

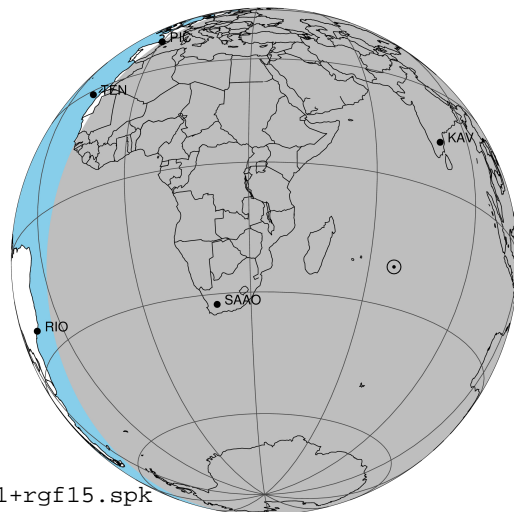
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2043-07-18T19:39:15.410
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116720346420847872
 2Mass ID (if available) : 17371356-2303309

Jupiter 2043-07-18T19:39:15 K8.87 G14.61 Pgt

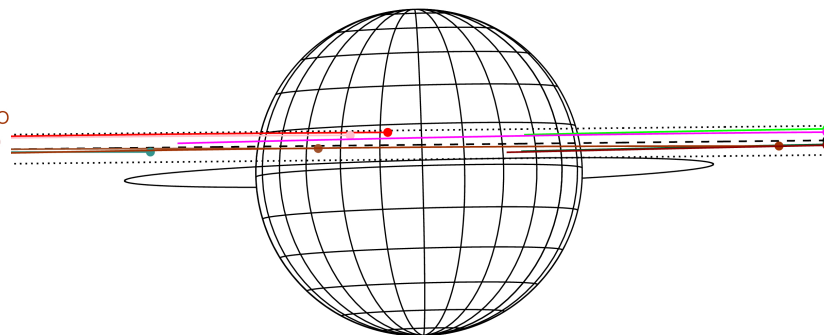
ICRS Star Coord at Epoch: 17h 37m 13.55746s -23°03'30.96052s

RUWE (>1.4 is poor) : 0.88
 K magnitude : 8.869
 G magnitude : 14.606
 RP magnitude : 13.182
 BP magnitude : 17.209
 DUPflag : 0
 Distance (au) : 4.357
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -12.34
 Sun-Target sep (deg) : 149.27
 Sun-Moon sep (deg) : 8.95
 B (ring opening deg) : -2.40
 PA of pole (deg) : 1.62
 Pole direction: RA (deg): 268.05670
 Dec (deg): 64.49732
 C/A sky separation (") : 3.841
 C/A sky separation (km) : 12137.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2043-07-18T19:39:15 K8.87 G14.61
 Pgt



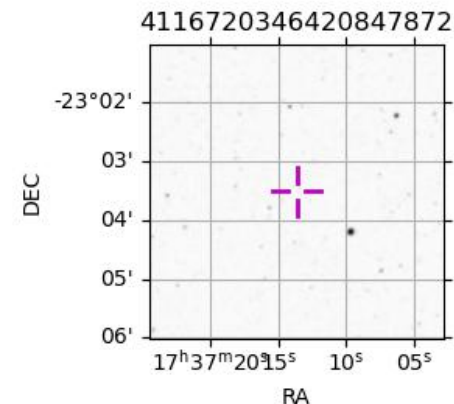
Earth
 PIC
 PMO
 TEN
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



2043-07-18T19:39:15.4100 at: 17 37 13.5575 s: -23 03 30.961 C/A 3.830" PA 180.62 deg v_sky -12.34 km/s D 04.36 AU
 Credit: Styled after SORA/Lucky Star

