

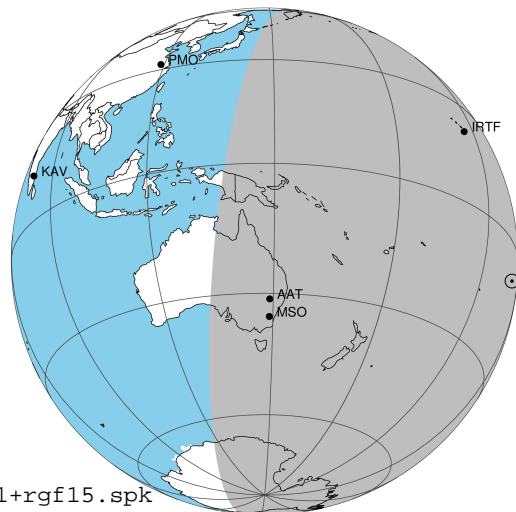
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-08-31T08:46:06.610
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4114552904104665984
 2Mass ID (if available) : 17122821-2243538

Jupiter 2031-08-31T08:46:06 K9.04 G13.62 Pgt

ICRS Star Coord at Epoch: 17h 12m 28.20465s -22:43:53.93236s

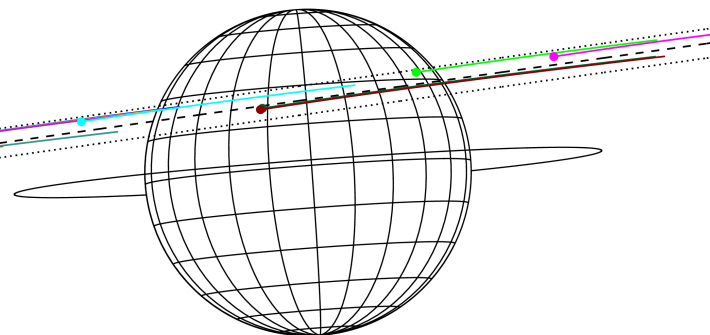
RUWE (>1.4 is poor) : 0.96
 K magnitude : 9.040
 G magnitude : 13.621
 RP magnitude : 12.482
 BP magnitude : 15.017
 DUPflag : 0
 Distance (au) : 4.955
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : 7.00
 Sun-Target sep (deg) : 101.72
 Sun-Moon sep (deg) : 64.15
 B (ring opening deg) : -2.43
 PA of pole (deg) : 4.27
 Pole direction: RA (deg): 268.05685
 Dec (deg): 64.49652
 C/A sky separation (") : 8.813
 C/A sky separation (km) : 31671.5
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-08-31T08:46:06 K9.04 G13.62
 Pgt



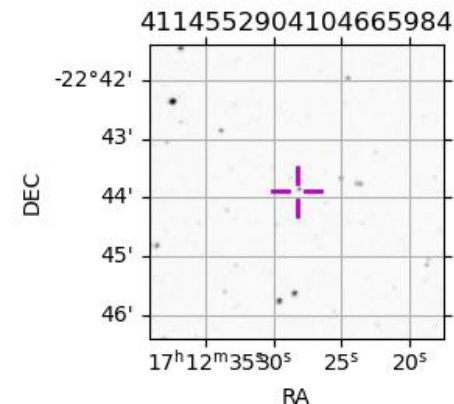
2031-08-31T08:46:06.6100 or: 17 12 28.2046 5: -22 43 53.932 C/A 8.803" PA 188.02 deg v_sky + 7.00 km/s D 04.96 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 KAV
 RIO
 ESO
 AAT
 MSO



