

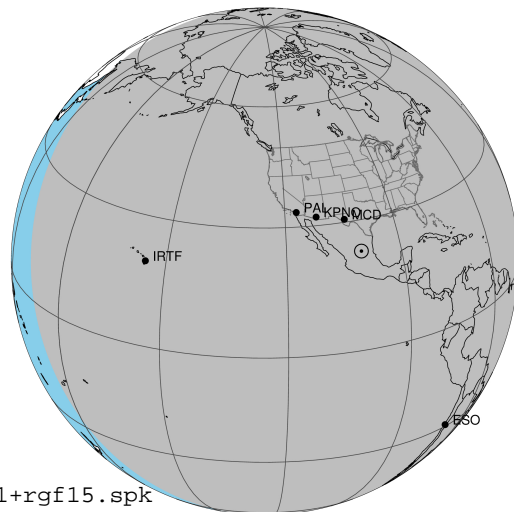
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2037-01-01T06:47:20.160
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 3415301987406872064
 2Mass ID (if available) : 05082540+2224329

Jupiter 2037-01-01T06:47:20 K9.54 G12.29 Pgt

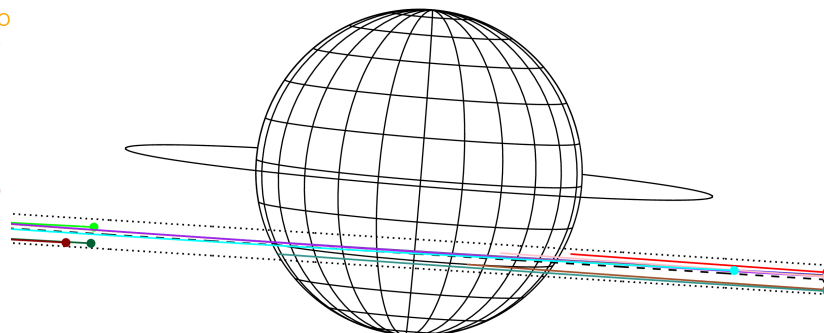
ICRS Star Coord at Epoch: 05h 08m 25.40464s +22:24:32.95065s

RUWE (>1.4 is poor) : 1.61
 K magnitude : 9.535
 G magnitude : 12.286
 RP magnitude : 11.451
 BP magnitude : 13.018
 DUPflag : 0
 Distance (au) : 4.177
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -14.63
 Sun-Target sep (deg) : 157.41
 Sun-Moon sep (deg) : 11.71
 B (ring opening deg) : 2.68
 PA of pole (deg) : -4.70
 Pole direction: RA (deg): 268.05631
 Dec (deg): 64.49687
 C/A sky separation (") : 11.772
 C/A sky separation (km) : 35661.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2037-01-01T06:47:20 K9.54 G12.29
 Pgt



Earth
 PIC
 PAL
 PMO
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 AAT
 MSO

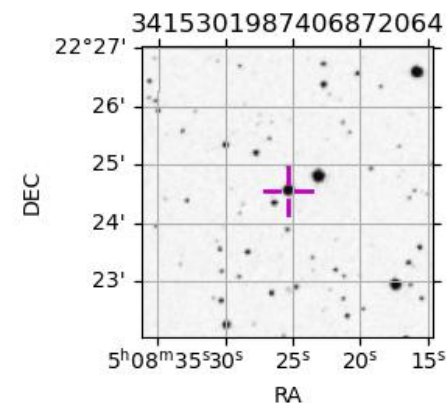


2037-01-01T06:47:20.1600 a: 05 08 25.4046 s: +22 24 32.951 C/A ***** PA 356.40 deg v_sky -14.63 km/s D 04.18 AU