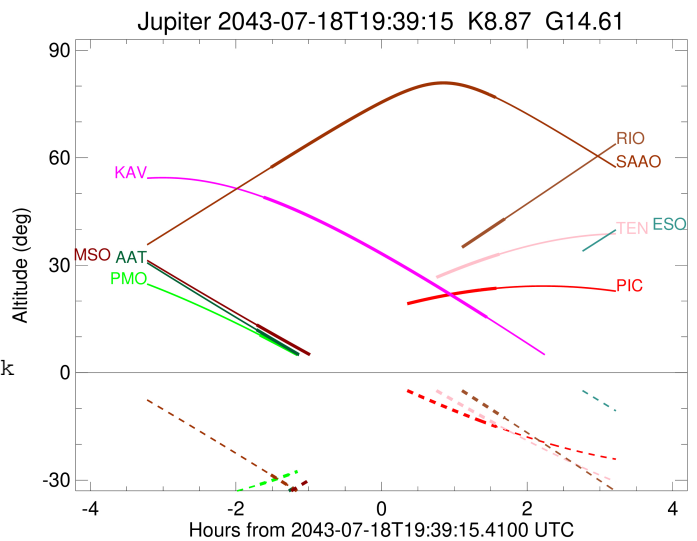
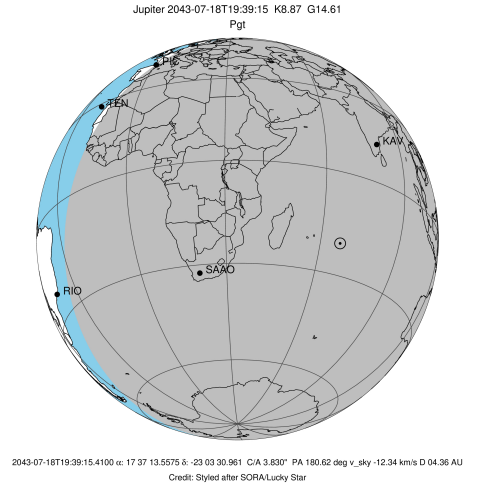
Observable events with sun below -5 deg and altitude above 5 deg

| Obs | Location | lat | Elon | Target | Observed Events Interval | OCode |
|------|-----------------------------------|-------|-------|--------|-----------------------------|-------|
| PIC | Pic du Midi | 42.9 | 0.1 | + | JUL 18 21:13 - JUL 18 21:13 | Pne |
| PAL | Palomar Mt (200") | 33.4 | 243.1 | | | Pnn |
| PMO | Purple Mtn Obs. Nanking | 32.1 | 118.8 | + | JUL 18 17:59 - JUL 18 17:59 | Pin |
| KPNO | Kitt Peak Natl Obs | 32.0 | 248.4 | | | Pnn |
| MCD | McDonald Obs. 2.7m | 30.7 | 256.0 | | | Pnn |
| TEN | Teide Obs./Tenerife | 28.3 | 343.5 | + | JUL 18 21:16 - JUL 18 21:16 | Pne |
| IRTF | Mauna Kea/IRTF | 19.8 | 204.5 | | | Pnn |
| KAV | Kavalur Observatory | 12.6 | 78.8 | + + | JUL 18 18:02 - JUL 18 21:06 | Pie |
| RIO | Rio de Janeiro | -22.9 | 316.8 | + | JUL 18 21:20 - JUL 18 21:20 | Pne |
| ESO | European Southern Obs. (3.6m) | -29.3 | 289.3 | | | Pnn |
| AAT | Siding Spring (AAT) | -31.3 | 149.1 | + | JUL 18 17:56 - JUL 18 17:56 | Pin |
| SAAO | So. Afr. Astro. Obs. (Sutherland) | -32.4 | 20.8 | + + | JUL 18 18:08 - JUL 18 21:13 | Pie |
| MSO | Mt. Stromlo Observatory | -35.3 | 149.0 | + | JUL 18 17:56 - JUL 18 17:56 | Pin |



