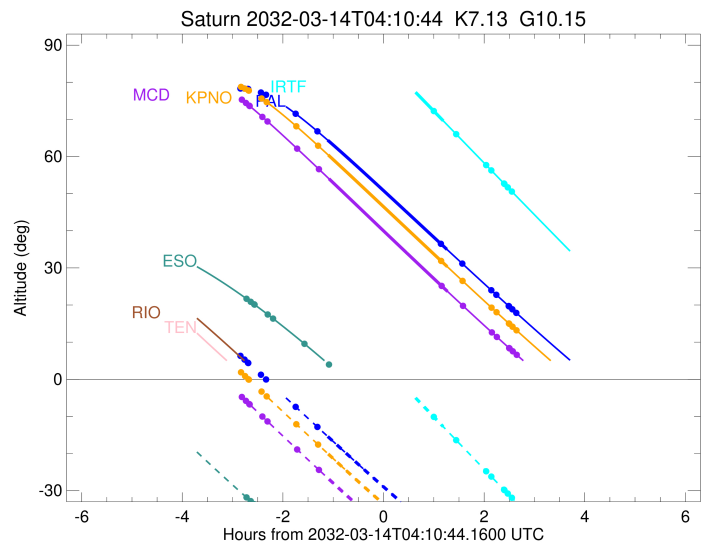
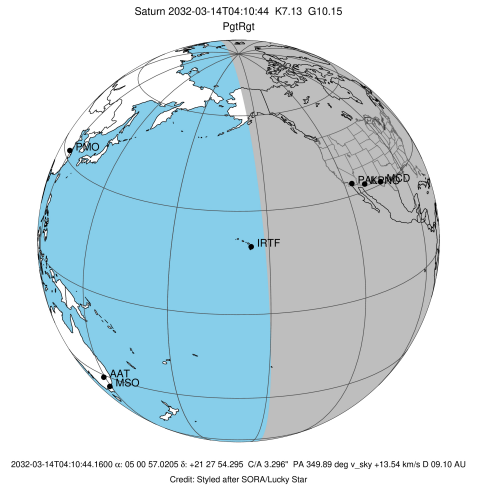


target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2032-03-14T04:15:41.050  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PAL  
 Location : Palomar Mt (200")  
 Latitude (deg) : 33.35622  
 E. Longitude (deg) : 243.13601  
 Altitude (km) : 1.706  
 Gaia source ID : 3412182058740339712  
 2Mass ID (if available) : 05005702+2127544  
 ICRS Star Coord at Epoch: 05h 00m 57.02047s +21:27:54.29464s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 7.132  
 G magnitude : 10.149  
 RP magnitude : 9.274  
 BP magnitude : 10.950  
 DUPflag : 0  
 Distance (au) : 9.096  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 13.54  
 Sun-Target sep (deg) : 82.58  
 Sun-Moon sep (deg) : 49.96  
 B (ring opening deg) : -26.76  
 PA of pole (deg) : -4.13  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 3.119  
 C/A sky separation (km) : 20575.2  
 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\_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   | 2032-03-14T01:20:10.053 |    | 78.33 | 6.30x   | 140461.00 | -12.66 |         |              |
| A (OER)     | I   | 2032-03-14T01:25:01.684 |    | 78.30 | 5.29x   | 136774.40 | -12.62 |         |              |
| Encke (OEG) | I   | 2032-03-14T01:29:02.045 |    | 78.21 | 4.46x   | 133744.89 | -12.59 |         |              |
| Encke (IEG) | I   | 2032-03-14T01:29:27.598 |    | 78.19 | 4.37x   | 133423.31 | -12.58 |         |              |
| A (IER)     | I   | 2032-03-14T01:44:36.871 |    | 77.24 | 1.21x   | 122050.38 | -12.43 |         |              |
| B (OER)     | I   | 2032-03-14T01:50:38.406 |    | 76.65 | -0.05x  | 117571.16 | -12.35 |         |              |
| B (IER)     | I   | 2032-03-14T02:26:01.000 |    | 71.52 | -7.44   | 91984.69  | -11.67 |         |              |
| C (IER)     | I   | 2032-03-14T02:51:58.503 |    | 66.78 | -12.86  | 74490.58  | -10.68 |         |              |
| Saturn      | I   | 2032-03-14T03:04:12.961 |    | 64.40 | -15.40  | 60198.15  |        | -12.56  | -15.29       |
| Saturn      | E   | 2032-03-14T05:26:24.055 |    | 34.98 | -43.24  | 60046.76  |        | -22.81  | -27.25       |
| C (IER)     | E   | 2032-03-14T05:19:11.167 | b  | 36.49 | -41.97  | 74490.58  | 10.81  |         |              |