Credit: Styled after SORA/Lucky Star

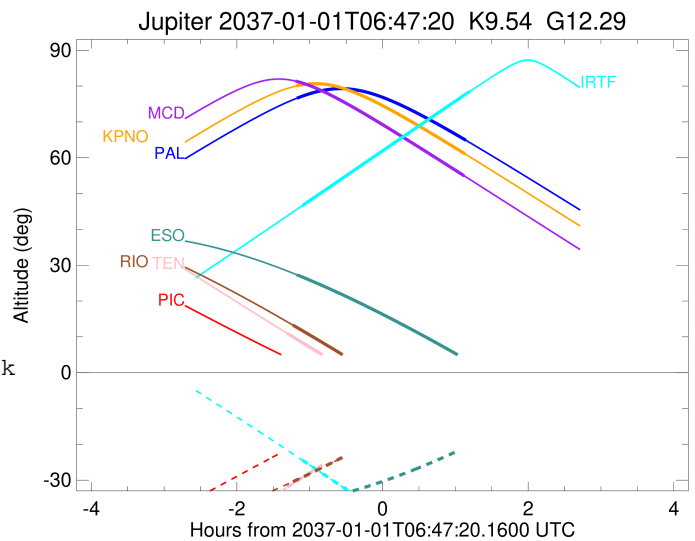
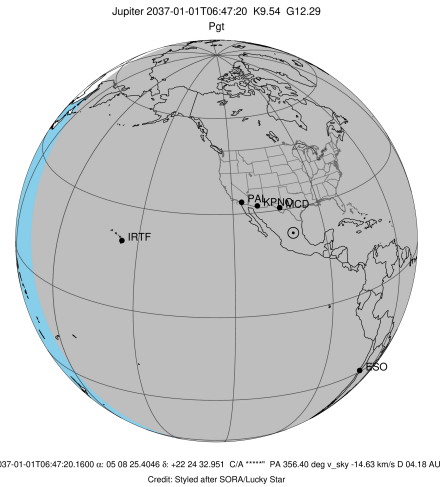
Observable events with sun below -5 deg and altitude above 5 deg

| Obs | Location | lat | Elon | Target | Observed Events Interval | OCode |
|------|-----------------------------------|-------|-------|--------|-----------------------------|-------|
| PIC | Pic du Midi | 42.9 | 0.1 | | | Pnn |
| PAL | Palomar Mt (200") | 33.4 | 243.1 | + + | JAN 01 05:36 - JAN 01 07:56 | Pie |
| PMO | Purple Mtn Obs. Nanking | 32.1 | 118.8 | | | Pnn |
| KPNO | Kitt Peak Natl Obs | 32.0 | 248.4 | + + | JAN 01 05:36 - JAN 01 07:55 | Pie |
| MCD | McDonald Obs. 2.7m | 30.7 | 256.0 | + + | JAN 01 05:35 - JAN 01 07:54 | Pie |
| TEN | Teide Obs./Tenerife | 28.3 | 343.5 | + | JAN 01 05:28 - JAN 01 05:28 | Pin |
| IRTF | Mauna Kea/IRTF | 19.8 | 204.5 | + + | JAN 01 05:41 - JAN 01 07:59 | Pie |
| KAV | Kavalur Observatory | 12.6 | 78.8 | | | Pnn |
| RIO | Rio de Janeiro | -22.9 | 316.8 | + | JAN 01 05:33 - JAN 01 05:33 | Pin |
| ESO | European Southern Obs. (3.6m) | -29.3 | 289.3 | + | JAN 01 05:36 - JAN 01 05:36 | Pin |
| 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             : 2037-01-01T06:46:22.270
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        : 3415301987406872064
2Mass ID (if available) : 05082540+2224329
ICRS Star Coord at Epoch: 05h 08m 25.40464s +22:24:32.95065s
RUWE (>1.4 is poor) : 1.61
K magnitude           : 9.535
G magnitude           : 12.286
RP magnitude          : 11.451
BP magnitude          : 13.018
DUPflag              : 0
Distance (au)         : 4.177
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -14.63
Sun-Target sep (deg)  : 157.41
Sun-Moon sep (deg)   : 11.82
B (ring opening deg) : 2.68
PA of pole (deg)     : -4.70
Pole direction: RA (deg): 268.05631
Dec (deg): 64.49687
C/A sky separation (" ) : 11.389
C/A sky separation (km) : 34501.3
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
    
