

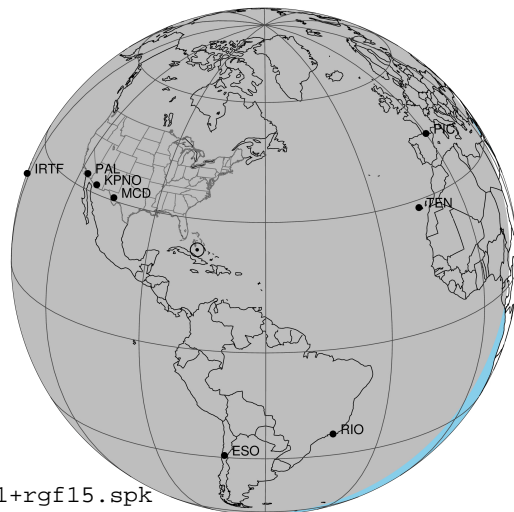
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2038-01-01T05:11:38.860
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 673744548992090368
 2Mass ID (if available) : 07521786+2117300

Jupiter 2038-01-01T05:11:38 K9.59 G11.76 Pgt

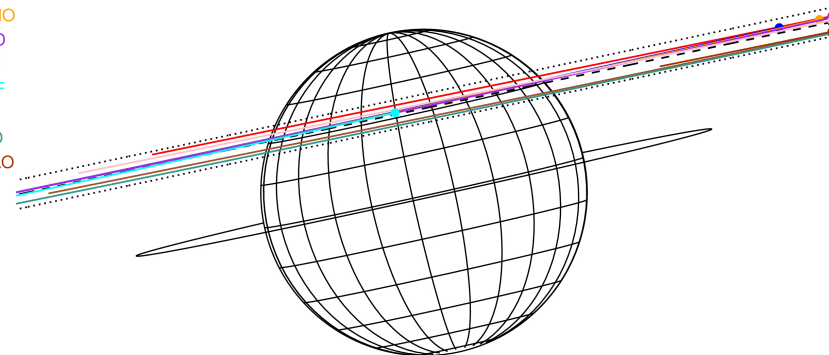
ICRS Star Coord at Epoch: 07h 52m 17.85599s +21:17:30.01194s

RUWE (>1.4 is poor) : 1.54
 K magnitude : 9.592
 G magnitude : 11.762
 RP magnitude : 11.081
 BP magnitude : 12.285
 DUPflag : 0
 Distance (au) : 4.275
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.24
 Sun-Target sep (deg) : 164.34
 Sun-Moon sep (deg) : 108.82
 B (ring opening deg) : 1.12
 PA of pole (deg) : 12.44
 Pole direction: RA (deg): 268.05622
 Dec (deg): 64.49690
 C/A sky separation (") : 11.618
 C/A sky separation (km) : 36020.2
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2038-01-01T05:11:38 K9.59 G11.76
 Pgt



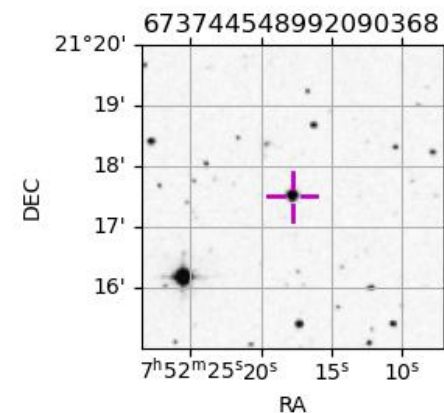
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 SAAO



2038-01-01T05:11:38.8600 a: 07 52 17.8560 & +21 17 30.012 C/A ***** PA 191.96 deg v_sky -16.24 km/s D 04.27 AU
 Credit: Styled after SORA/Lucky Star