| B (IER)     | E   | 2032-03-14T05:44:46.681 |    | 31.14 | -46.37  | 91984.69  | 11.87  |         |              |
| B (OER)     | E   | 2032-03-14T06:19:28.189 |    | 23.95 | -51.65  | 117571.16 | 12.63  |         |              |
| A (IER)     | E   | 2032-03-14T06:25:21.569 |    | 22.74 | -52.45  | 122050.38 | 12.72  |         |              |
| Encke (IEG) | E   | 2032-03-14T06:40:08.937 |    | 19.71 | -54.30  | 133423.31 | 12.91  |         |              |
| Encke (OEG) | E   | 2032-03-14T06:40:33.847 |    | 19.63 | -54.35  | 133744.89 | 12.91  |         |              |
| A (OER)     | E   | 2032-03-14T06:44:28.078 |    | 18.83 | -54.79  | 136774.40 | 12.96  |         |              |
| F ring      | E   | 2032-03-14T06:49:12.095 |    | 17.87 | -55.31  | 140461.00 | 13.00  |         |              |

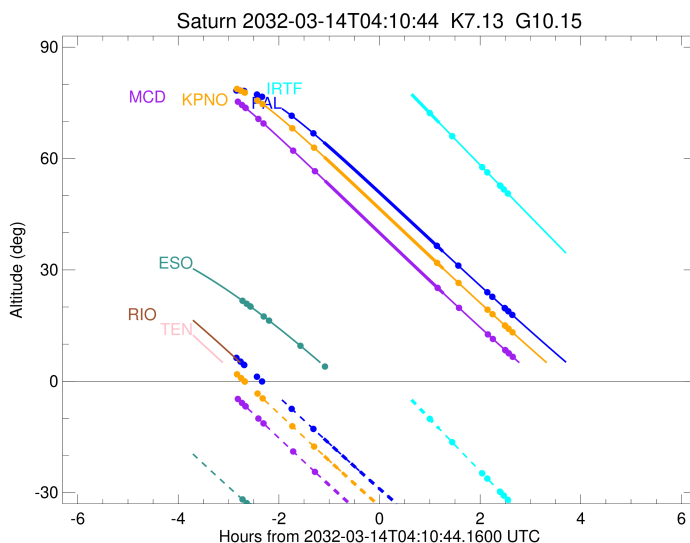
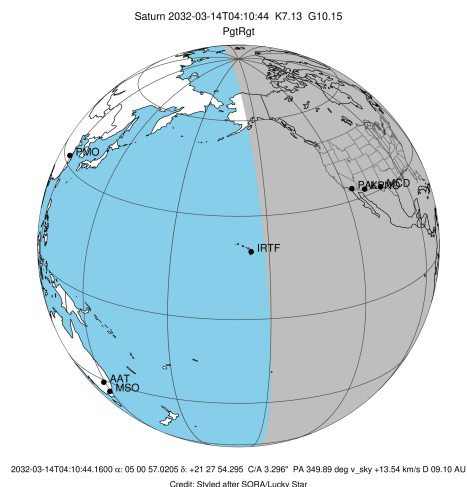
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2032-03-14T04:16:12.450  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : KPNO  
 Location : Kitt Peak Natl Obs  
 Latitude (deg) : 31.96333  
 E. Longitude (deg) : 248.40000  
 Altitude (km) : 2.120  
 Gaia source ID : 3412182058740339712  
 2Mass ID (if available) : 05005702+2127544  
 ICRS Star Coord at Epoch: 05h 00m 57.02047s +21:27:54.29464s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 7.132  
 G magnitude : 10.149  
 RP magnitude : 9.274  
 BP magnitude : 10.950  
 DUPflag : 0  
 Distance (au) : 9.096  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 13.54  
 Sun-Target sep (deg) : 82.58  
 Sun-Moon sep (deg) : 49.96  
 B (ring opening deg) : -26.76  
 PA of pole (deg) : -4.13  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 3.131  
 C/A sky separation (km) : 20653.4  
 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\_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   | 2032-03-14T01:20:51.247 |    | 78.75 | 1.87x   | 140461.00 | -12.64 |         |              |
| A (OER)     | I   | 2032-03-14T01:25:43.310 |    | 78.26 | 0.84x   | 136774.40 | -12.60 |         |              |
| Encke (OEG) | I   | 2032-03-14T01:29:44.020 |    | 77.80 | -0.01x  | 133744.89 | -12.57 |         |              |