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-18T19:42:34.370
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : PIC
Location            : Pic du Midi
Latitude (deg)      : 42.93656
E. Longitude (deg)  : 0.14231
Altitude (km)       : 2.890
Gaia source ID      : 4116720346420847872
2Mass ID (if available) : 17371356-2303309
ICRS Star Coord at Epoch: 17h 37m 13.55746s -23:03:30.96052s
RUWE (>1.4 is poor) : 0.88
K magnitude         : 8.869
G magnitude         : 14.606
RP magnitude        : 13.182
BP magnitude        : 17.209
DUPflag            : 0
Distance (au)       : 4.357
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -12.34
Sun-Target sep (deg) : 149.27
Sun-Moon sep (deg)  : 9.16
B (ring opening deg) : -2.40
PA of pole (deg)    : 1.62
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49732
C/A sky separation (" ) : 5.583
C/A sky separation (km) : 17644.8
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

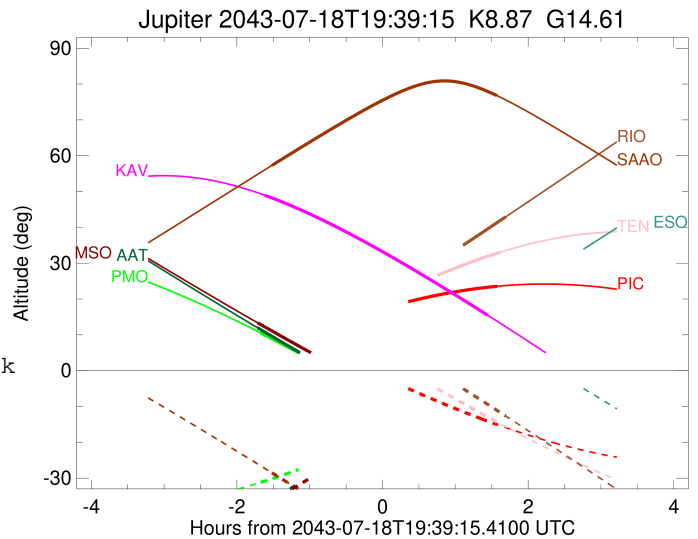
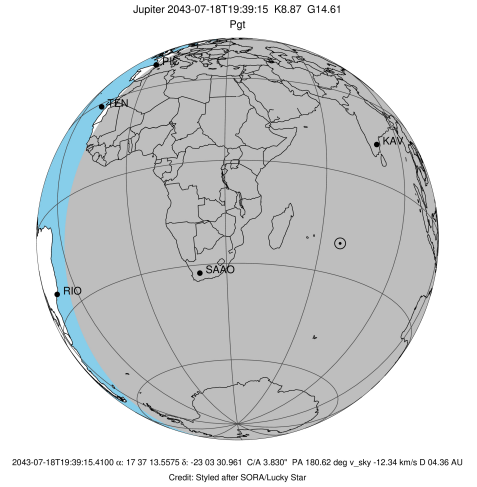


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2043-07-18T18:10:48.653 | 6.60 | 13.13x | 71491.6 | 12.85 | 14.61 |
| Jupiter | E | 2043-07-18T21:13:55.794 | 23.56 | -15.07 | 71491.4 | 15.50 | 17.58 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-18T19:32:17.020
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : PMO
Location             : Purple Mtn Obs. Nanking
Latitude (deg)       : 32.06667
E. Longitude (deg)   : 118.82089
Altitude (km)        : 0.364
Gaia source ID       : 4116720346420847872
2Mass ID (if available) : 17371356-2303309
ICRS Star Coord at Epoch: 17h 37m 13.55746s -23:03:30.96052s
RUWE (>1.4 is poor) : 0.88
K magnitude           : 8.869
G magnitude           : 14.606
RP magnitude          : 13.182
BP magnitude          : 17.209
DUPflag              : 0
Distance (au)         : 4.357
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.34
Sun-Target sep (deg) : 149.27
Sun-Moon sep (deg)   : 9.81
B (ring opening deg) : -2.40
PA of pole (deg)     : 1.62
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49732
C/A sky separation ("): 4.908
C/A sky separation (km): 15510.9
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