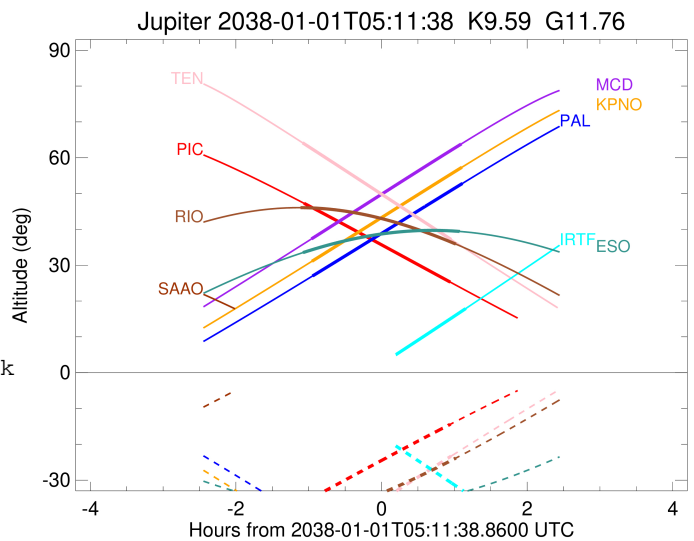
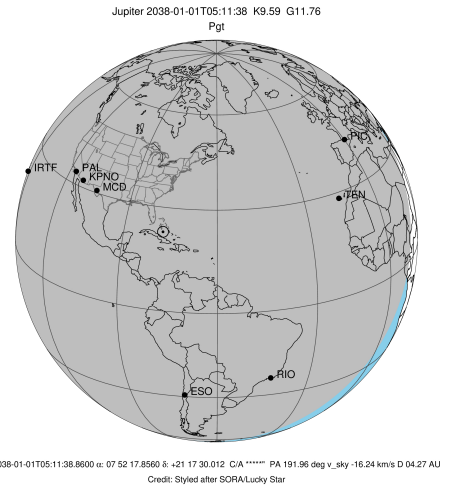
Observable events with sun below -5 deg and altitude above 5 deg

| Obs | Location | lat | Elon | Target | Observed Events Interval | OCode |
|------|-----------------------------------|-------|-------|--------|-----------------------------|-------|
| PIC | Pic du Midi | 42.9 | 0.1 | + + | JAN 01 04:07 - JAN 01 06:08 | Pie |
| PAL | Palomar Mt (200") | 33.4 | 243.1 | + + | JAN 01 04:14 - JAN 01 06:18 | Pie |
| PMO | Purple Mtn Obs. Nanking | 32.1 | 118.8 | | | Pnn |
| KPNO | Kitt Peak Natl Obs | 32.0 | 248.4 | + + | JAN 01 04:14 - JAN 01 06:17 | Pie |
| MCD | McDonald Obs. 2.7m | 30.7 | 256.0 | + + | JAN 01 04:13 - JAN 01 06:17 | Pie |
| TEN | Teide Obs./Tenerife | 28.3 | 343.5 | + + | JAN 01 04:06 - JAN 01 06:08 | Pie |
| IRTF | Mauna Kea/IRTF | 19.8 | 204.5 | | JAN 01 06:21 - JAN 01 06:21 | Pne |
| KAV | Kavalur Observatory | 12.6 | 78.8 | | | Pnn |
| RIO | Rio de Janeiro | -22.9 | 316.8 | + + | JAN 01 04:04 - JAN 01 06:12 | Pie |
| ESO | European Southern Obs. (3.6m) | -29.3 | 289.3 | + + | JAN 01 04:06 - JAN 01 06:15 | Pie |
| AAT | Siding Spring (AAT) | -31.3 | 149.1 | | | Pnn |
| SAAO | So. Afr. Astro. Obs. (Sutherland) | -32.4 | 20.8 | | | Pnn |
| MSO | Mt. Stromlo Observatory | -35.3 | 149.0 | | | Pnn |