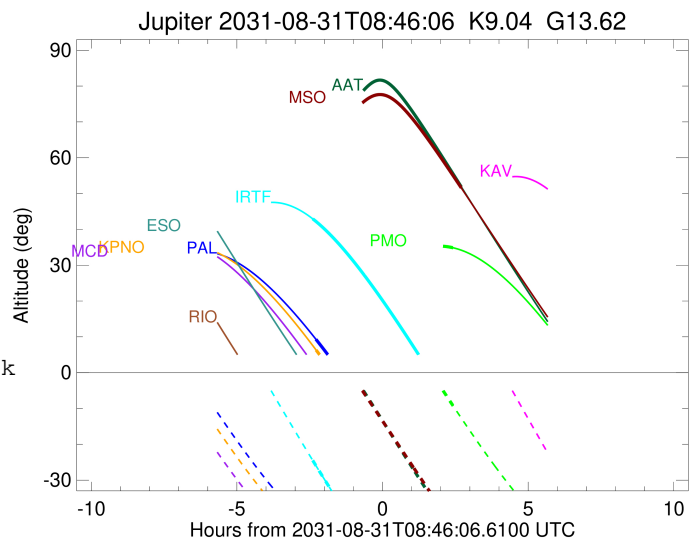
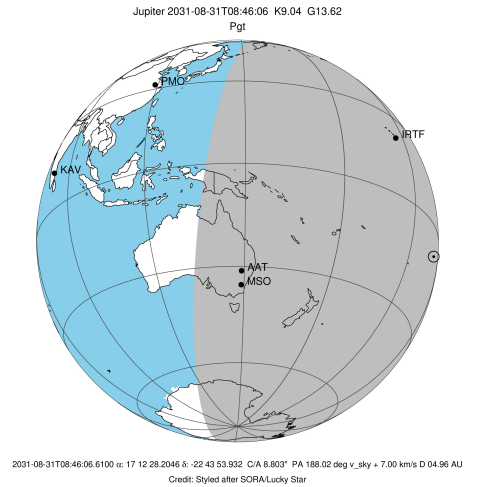
Observable events with sun below -5 deg and altitude above 5 deg

| Obs | Location | lat | Elon | Target | Observed Events Interval | OCode |
|------|-----------------------------------|-------|-------|--------|-----------------------------|-------|
| PIC | Pic du Midi | 42.9 | 0.1 | | | Pnn |
| PAL | Palomar Mt (200") | 33.4 | 243.1 | + | AUG 31 06:28 - AUG 31 06:28 | Pin |
| PMO | Purple Mtn Obs. Nanking | 32.1 | 118.8 | + | AUG 31 11:11 - AUG 31 11:11 | Pne |
| KPNO | Kitt Peak Natl Obs | 32.0 | 248.4 | + | AUG 31 06:29 - AUG 31 06:29 | Pin |
| MCD | McDonald Obs. 2.7m | 30.7 | 256.0 | | | Pnn |
| TEN | Teide Obs./Tenerife | 28.3 | 343.5 | | | Pnn |
| IRTF | Mauna Kea/IRTF | 19.8 | 204.5 | + | AUG 31 06:22 - AUG 31 06:22 | Pin |
| KAV | Kavalur Observatory | 12.6 | 78.8 | | | Pnn |
| RIO | Rio de Janeiro | -22.9 | 316.8 | | | Pnn |
| ESO | European Southern Obs. (3.6m) | -29.3 | 289.3 | | | Pnn |
| AAT | Siding Spring (AAT) | -31.3 | 149.1 | + | AUG 31 11:28 - AUG 31 11:28 | Pne |
| SAAO | So. Afr. Astro. Obs. (Sutherland) | -32.4 | 20.8 | | | Pnn |
| MSO | Mt. Stromlo Observatory | -35.3 | 149.0 | + | AUG 31 11:28 - AUG 31 11:28 | Pne |



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-08-31T08:59:27.660
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : PAL
Location              : Palomar Mt (200")
Latitude (deg)        : 33.35622
E. Longitude (deg)    : 243.13601
Altitude (km)         : 1.706
Gaia source ID        : 4114552904104665984
2Mass ID (if available) : 17122821-2243538
ICRS Star Coord at Epoch: 17h 12m 28.20465s -22:43:53.93236s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 9.040
G magnitude           : 13.621
RP magnitude          : 12.482
BP magnitude          : 15.017
DUPflag              : 0
Distance (au)         : 4.955
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 7.00
Sun-Target sep (deg)  : 101.72
Sun-Moon sep (deg)    : 63.52
B (ring opening deg) : -2.43
PA of pole (deg)      : 4.27
Pole direction: RA (deg): 268.05685
Dec (deg): 64.49652
C/A sky separation (") : 9.815
C/A sky separation (km) : 35273.4
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
    