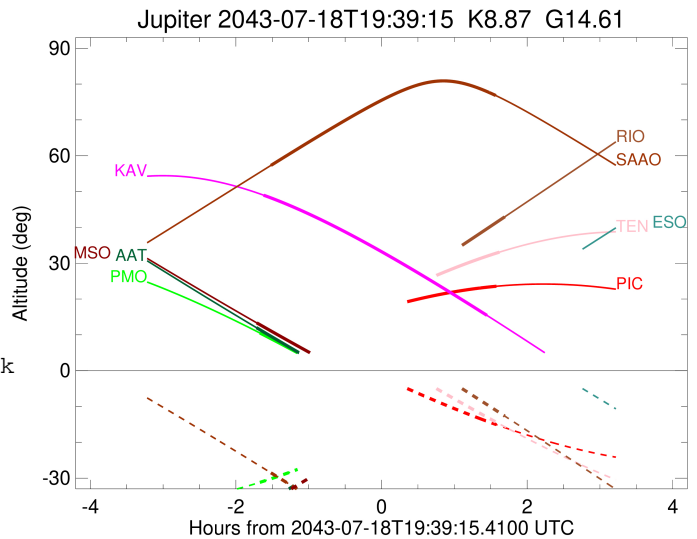
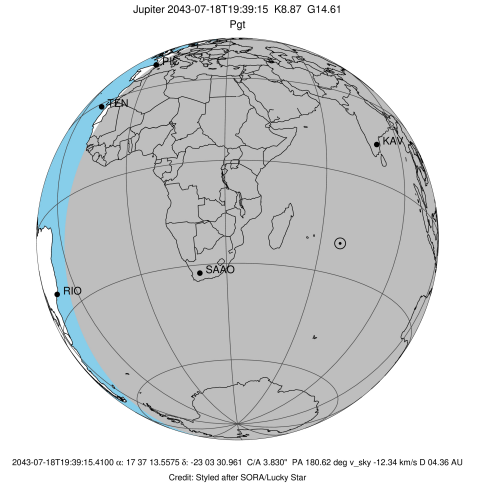


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|---------|---------|---------|---------|--------------|
| Jupiter | I | 2043-07-18T17:59:00.381 | 10.52 | -31.18 | 71491.6 | 12.19 | 13.87 |
| Jupiter | E | 2043-07-18T21:06:52.582 | -25.96x | -1.74x | 71491.6 | 12.80 | 14.56 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-18T19:44:47.190
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : TEN
Location            : Teide Obs./Tenerife
Latitude (deg)      : 28.30050
E. Longitude (deg)  : 343.48909
Altitude (km)       : 2.395
Gaia source ID      : 4116720346420847872
2Mass ID (if available) : 17371356-2303309
ICRS Star Coord at Epoch: 17h 37m 13.55746s -23:03:30.96052s
RUWE (>1.4 is poor) : 0.88
K magnitude          : 8.869
G magnitude          : 14.606
RP magnitude         : 13.182
BP magnitude         : 17.209
DUPflag             : 0
Distance (au)        : 4.357
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.34
Sun-Target sep (deg) : 149.27
Sun-Moon sep (deg)   : 8.85
B (ring opening deg) : -2.40
PA of pole (deg)     : 1.62
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49732
C/A sky separation ("): 5.168
C/A sky separation (km): 16331.5
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