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2038-01-01T05:07:56.340
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      : 673744548992090368
2Mass ID (if available) : 07521786+2117300
ICRS Star Coord at Epoch: 07h 52m 17.85599s +21:17:30.01194s
RUWE (>1.4 is poor) : 1.54
K magnitude          : 9.592
G magnitude          : 11.762
RP magnitude         : 11.081
BP magnitude         : 12.285
DUPflag             : 0
Distance (au)       : 4.275
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.24
Sun-Target sep (deg) : 164.34
Sun-Moon sep (deg)  : 109.55
B (ring opening deg) : 1.12
PA of pole (deg)    : 12.44
Pole direction: RA (deg): 268.05622
Dec (deg): 64.49690
C/A sky separation (") : 12.893
C/A sky separation (km) : 39972.3
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
    
```

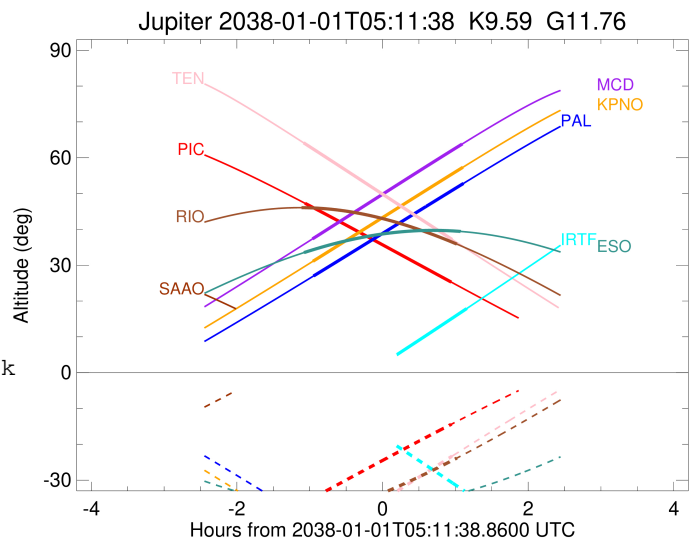
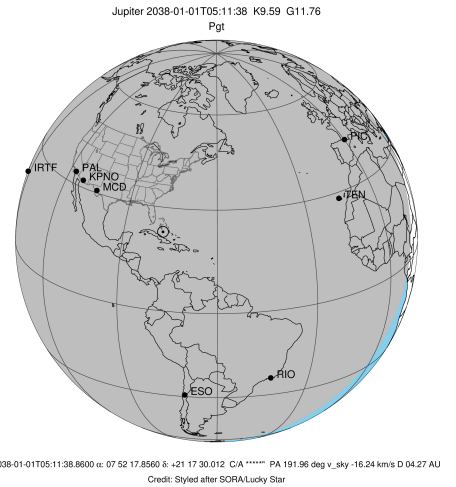


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2038-01-01T04:07:47.349 | 47.27 | -36.18 | 71491.5 | 33.03 | 36.55 |
| Jupiter | E | 2038-01-01T06:08:21.916 | 25.27 | -14.41 | 71491.4 | 34.95 | 38.55 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2038-01-01T05:16:40.190
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       : 673744548992090368
2Mass ID (if available) : 07521786+2117300
ICRS Star Coord at Epoch: 07h 52m 17.85599s +21:17:30.01194s
RUWE (>1.4 is poor) : 1.54
K magnitude           : 9.592
G magnitude           : 11.762
RP magnitude          : 11.081
BP magnitude          : 12.285
DUPflag              : 0
Distance (au)         : 4.275
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.24
Sun-Target sep (deg) : 164.34
Sun-Moon sep (deg)   : 109.16
B (ring opening deg) : 1.12
PA of pole (deg)     : 12.44
Pole direction: RA (deg): 268.05622
Dec (deg): 64.49690
C/A sky separation ("): 12.000
C/A sky separation (km): 37203.5
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
    
```