```

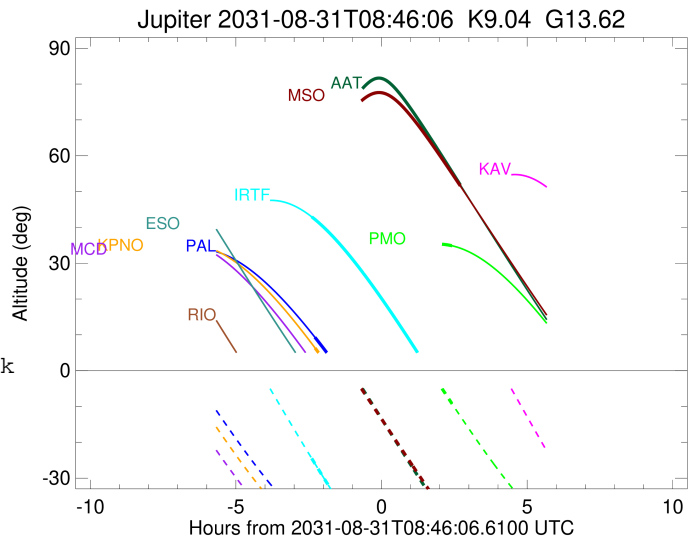
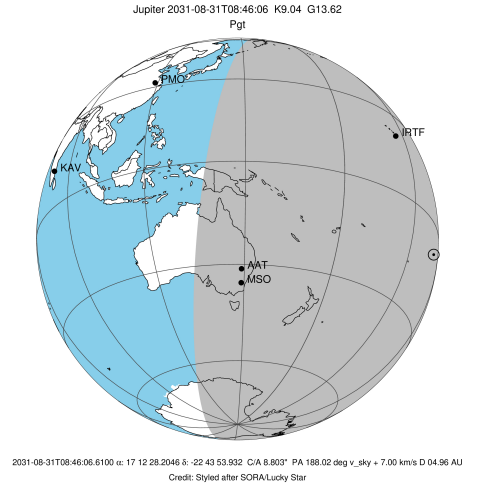


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|---------|---------|---------|---------|--------------|
| Jupiter | I | 2031-08-31T06:28:51.021 | 9.34 | -44.11 | 71490.4 | 26.89 | 30.06 |
| Jupiter | E | 2031-08-31T11:23:44.381 | -49.18x | -23.88 | 71489.7 | 32.04 | 35.52 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-08-31T08:36:15.790
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       : 4114552904104665984
2Mass ID (if available) : 17122821-2243538
ICRS Star Coord at Epoch: 17h 12m 28.20465s -22:43:53.93236s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 9.040
G magnitude           : 13.621
RP magnitude          : 12.482
BP magnitude          : 15.017
DUPflag              : 0
Distance (au)        : 4.955
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 7.00
Sun-Target sep (deg) : 101.72
Sun-Moon sep (deg)  : 64.76
B (ring opening deg) : -2.43
PA of pole (deg)    : 4.27
Pole direction: RA (deg): 268.05685
Dec (deg): 64.49652
C/A sky separation (") : 10.057
C/A sky separation (km) : 36140.4
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
    
```