```

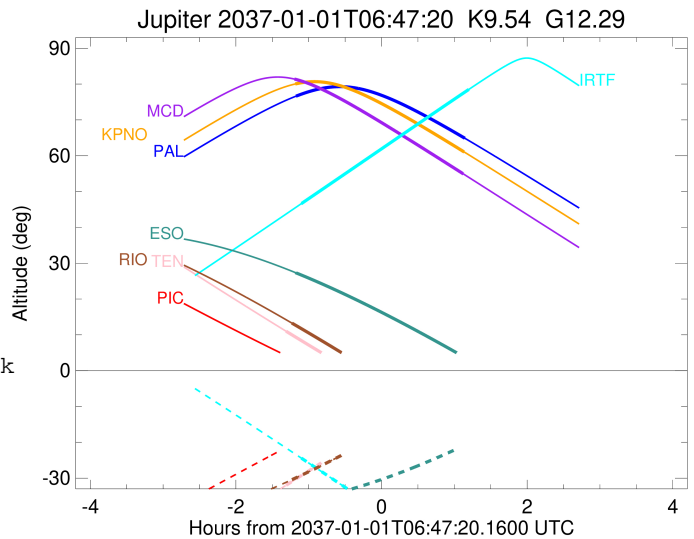
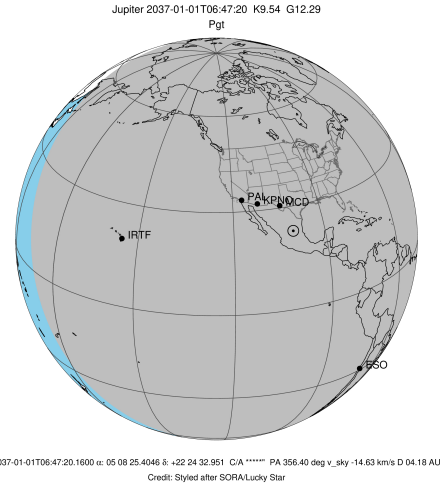


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2037-01-01T05:36:50.533 | 76.61 | -58.86 | 71489.9 | -27.63 | -30.85 |
| Jupiter | E | 2037-01-01T07:56:00.722 | 64.87 | -79.72 | 71489.6 | -29.84 | -33.20 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2037-01-01T06:45:51.530
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        : 3415301987406872064
2Mass ID (if available) : 05082540+2224329
ICRS Star Coord at Epoch: 05h 08m 25.40464s +22:24:32.95065s
RUWE (>1.4 is poor) : 1.61
K magnitude           : 9.535
G magnitude           : 12.286
RP magnitude          : 11.451
BP magnitude          : 13.018
DUPflag              : 0
Distance (au)         : 4.177
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -14.63
Sun-Target sep (deg)  : 157.41
Sun-Moon sep (deg)    : 11.74
B (ring opening deg) : 2.68
PA of pole (deg)      : -4.70
Pole direction: RA (deg): 268.05631
Dec (deg): 64.49687
C/A sky separation (" ) : 11.437
C/A sky separation (km) : 34646.5
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
    
```