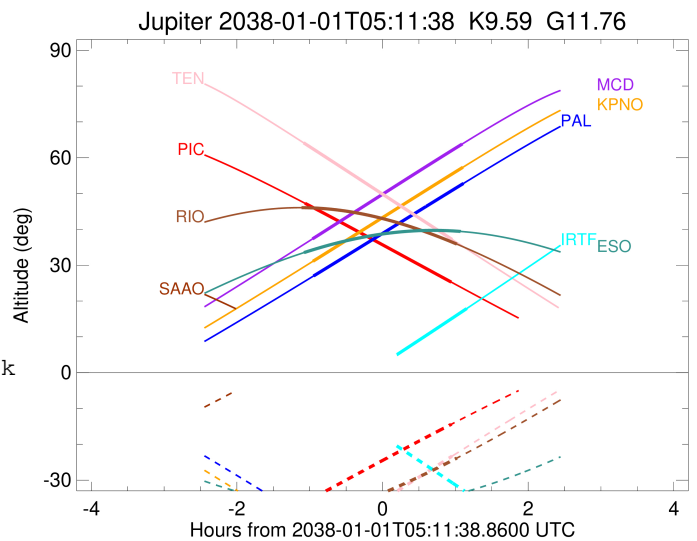
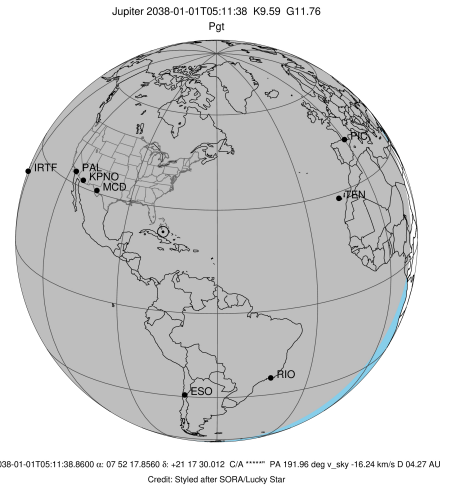


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2038-01-01T04:14:48.463 | 26.98 | -41.80 | 71491.5 | 31.17 | 34.61 |
| Jupiter | E | 2038-01-01T06:18:12.577 | 52.79 | -67.23 | 71491.5 | 31.67 | 35.13 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2038-01-01T05:16:21.050
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      : 673744548992090368
2Mass ID (if available) : 07521786+2117300
ICRS Star Coord at Epoch: 07h 52m 17.85599s +21:17:30.01194s
RUWE (>1.4 is poor) : 1.54
K magnitude          : 9.592
G magnitude          : 11.762
RP magnitude         : 11.081
BP magnitude         : 12.285
DUPflag             : 0
Distance (au)       : 4.275
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.24
Sun-Target sep (deg) : 164.34
Sun-Moon sep (deg)  : 109.23
B (ring opening deg) : 1.12
PA of pole (deg)    : 12.44
Pole direction: RA (deg): 268.05622
Dec (deg): 64.49690
C/A sky separation (") : 11.927
C/A sky separation (km) : 36978.3
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
    