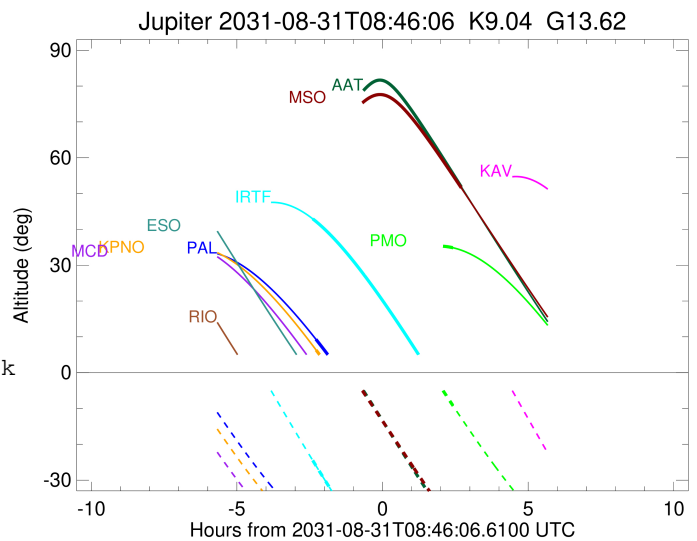
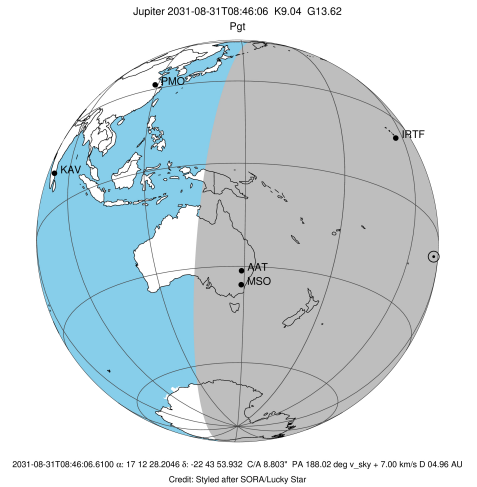


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2031-08-31T06:03:27.955 | 3.87x | 54.07x | 71490.5 | 25.31 | 28.36 |
| Jupiter | E | 2031-08-31T11:11:26.443 | 34.86 | -9.24 | 71489.4 | 34.78 | 38.37 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-08-31T08:59:33.150
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : KPNO
Location            : Kitt Peak Natl Obs
Latitude (deg)      : 31.96333
E. Longitude (deg)  : 248.40000
Altitude (km)       : 2.120
Gaia source ID      : 4114552904104665984
2Mass ID (if available) : 17122821-2243538
ICRS Star Coord at Epoch: 17h 12m 28.20465s -22:43:53.93236s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 9.040
G magnitude          : 13.621
RP magnitude         : 12.482
BP magnitude         : 15.017
DUPflag             : 0
Distance (au)       : 4.955
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 7.00
Sun-Target sep (deg) : 101.72
Sun-Moon sep (deg)  : 63.46
B (ring opening deg) : -2.43
PA of pole (deg)    : 4.27
Pole direction: RA (deg): 268.05685
Dec (deg): 64.49652
C/A sky separation (") : 9.728
C/A sky separation (km) : 34960.2
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
    