| Encke (IEG) | I   | 2032-03-14T01:30:09.610 |    | 77.75 | -0.10x  | 133423.31 | -12.56 |         |              |
| A (IER)     | I   | 2032-03-14T01:45:20.158 |    | 75.63 | -3.33x  | 122050.38 | -12.41 |         |              |
| B (OER)     | I   | 2032-03-14T01:51:22.184 |    | 74.66 | -4.61x  | 117571.16 | -12.33 |         |              |
| B (IER)     | I   | 2032-03-14T02:26:47.706 |    | 68.14 | -12.12  | 91984.69  | -11.66 |         |              |
| C (IER)     | I   | 2032-03-14T02:52:47.995 |    | 62.90 | -17.61  | 74490.58  | -10.66 |         |              |
| Saturn      | I   | 2032-03-14T03:04:51.683 |    | 60.41 | -20.14  | 60196.74  | -12.69 | -15.45  |              |
| Saturn      | E   | 2032-03-14T05:26:45.295 |    | 30.34 | -47.73  | 60046.44  | -22.83 | -27.27  |              |
| C (IER)     | E   | 2032-03-14T05:19:30.095 | b  | 31.87 | -46.49  | 74490.58  | 10.80  |         |              |
| B (IER)     | E   | 2032-03-14T05:45:05.347 |    | 26.48 | -50.69  | 91984.69  | 11.88  |         |              |
| B (OER)     | E   | 2032-03-14T06:19:44.299 |    | 19.26 | -55.52  | 117571.16 | 12.65  |         |              |
| A (IER)     | E   | 2032-03-14T06:25:37.093 |    | 18.05 | -56.22  | 122050.38 | 12.74  |         |              |
| Encke (IEG) | E   | 2032-03-14T06:40:22.851 |    | 15.02 | -57.76  | 133423.31 | 12.93  |         |              |
| Encke (OEG) | E   | 2032-03-14T06:40:47.713 |    | 14.93 | -57.80  | 133744.89 | 12.94  |         |              |
| A (OER)     | E   | 2032-03-14T06:44:41.489 |    | 14.14 | -58.16  | 136774.40 | 12.98  |         |              |
| F ring      | E   | 2032-03-14T06:49:24.940 |    | 13.17 | -58.56  | 140461.00 | 13.03  |         |              |

target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2032-03-14T04:16:52.420  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : MCD  
 Location : McDonald Obs. 2.7m  
 Latitude (deg) : 30.67158  
 E. Longitude (deg) : 255.97844  
 Altitude (km) : 2.075  
 Gaia source ID : 3412182058740339712  
 2Mass ID (if available) : 05005702+2127544  
 ICRS Star Coord at Epoch: 05h 00m 57.02047s +21:27:54.29464s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 7.132  
 G magnitude : 10.149  
 RP magnitude : 9.274  
 BP magnitude : 10.950  
 DUPflag : 0  