```

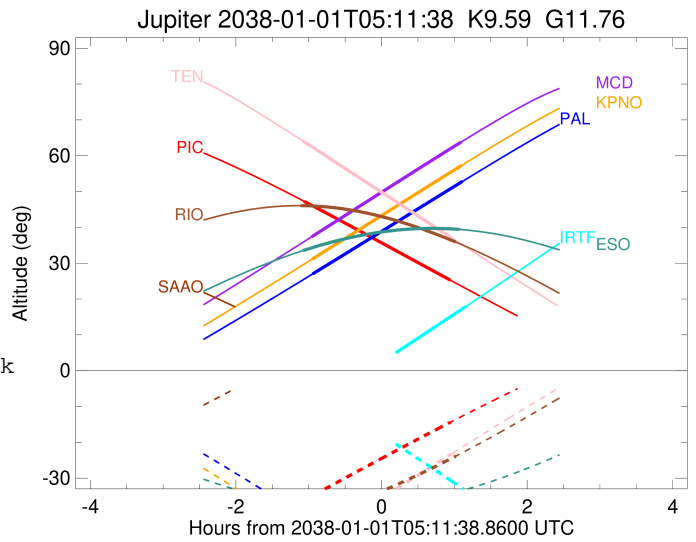
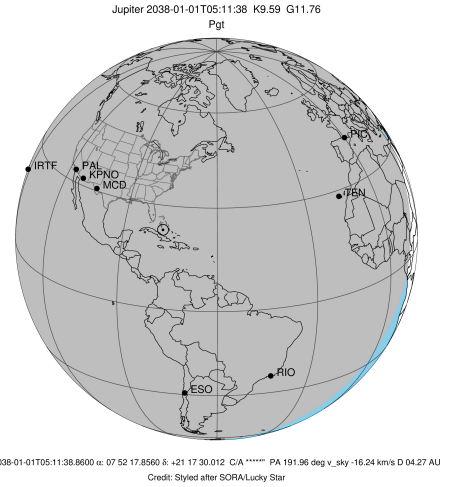


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2038-01-01T04:14:28.373 | 31.12 | -46.13 | 71491.5 | 30.92 | 34.34 |
| Jupiter | E | 2038-01-01T06:17:55.570 | 57.33 | -71.81 | 71491.5 | 31.51 | 34.96 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2038-01-01T05:15:48.030
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : MCD
Location              : McDonald Obs. 2.7m
Latitude (deg)        : 30.67158
E. Longitude (deg)    : 255.97844
Altitude (km)         : 2.075
Gaia source ID        : 673744548992090368
2Mass ID (if available) : 07521786+2117300
ICRS Star Coord at Epoch: 07h 52m 17.85599s +21:17:30.01194s
RUWE (>1.4 is poor) : 1.54
K magnitude           : 9.592
G magnitude           : 11.762
RP magnitude          : 11.081
BP magnitude          : 12.285
DUPflag              : 0
Distance (au)         : 4.275
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.24
Sun-Target sep (deg) : 164.34
Sun-Moon sep (deg)   : 109.32
B (ring opening deg) : 1.12
PA of pole (deg)     : 12.44
Pole direction: RA (deg): 268.05622
Dec (deg): 64.49690
C/A sky separation (") : 11.857
C/A sky separation (km) : 36758.7
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
    
```

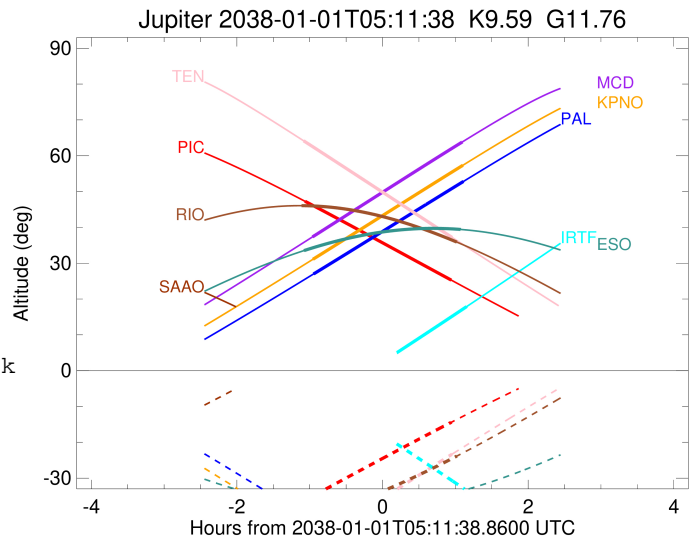
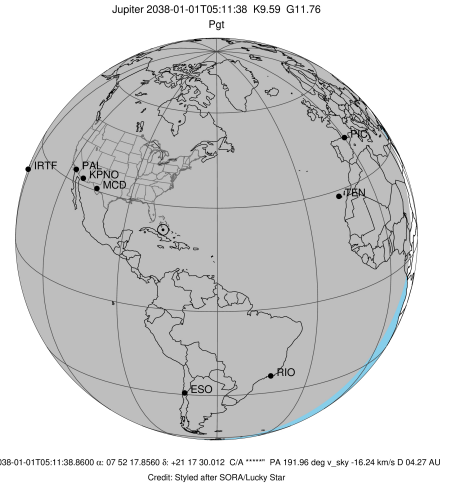