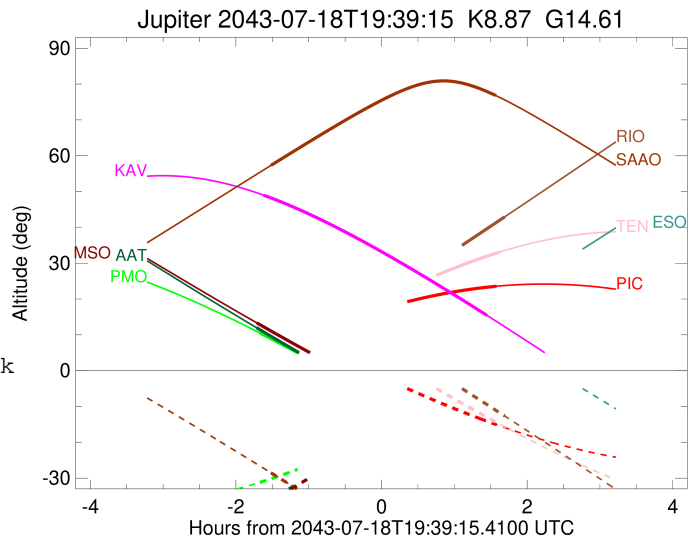
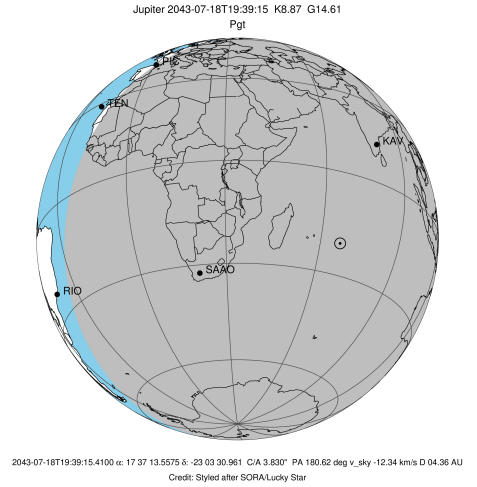


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2043-07-18T18:12:17.935 | 3.84x | 22.42x | 71491.7 | 11.56 | 13.16 |
| Jupiter | E | 2043-07-18T21:16:30.446 | 33.09 | -14.88 | 71491.5 | 14.64 | 16.62 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-18T19:33:39.380
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : KAV
Location             : Kavalur Observatory
Latitude (deg)       : 12.57556
E. Longitude (deg)   : 78.83167
Altitude (km)        : 0.722
Gaia source ID       : 4116720346420847872
2Mass ID (if available) : 17371356-2303309
ICRS Star Coord at Epoch: 17h 37m 13.55746s -23:03:30.96052s
RUWE (>1.4 is poor) : 0.88
K magnitude           : 8.869
G magnitude           : 14.606
RP magnitude          : 13.182
BP magnitude          : 17.209
DUPflag              : 0
Distance (au)        : 4.357
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -12.34
Sun-Target sep (deg) : 149.27
Sun-Moon sep (deg)   : 9.78
B (ring opening deg) : -2.40
PA of pole (deg)     : 1.62
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49732
C/A sky separation ("): 4.808
C/A sky separation (km): 15195.8
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

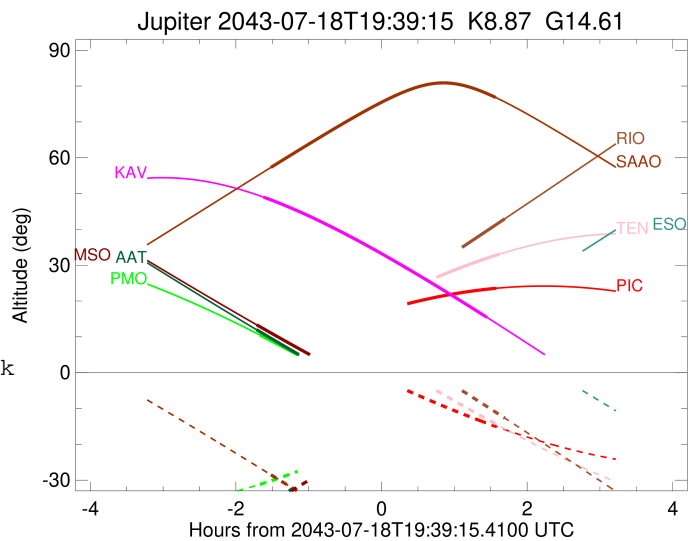
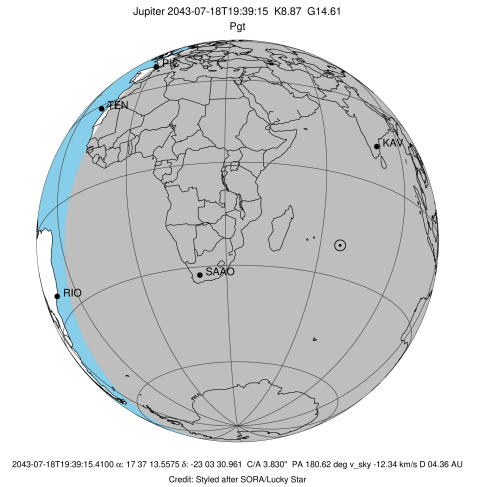