 Distance (au) : 9.096  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 13.54  
 Sun-Target sep (deg) : 82.58  
 Sun-Moon sep (deg) : 49.95  
 B (ring opening deg) : -26.76  
 PA of pole (deg) : -4.13  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 3.131  
 C/A sky separation (km) : 20656.2  
 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\_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

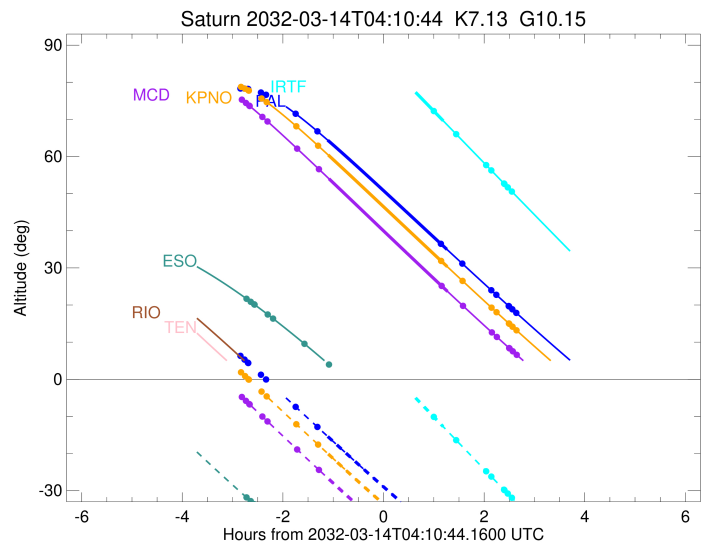
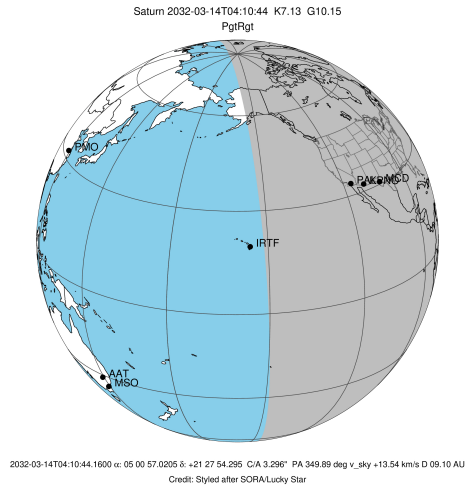


b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

| Ring        | I/E | UTC                     | b? | alt   | alt-sun | radius    | r-dot  | lat-geo | lat-geodetic |
|-------------|-----|-------------------------|----|-------|---------|-----------|--------|---------|--------------|
| F ring      | I   | 2032-03-14T01:21:50.152 |    | 75.31 | -4.78x  | 140461.00 | -12.63 |         |              |
| A (OER)     | I   | 2032-03-14T01:26:42.426 |    | 74.43 | -5.83   | 136774.40 | -12.59 |         |              |
| Encke (OEG) | I   | 2032-03-14T01:30:43.292 |    | 73.68 | -6.69   | 133744.89 | -12.56 |         |              |
| Encke (IEG) | I   | 2032-03-14T01:31:08.898 |    | 73.60 | -6.78   | 133423.31 | -12.56 |         |              |
| A (IER)     | I   | 2032-03-14T01:46:19.873 |    | 70.67 | -10.05  | 122050.38 | -12.40 |         |              |
| B (OER)     | I   | 2032-03-14T01:52:22.002 |    | 69.46 | -11.35  | 117571.16 | -12.33 |         |              |
| B (IER)     | I   | 2032-03-14T02:27:47.399 |    | 62.11 | -18.92  | 91984.69  | -11.66 |         |              |
| C (IER)     | I   | 2032-03-14T02:53:46.914 |    | 56.58 | -24.42  | 74490.58  | -10.67 |         |              |
| Saturn      | I   | 2032-03-14T03:05:41.824 |    | 54.02 | -26.92  | 60195.83  |        | -12.77  | -15.55       |
| Saturn      | E   | 2032-03-14T05:27:11.722 |    | 23.64 | -53.49  | 60047.64  |        | -22.76  | -27.19       |
| C (IER)     | E   | 2032-03-14T05:20:05.895 | b  | 25.14 | -52.41  | 74490.58  | 10.83  |         |              |
| B (IER)     | E   | 2032-03-14T05:45:36.434 |    | 19.76 | -56.09  | 91984.69  | 11.92  |         |              |
| B (OER)     | E   | 2032-03-14T06:20:08.184 |    | 12.59 | -59.84  | 117571.16 | 12.70  |         |              |