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2038-01-01T04:13:56.889 | 37.33 | -52.51 | 71491.6 | 30.65 | 34.06 |
| Jupiter | E | 2038-01-01T06:17:23.151 | 63.83 | -77.97 | 71491.5 | 31.37 | 34.82 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2038-01-01T05:07:43.030
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       : 673744548992090368
2Mass ID (if available) : 07521786+2117300
ICRS Star Coord at Epoch: 07h 52m 17.85599s +21:17:30.01194s
RUWE (>1.4 is poor) : 1.54
K magnitude           : 9.592
G magnitude           : 11.762
RP magnitude          : 11.081
BP magnitude          : 12.285
DUPflag              : 0
Distance (au)        : 4.275
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.24
Sun-Target sep (deg) : 164.34
Sun-Moon sep (deg)   : 109.72
B (ring opening deg) : 1.12
PA of pole (deg)     : 12.44
Pole direction: RA (deg): 268.05622
Dec (deg): 64.49690
C/A sky separation ("): 12.292
C/A sky separation (km): 38108.1
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
    
```

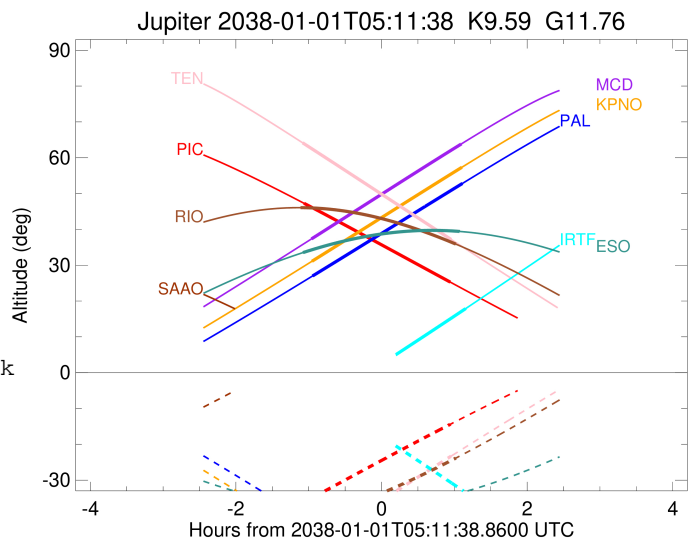
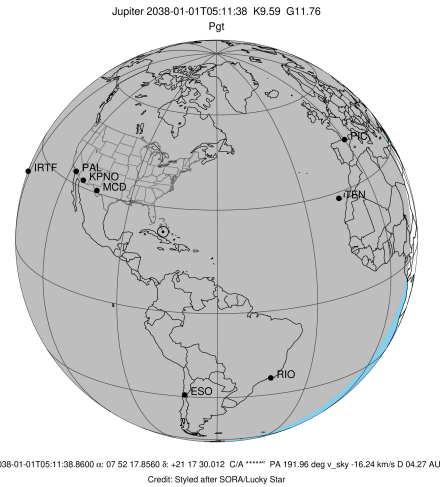


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2038-01-01T04:06:48.602 | 64.12 | -49.87 | 71491.5 | 31.20 | 34.63 |
| Jupiter | E | 2038-01-01T06:08:54.018 | 37.20 | -23.33 | 71491.5 | 33.26 | 36.79 |


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2038-01-01T05:18:29.810
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       : 673744548992090368
2Mass ID (if available) : 07521786+2117300
ICRS Star Coord at Epoch: 07h 52m 17.85599s +21:17:30.01194s
RUWE (>1.4 is poor) : 1.54
K magnitude           : 9.592
G magnitude           : 11.762
RP magnitude          : 11.081
BP magnitude          : 12.285
DUPflag              : 0
Distance (au)        : 4.275
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.24
Sun-Target sep (deg) : 164.34
Sun-Moon sep (deg)   : 108.55
B (ring opening deg) : 1.12
PA of pole (deg)     : 12.44
Pole direction: RA (deg): 268.05622
Dec (deg): 64.49690
C/A sky separation (") : 11.886
C/A sky separation (km) : 36849.1
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
    
```