```

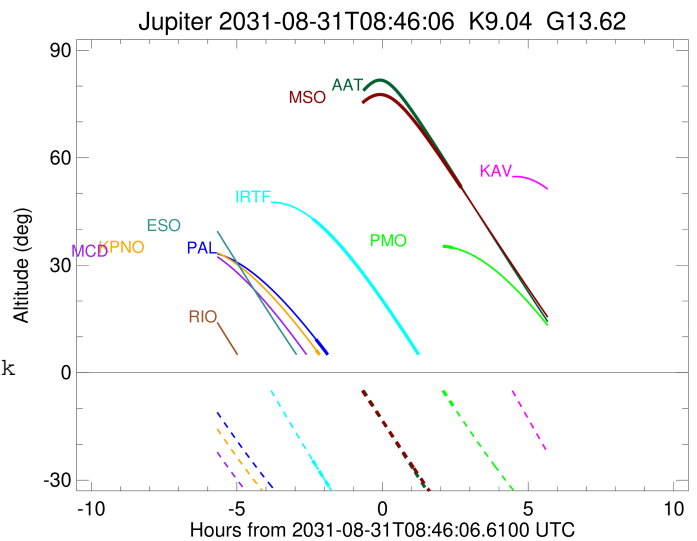
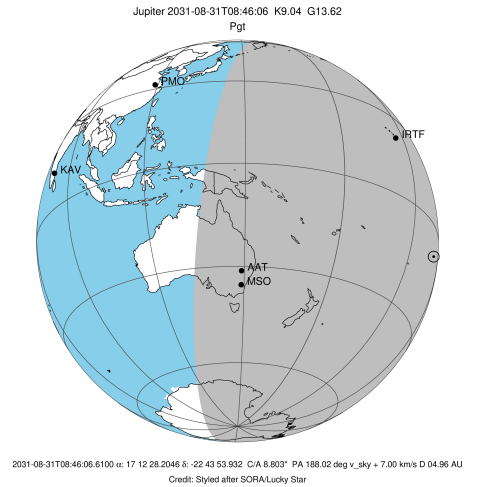


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|---------|---------|---------|---------|--------------|
| Jupiter | I | 2031-08-31T06:29:18.936 | 6.32 | -47.25 | 71490.4 | 26.67 | 29.83 |
| Jupiter | E | 2031-08-31T11:23:30.512 | -53.65x | -20.59 | 71489.8 | 31.76 | 35.23 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-08-31T08:58:48.180
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : IRTF
Location             : Mauna Kea/IRTF
Latitude (deg)       : 19.82622
E. Longitude (deg)   : 204.52800
Altitude (km)        : 4.168
Gaia source ID       : 4114552904104665984
2Mass ID (if available) : 17122821-2243538
ICRS Star Coord at Epoch: 17h 12m 28.20465s -22:43:53.93236s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 9.040
G magnitude          : 13.621
RP magnitude         : 12.482
BP magnitude         : 15.017
DUPflag             : 0
Distance (au)        : 4.955
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 7.00
Sun-Target sep (deg) : 101.72
Sun-Moon sep (deg)  : 64.11
B (ring opening deg) : -2.43
PA of pole (deg)    : 4.27
Pole direction: RA (deg): 268.05685
Dec (deg): 64.49652
C/A sky separation (") : 9.879
C/A sky separation (km) : 35502.1
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
    
```

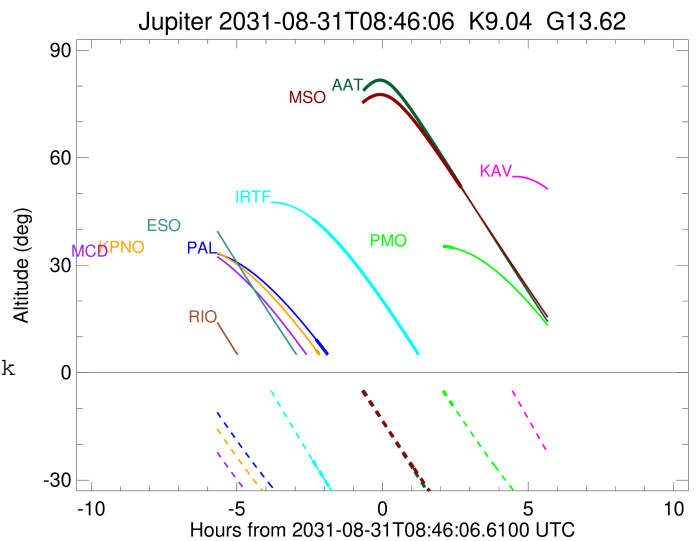
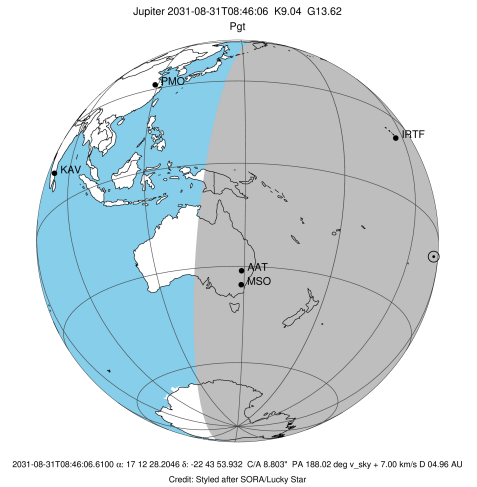