| A (IER)     | E   | 2032-03-14T06:25:59.689 |    | 11.39 | -60.30  | 122050.38 | 12.79  |         |              |
| Encke (IEG) | E   | 2032-03-14T06:40:42.145 |    | 8.39  | -61.19  | 133423.31 | 12.98  |         |              |
| Encke (OEG) | E   | 2032-03-14T06:41:06.913 |    | 8.30  | -61.21  | 133744.89 | 12.99  |         |              |
| A (OER)     | E   | 2032-03-14T06:44:59.803 |    | 7.52  | -61.38  | 136774.40 | 13.03  |         |              |
| F ring      | E   | 2032-03-14T06:49:42.173 |    | 6.57  | -61.54  | 140461.00 | 13.08  |         |              |

```

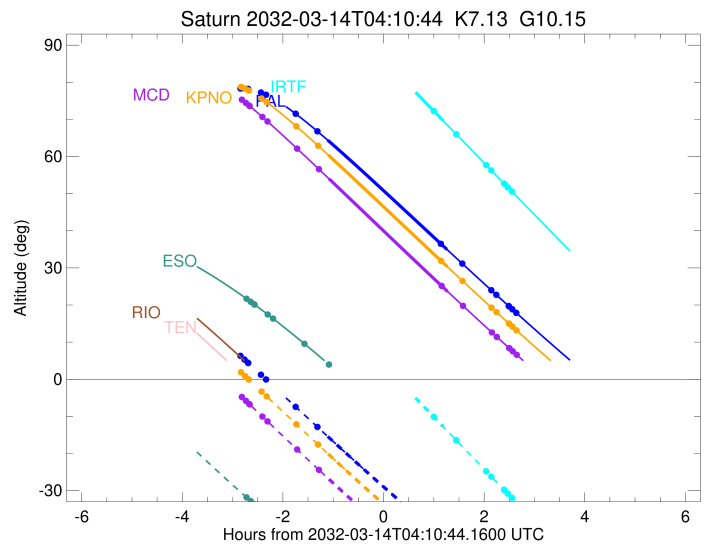
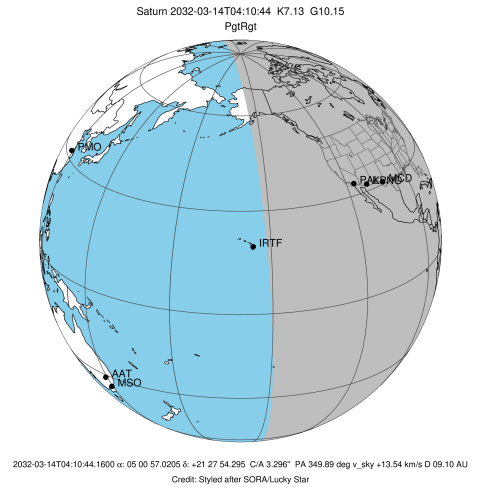
target                : Saturn
target radius (km)   : 60268.00
C/A epoch            : 2032-03-14T04:11:03.520
Event type          : PgtRgt
: Saturn occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code       : IRTF
Location            : Mauna Kea/IRTF
Latitude (deg)      : 19.82622
E. Longitude (deg)  : 204.52800
Altitude (km)       : 4.168
Gaia source ID      : 3412182058740339712
2Mass ID (if available) : 05005702+2127544
ICRS Star Coord at Epoch: 05h 00m 57.02047s +21:27:54.29464s
RUWE (>1.4 is poor) : 1.03
K magnitude          : 7.132
G magnitude          : 10.149
RP magnitude         : 9.274
BP magnitude         : 10.950
DUPflag             : 0
Distance (au)       : 9.096
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : 13.54
Sun-Target sep (deg) : 82.58
Sun-Moon sep (deg)  : 49.80
B (ring opening deg) : -26.76
PA of pole (deg)    : -4.13
Pole direction: RA (deg): 40.60000
Dec (deg): 83.50000
C/A sky separation (") : 3.336
C/A sky separation (km) : 22007.5
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   | 2032-03-14T01:15:24.056 |    | 52.51 | 44.03x  | 140461.00 | -12.68 |         |              |
| A (OER)     | I   | 2032-03-14T01:20:15.449 |    | 53.64 | 42.98x  | 136774.40 | -12.63 |         |              |
| Encke (OEG) | I   | 2032-03-14T01:24:15.818 |    | 54.57 | 42.11x  | 133744.89 | -12.58 |         |              |
| Encke (IEG) | I   | 2032-03-14T01:24:41.383 |    | 54.67 | 42.02x  | 133423.31 | -12.58 |         |              |
| A (IER)     | I   | 2032-03-14T01:39:52.621 |    | 58.21 | 38.69x  | 122050.38 | -12.38 |         |              |