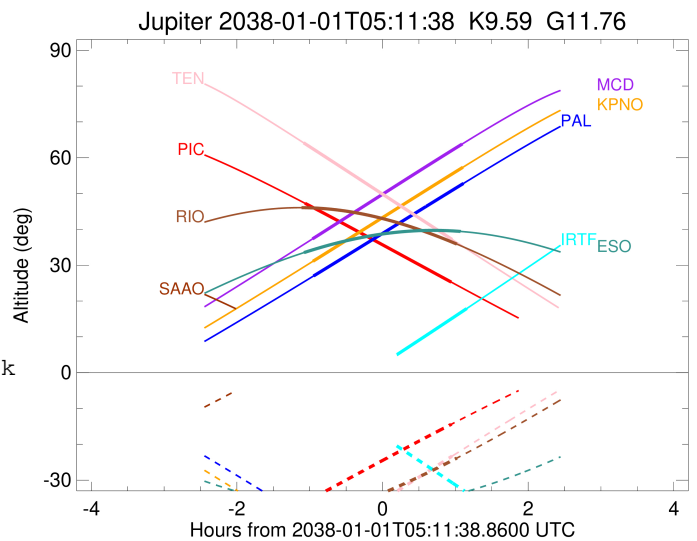
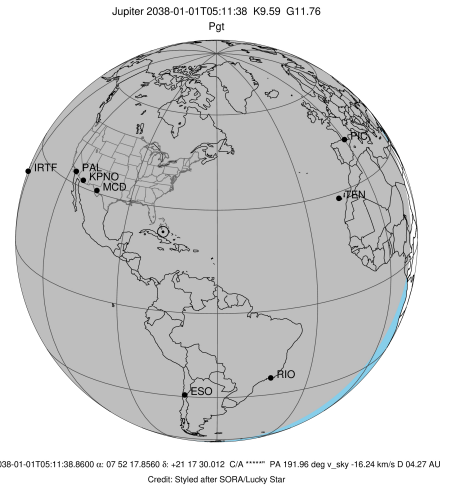


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|--------|---------|---------|---------|--------------|
| Jupiter | I | 2038-01-01T04:15:26.514 | -9.69x | -5.43 | 71491.5 | 31.14 | 34.57 |
| Jupiter | E | 2038-01-01T06:21:04.018 | 17.90 | -33.44 | 71491.5 | 30.98 | 34.41 |

```

target                : Jupiter
target radius (km)    : 71492.00
C/A epoch              : 2038-01-01T05:08:47.780
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        : 673744548992090368
2Mass ID (if available) : 07521786+2117300
ICRS Star Coord at Epoch: 07h 52m 17.85599s +21:17:30.01194s
RUWE (>1.4 is poor)  : 1.54
K magnitude            : 9.592
G magnitude            : 11.762
RP magnitude           : 11.081
BP magnitude           : 12.285
DUPflag                : 0
Distance (au)         : 4.275
f0 (km)                : 0.00
g0 (km)                : 0.00
skyplane vel. (km/s)  : -16.24
Sun-Target sep (deg)  : 164.34
Sun-Moon sep (deg)    : 109.56
B (ring opening deg)  : 1.12
PA of pole (deg)      : 12.44
Pole direction: RA (deg): 268.05622
Dec (deg): 64.49690
C/A sky separation (") : 10.363
C/A sky separation (km) : 32128.0
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
    
```