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|---------|---------|---------|---------|--------------|
| Jupiter | I | 2031-08-31T06:22:15.965 | 42.94 | -24.47 | 71490.4 | 26.52 | 29.66 |
| Jupiter | E | 2031-08-31T11:28:35.196 | -14.14x | -57.32 | 71489.7 | 32.24 | 35.73 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-08-31T08:46:09.130
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      : 4114552904104665984
2Mass ID (if available) : 17122821-2243538
ICRS Star Coord at Epoch: 17h 12m 28.20465s -22:43:53.93236s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 9.040
G magnitude          : 13.621
RP magnitude         : 12.482
BP magnitude         : 15.017
DUPflag             : 0
Distance (au)       : 4.955
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 7.00
Sun-Target sep (deg) : 101.72
Sun-Moon sep (deg)  : 65.05
B (ring opening deg) : -2.43
PA of pole (deg)    : 4.27
Pole direction: RA (deg): 268.05685
Dec (deg): 64.49652
C/A sky separation (" ) : 8.563
C/A sky separation (km) : 30773.4
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
    
```

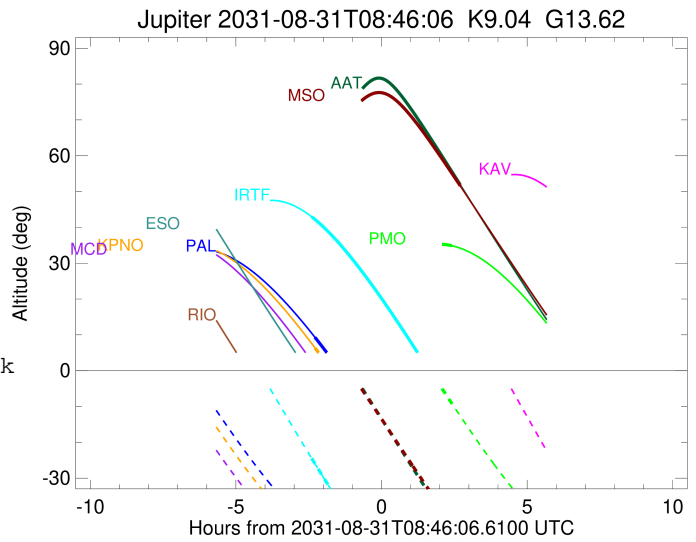
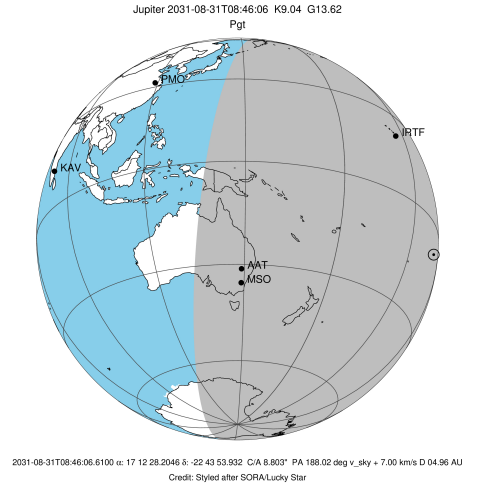


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2031-08-31T06:02:55.960 | 53.96 | 20.43x | 71491.0 | 20.85 | 23.50 |
| Jupiter | E | 2031-08-31T11:28:20.181 | 51.87 | -47.37 | 71490.1 | 29.16 | 32.48 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-08-31T08:46:18.700
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       : 4114552904104665984
2Mass ID (if available) : 17122821-2243538
ICRS Star Coord at Epoch: 17h 12m 28.20465s -22:43:53.93236s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 9.040
G magnitude          : 13.621
RP magnitude         : 12.482
BP magnitude         : 15.017
DUPflag             : 0
Distance (au)        : 4.955
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 7.00
Sun-Target sep (deg) : 101.72
Sun-Moon sep (deg)  : 65.04
B (ring opening deg) : -2.43
PA of pole (deg)    : 4.27
Pole direction: RA (deg): 268.05685
Dec (deg): 64.49652
C/A sky separation (" ) : 8.441
C/A sky separation (km) : 30335.7
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 | 2031-08-31T06:03:00.349 | 53.49 | 18.75x | 71491.0 | 20.50 | 23.12 |
| Jupiter | E | 2031-08-31T11:28:34.134 | 51.54 | -45.64 | 71490.1 | 28.77 | 32.07 |