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2043-07-18T18:02:08.522 | 48.98 | -54.49 | 71491.7 | 11.68 | 13.29 |
| Jupiter | E | 2043-07-18T21:06:10.937 | 15.42 | -42.89 | 71491.6 | 12.60 | 14.34 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-18T19:46:43.680
Event type          : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code       : RIO
Location            : Rio de Janeiro
Latitude (deg)      : -22.89506
E. Longitude (deg)  : 316.77708
Altitude (km)       : 0.033
Gaia source ID      : 4116720346420847872
2Mass ID (if available) : 17371356-2303309
ICRS Star Coord at Epoch: 17h 37m 13.55746s -23:03:30.96052s
RUWE (>1.4 is poor) : 0.88
K magnitude          : 8.869
G magnitude          : 14.606
RP magnitude         : 13.182
BP magnitude         : 17.209
DUPflag             : 0
Distance (au)       : 4.357
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.34
Sun-Target sep (deg) : 149.27
Sun-Moon sep (deg)  : 8.19
B (ring opening deg) : -2.40
PA of pole (deg)    : 1.62
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49732
C/A sky separation (" ) : 3.301
C/A sky separation (km) : 10432.4
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

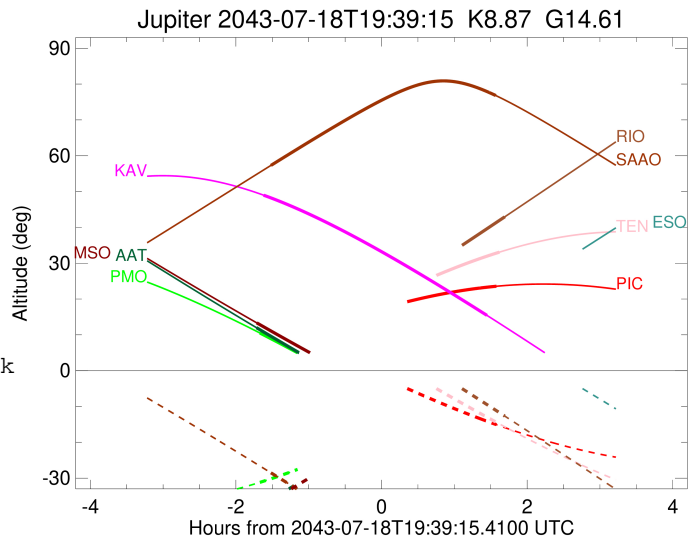
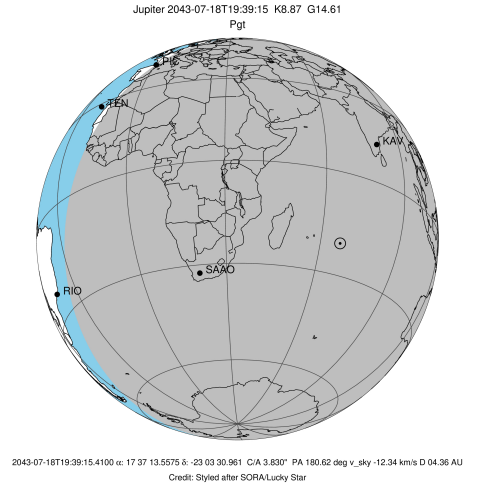