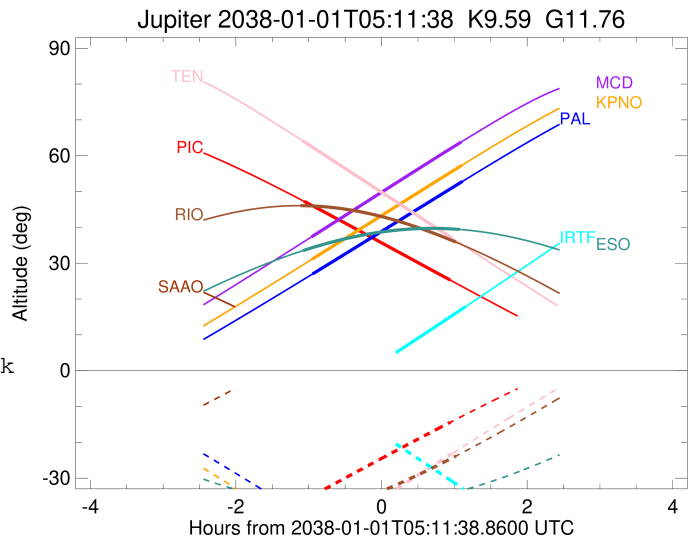
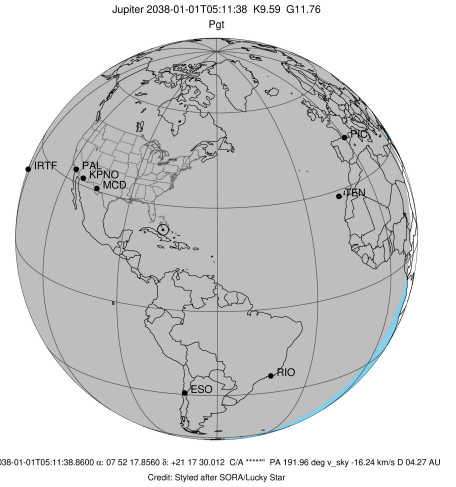


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2038-01-01T04:04:53.191 | 46.05 | -41.30 | 71491.7 | 25.84 | 28.93 |
| Jupiter | E | 2038-01-01T06:12:50.820 | 35.89 | -23.86 | 71491.6 | 27.68 | 30.90 |


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2038-01-01T05:11:30.190
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
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        : 673744548992090368
2Mass ID (if available) : 07521786+2117300
ICRS Star Coord at Epoch: 07h 52m 17.85599s +21:17:30.01194s
RUWE (>1.4 is poor) : 1.54
K magnitude           : 9.592
G magnitude           : 11.762
RP magnitude          : 11.081
BP magnitude          : 12.285
DUPflag              : 0
Distance (au)         : 4.275
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.24
Sun-Target sep (deg)  : 164.34
Sun-Moon sep (deg)   : 109.37
B (ring opening deg) : 1.12
PA of pole (deg)     : 12.44
Pole direction: RA (deg): 268.05622
Dec (deg): 64.49690
C/A sky separation (") : 10.014
C/A sky separation (km) : 31045.0
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 | 2038-01-01T04:06:58.447 | 33.52 | -37.06 | 71491.7 | 25.13 | 28.17 |
| Jupiter | E | 2038-01-01T06:15:57.875 | 39.42 | -33.63 | 71491.7 | 26.48 | 29.63 |