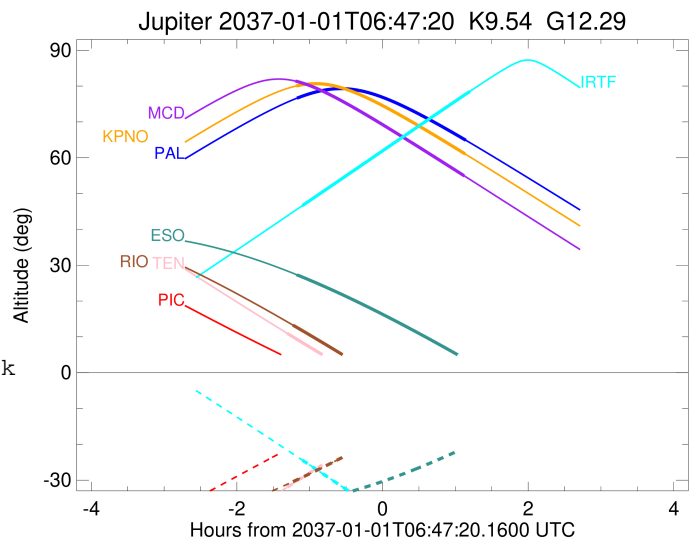
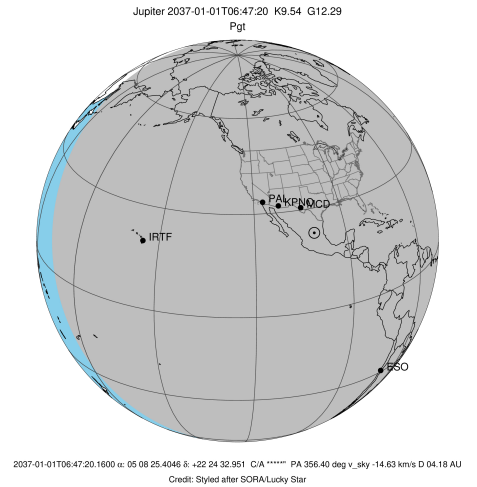


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2037-01-01T05:36:26.596 | 80.04 | -63.40 | 71489.9 | -27.82 | -31.05 |
| Jupiter | E | 2037-01-01T07:55:26.087 | 61.05 | -79.52 | 71489.6 | -29.92 | -33.28 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2037-01-01T06:45:07.570
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      : 3415301987406872064
2Mass ID (if available) : 05082540+2224329
ICRS Star Coord at Epoch: 05h 08m 25.40464s +22:24:32.95065s
RUWE (>1.4 is poor) : 1.61
K magnitude          : 9.535
G magnitude          : 12.286
RP magnitude         : 11.451
BP magnitude         : 13.018
DUPflag             : 0
Distance (au)       : 4.177
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -14.63
Sun-Target sep (deg) : 157.41
Sun-Moon sep (deg)  : 11.62
B (ring opening deg) : 2.68
PA of pole (deg)    : -4.70
Pole direction: RA (deg): 268.05631
Dec (deg): 64.49687
C/A sky separation (") : 11.471
C/A sky separation (km) : 34748.2
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
    