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2043-07-18T18:11:24.867 | 1.20x | 25.93x | 71491.9 | 6.61 | 7.55 |
| Jupiter | E | 2043-07-18T21:20:53.470 | 42.95 | -12.69 | 71491.8 | 10.07 | 11.47 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-18T19:32:36.660
Event type          : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code       : AAT
Location            : Siding Spring (AAT)
Latitude (deg)      : -31.27703
E. Longitude (deg)  : 149.06608
Altitude (km)       : 1.164
Gaia source ID      : 4116720346420847872
2Mass ID (if available) : 17371356-2303309
ICRS Star Coord at Epoch: 17h 37m 13.55746s -23:03:30.96052s
RUWE (>1.4 is poor) : 0.88
K magnitude          : 8.869
G magnitude          : 14.606
RP magnitude         : 13.182
BP magnitude         : 17.209
DUPflag             : 0
Distance (au)       : 4.357
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.34
Sun-Target sep (deg) : 149.27
Sun-Moon sep (deg)   : 9.24
B (ring opening deg) : -2.40
PA of pole (deg)     : 1.62
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49732
C/A sky separation ("): 2.619
C/A sky separation (km): 8277.0
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

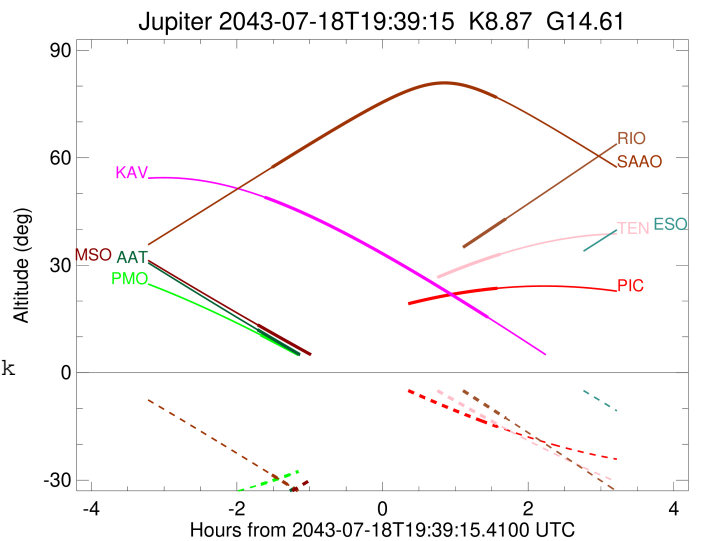
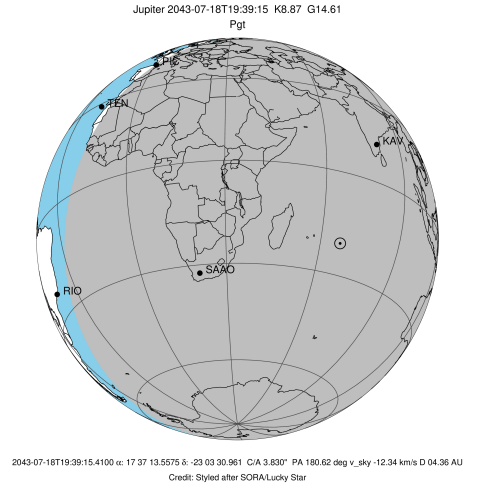


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|---------|---------|---------|---------|--------------|
| Jupiter | I | 2043-07-18T17:56:09.454 | 12.01 | -38.72 | 71491.9 | 6.35 | 7.26 |
| Jupiter | E | 2043-07-18T21:10:24.597 | -22.68x | 1.37x | 71491.9 | 7.04 | 8.04 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-18T19:40:46.460
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
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      : 4116720346420847872
2Mass ID (if available) : 17371356-2303309
ICRS Star Coord at Epoch: 17h 37m 13.55746s -23:03:30.96052s
RUWE (>1.4 is poor) : 0.88
K magnitude          : 8.869
G magnitude          : 14.606
RP magnitude         : 13.182
BP magnitude         : 17.209
DUPflag             : 0
Distance (au)       : 4.357
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -12.34
Sun-Target sep (deg) : 149.27
Sun-Moon sep (deg)  : 8.86
B (ring opening deg) : -2.40
PA of pole (deg)    : 1.62
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49732
C/A sky separation ("): 3.503
C/A sky separation (km): 11070.2
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