| B (OER)     | I   | 2032-03-14T01:45:55.849 |    | 59.62 | 37.35x  | 117571.16 | -12.28 |         |              |
| B (IER)     | I   | 2032-03-14T02:21:42.746 |    | 67.96 | 29.29x  | 91984.69  | -11.46 |         |              |
| C (IER)     | I   | 2032-03-14T02:48:24.525 |    | 74.18 | 23.17x  | 74490.58  | -10.26 |         |              |
| Saturn      | I   | 2032-03-14T02:59:44.726 |    | 76.82 | 20.55x  | 60188.50  |        | -13.42  | -16.32       |
| Saturn      | E   | 2032-03-14T05:22:00.028 |    | 69.62 | -12.78  | 60014.97  |        | -24.51  | -29.16       |
| C (IER)     | E   | 2032-03-14T05:10:45.165 | b  | 72.25 | -10.13  | 74490.58  | 10.24  |         |              |
| B (IER)     | E   | 2032-03-14T05:37:30.081 |    | 66.01 | -16.42  | 91984.69  | 11.44  |         |              |
| B (OER)     | E   | 2032-03-14T06:13:20.383 |    | 57.66 | -24.82  | 117571.16 | 12.27  |         |              |
| A (IER)     | E   | 2032-03-14T06:19:24.164 |    | 56.25 | -26.24  | 122050.38 | 12.36  |         |              |
| Encke (IEG) | E   | 2032-03-14T06:34:36.767 |    | 52.71 | -29.78  | 133423.31 | 12.56  |         |              |
| Encke (OEG) | E   | 2032-03-14T06:35:02.371 |    | 52.61 | -29.88  | 133744.89 | 12.56  |         |              |
| A (OER)     | E   | 2032-03-14T06:39:03.091 |    | 51.68 | -30.81  | 136774.40 | 12.61  |         |              |
| F ring      | E   | 2032-03-14T06:43:54.905 |    | 50.55 | -31.94  | 140461.00 | 12.66  |         |              |

target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2032-03-14T04:17:13.320  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : ESO  
 Location : European Southern Obs. (3.6m)  
 Latitude (deg) : -29.26097  
 E. Longitude (deg) : 289.26831  
 Altitude (km) : 2.400  
 Gaia source ID : 3412182058740339712  
 2Mass ID (if available) : 05005702+2127544  
 ICRS Star Coord at Epoch: 05h 00m 57.02047s +21:27:54.29464s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 7.132  
 G magnitude : 10.149  
 RP magnitude : 9.274  
 BP magnitude : 10.950  
 DUPflag : 0  
 Distance (au) : 9.096  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 13.54  
 Sun-Target sep (deg) : 82.58  
 Sun-Moon sep (deg) : 49.44  
 B (ring opening deg) : -26.76  
 PA of pole (deg) : -4.13  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 3.871  