```

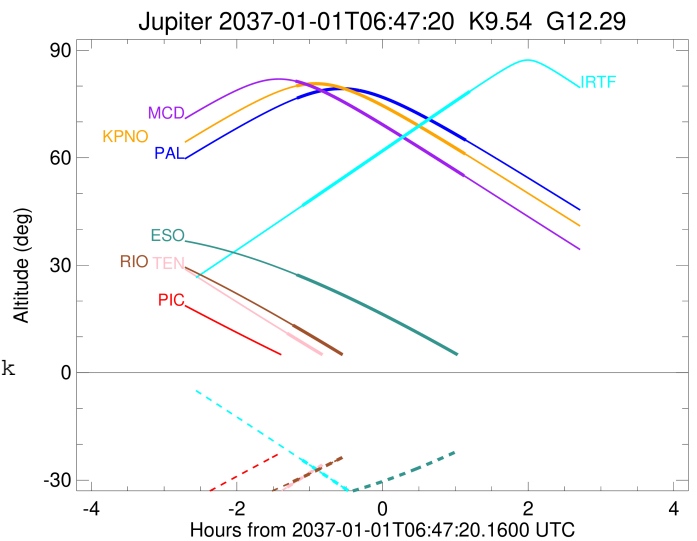
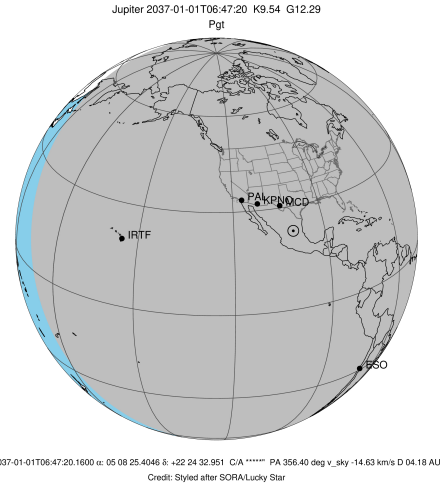


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2037-01-01T05:35:46.091 | 81.37 | -69.86 | 71489.8 | -27.98 | -31.23 |
| Jupiter | E | 2037-01-01T07:54:42.823 | 54.94 | -75.60 | 71489.6 | -29.94 | -33.30 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2037-01-01T06:41:24.390
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       : 3415301987406872064
2Mass ID (if available) : 05082540+2224329
ICRS Star Coord at Epoch: 05h 08m 25.40464s +22:24:32.95065s
RUWE (>1.4 is poor) : 1.61
K magnitude          : 9.535
G magnitude          : 12.286
RP magnitude         : 11.451
BP magnitude         : 13.018
DUPflag             : 0
Distance (au)        : 4.177
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.63
Sun-Target sep (deg) : 157.41
Sun-Moon sep (deg)   : 10.99
B (ring opening deg) : 2.68
PA of pole (deg)     : -4.70
Pole direction: RA (deg): 268.05631
Dec (deg): 64.49687
C/A sky separation ("): 10.750
C/A sky separation (km): 32562.6
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
    
```

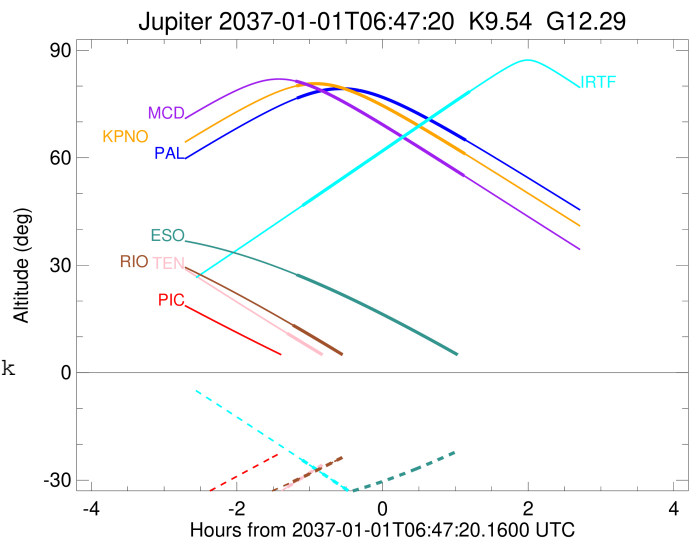
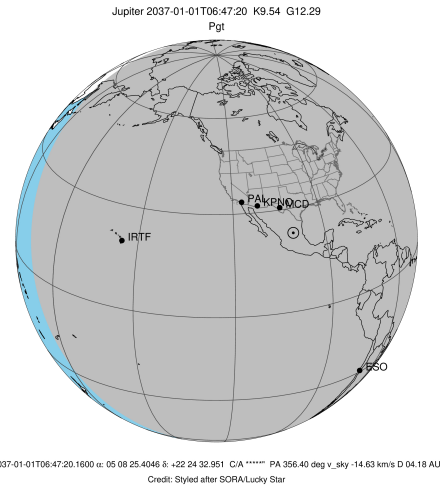