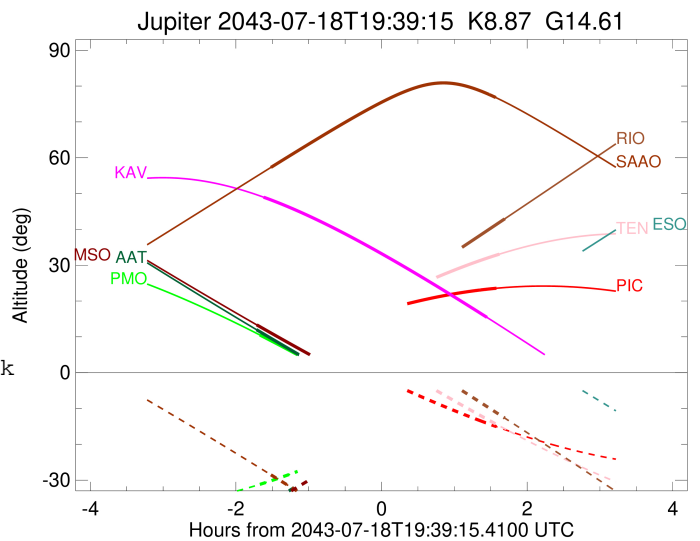
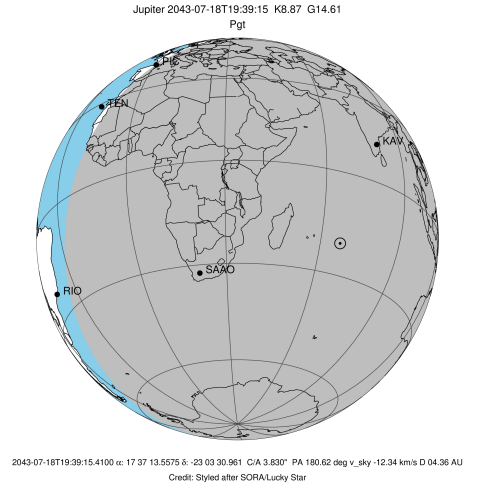


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2043-07-18T18:08:04.103 | 57.28 | -28.49 | 71491.9 | 7.61 | 8.69 |
| Jupiter | E | 2043-07-18T21:13:21.163 | 76.81 | -67.06 | 71491.8 | 9.92 | 11.30 |


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-18T19:32:54.190
Event type          : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code       : MSO
Location            : Mt. Stromlo Observatory
Latitude (deg)      : -35.32000
E. Longitude (deg)  : 149.00833
Altitude (km)       : 0.770
Gaia source ID      : 4116720346420847872
2Mass ID (if available) : 17371356-2303309
ICRS Star Coord at Epoch: 17h 37m 13.55746s -23:03:30.96052s
RUWE (>1.4 is poor) : 0.88
K magnitude          : 8.869
G magnitude          : 14.606
RP magnitude         : 13.182
BP magnitude         : 17.209
DUPflag             : 0
Distance (au)       : 4.357
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.34
Sun-Target sep (deg) : 149.27
Sun-Moon sep (deg)  : 9.20
B (ring opening deg) : -2.40
PA of pole (deg)    : 1.62
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49732
C/A sky separation ("): 2.522
C/A sky separation (km): 7969.5
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```



x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|---------|---------|---------|---------|--------------|
| Jupiter | I | 2043-07-18T17:56:25.671 | 13.35 | -38.81 | 71491.9 | 6.07 | 6.94 |
| Jupiter | E | 2043-07-18T21:10:40.118 | -19.64x | -0.37x | 71491.9 | 6.82 | 7.79 |