 C/A sky separation (km) : 25539.1  
 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



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   | 2032-03-14T01:27:25.967 |    | 21.68   | -31.83  | 140461.00 | -12.30 |         |              |
| A (OER)     | I   | 2032-03-14T01:32:26.327 |    | 20.86   | -32.83  | 136774.40 | -12.25 |         |              |
| Encke (OEG) | I   | 2032-03-14T01:36:34.236 |    | 20.18   | -33.65  | 133744.89 | -12.19 |         |              |
| Encke (IEG) | I   | 2032-03-14T01:37:00.612 |    | 20.11   | -33.74  | 133423.31 | -12.19 |         |              |
| A (IER)     | I   | 2032-03-14T01:52:42.228 |    | 17.44   | -36.80  | 122050.38 | -11.96 |         |              |
| B (OER)     | I   | 2032-03-14T01:58:58.642 |    | 16.35   | -38.00  | 117571.16 | -11.84 |         |              |
| B (IER)     | I   | 2032-03-14T02:36:30.140 |    | 9.54    | -44.81  | 91984.69  | -10.74 |         |              |
| C (IER)     | I   | 2032-03-14T03:05:46.570 |    | 3.95x   | -49.55  | 74490.58  | -8.98  |         |              |
| Saturn      | I   | 2032-03-14T03:09:43.501 |    | 3.18x   | -50.14  | 60134.27  |        | -17.52  | -21.17       |
| Saturn      | E   | 2032-03-14T05:23:46.872 |    | -24.48x | -57.69  | 59965.34  |        | -27.00  | -31.92       |
| C (IER)     | E   | 2032-03-14T05:05:42.336 | b  | -20.63x | -58.43  | 74490.58  | 9.13   |         |              |
| B (IER)     | E   | 2032-03-14T05:34:21.010 |    | -26.75x | -57.01  | 91984.69  | 11.04  |         |              |
| B (OER)     | E   | 2032-03-14T06:10:40.877 |    | -34.61x | -53.40  | 117571.16 | 12.30  |         |              |
| A (IER)     | E   | 2032-03-14T06:16:43.049 |    | -35.92x | -52.63  | 122050.38 | 12.44  |         |              |
| Encke (IEG) | E   | 2032-03-14T06:31:46.383 |    | -39.20x | -50.56  | 133423.31 | 12.73  |         |              |
| Encke (OEG) | E   | 2032-03-14T06:32:11.633 |    | -39.29x | -50.50  | 133744.89 | 12.74  |         |              |
| A (OER)     | E   | 2032-03-14T06:36:08.823 |    | -40.16x | -49.92  | 136774.40 | 12.81  |         |              |
| F ring      | E   | 2032-03-14T06:40:55.863 |    | -41.20x | -49.20  | 140461.00 | 12.88  |         |              |