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|---------|---------|---------|---------|--------------|
| Jupiter | I | 2037-01-01T05:28:41.227 | 11.01 | -31.99 | 71490.0 | -26.58 | -29.73 |
| Jupiter | E | 2037-01-01T07:54:47.425 | -17.31x | -1.42x | 71489.9 | -27.57 | -30.79 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2037-01-01T06:50:23.650
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       : 3415301987406872064
2Mass ID (if available) : 05082540+2224329
ICRS Star Coord at Epoch: 05h 08m 25.40464s +22:24:32.95065s
RUWE (>1.4 is poor) : 1.61
K magnitude           : 9.535
G magnitude           : 12.286
RP magnitude         : 11.451
BP magnitude         : 13.018
DUPflag              : 0
Distance (au)        : 4.177
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.63
Sun-Target sep (deg) : 157.41
Sun-Moon sep (deg)   : 12.35
B (ring opening deg) : 2.68
PA of pole (deg)     : -4.70
Pole direction: RA (deg): 268.05631
Dec (deg): 64.49687
C/A sky separation ("): 11.720
C/A sky separation (km): 35502.6
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
    
```

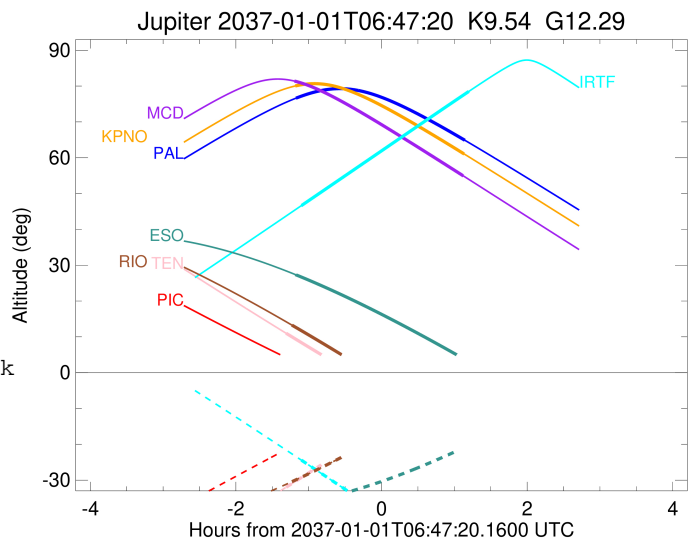
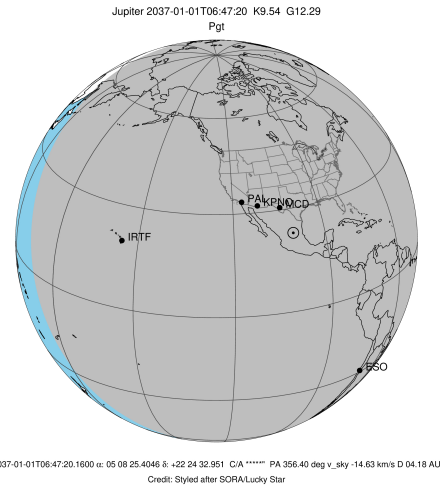


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2037-01-01T05:41:16.261 | 46.62 | -24.41 | 71489.8 | -28.17 | -31.43 |
| Jupiter | E | 2037-01-01T07:59:15.807 | 78.49 | -55.88 | 71489.4 | -31.15 | -34.59 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2037-01-01T06:41:23.150
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      : 3415301987406872064
2Mass ID (if available) : 05082540+2224329
ICRS Star Coord at Epoch: 05h 08m 25.40464s +22:24:32.95065s
RUWE (>1.4 is poor) : 1.61
K magnitude          : 9.535
G magnitude          : 12.286
RP magnitude         : 11.451
BP magnitude         : 13.018
DUPflag             : 0
Distance (au)       : 4.177
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.63
Sun-Target sep (deg) : 157.41
Sun-Moon sep (deg)  : 10.76
B (ring opening deg) : 2.68
PA of pole (deg)    : -4.70
Pole direction: RA (deg): 268.05631
Dec (deg): 64.49687
C/A sky separation (") : 12.756
C/A sky separation (km) : 38641.5
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
    
```

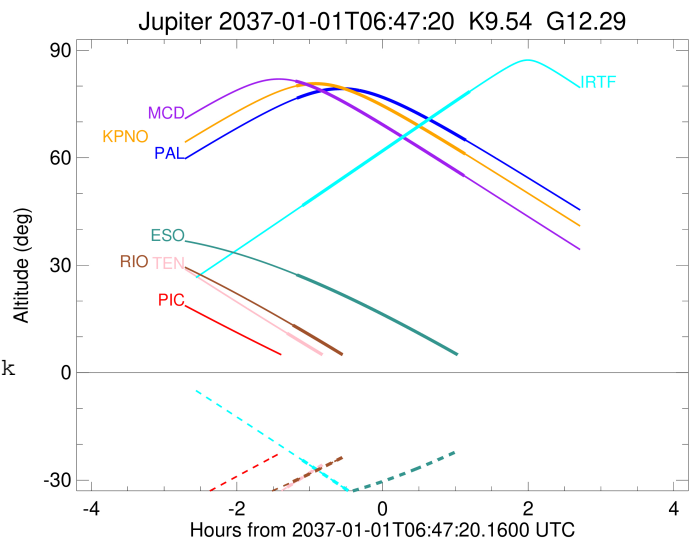
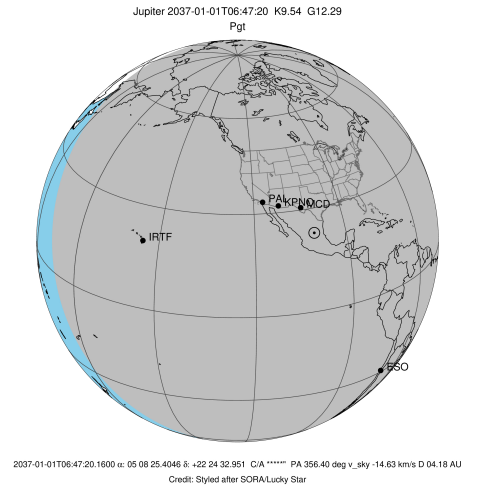


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|---------|---------|---------|---------|--------------|
| Jupiter | I | 2037-01-01T05:33:30.568 | 13.27 | -30.43 | 71489.2 | -32.15 | -35.63 |
| Jupiter | E | 2037-01-01T07:49:52.180 | -15.37x | -5.31 | 71489.1 | -33.14 | -36.67 |


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2037-01-01T06:42:51.170
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      : 3415301987406872064
2Mass ID (if available) : 05082540+2224329
ICRS Star Coord at Epoch: 05h 08m 25.40464s +22:24:32.95065s
RUWE (>1.4 is poor) : 1.61
K magnitude          : 9.535
G magnitude          : 12.286
RP magnitude         : 11.451
BP magnitude         : 13.018
DUPflag             : 0
Distance (au)       : 4.177
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -14.63
Sun-Target sep (deg) : 157.41
Sun-Moon sep (deg)  : 10.99
B (ring opening deg) : 2.68
PA of pole (deg)    : -4.70
Pole direction: RA (deg): 268.05631
Dec (deg): 64.49687
C/A sky separation (" ) : 13.220
C/A sky separation (km) : 40047.7
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 | 2037-01-01T05:36:40.455 | 27.33 | -36.56 | 71489.0 | -33.29 | -36.82 |
| Jupiter | E | 2037-01-01T07:49:28.596 | 4.95x | -21.83 | 71488.8 | -34.64 | -38.23 |