

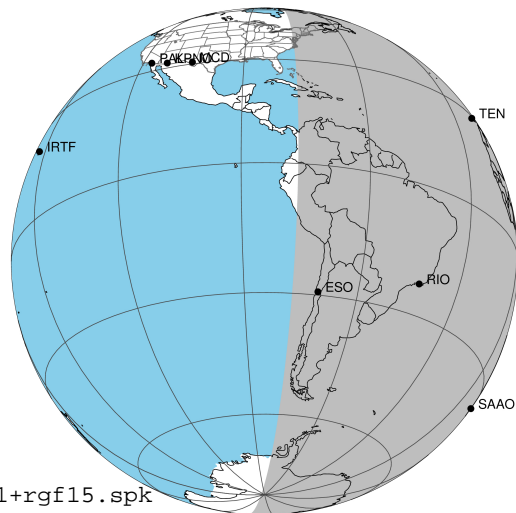
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-09-20T23:01:14.610
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4114673231930646784
 2Mass ID (if available) : 17191314-2254331

Jupiter 2031-09-20T23:01:14 K9.87 G13.59 Pgt

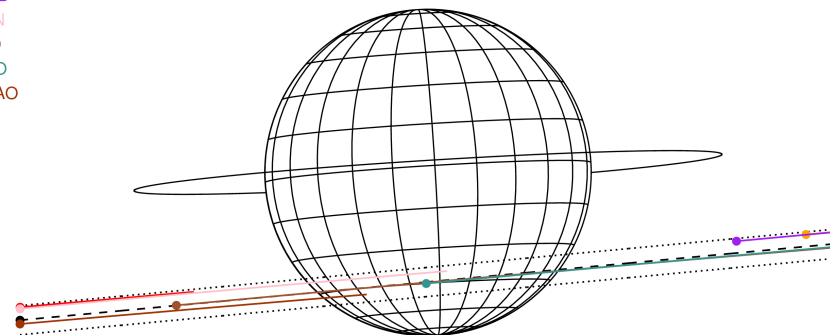
ICRS Star Coord at Epoch: 17h 19m 13.14128s -22:54:33.28219s

RUWE (>1.4 is poor) : 1.06
 K magnitude : 9.867
 G magnitude : 13.591
 RP magnitude : 12.556
 BP magnitude : 14.697
 DUPflag : 0
 Distance (au) : 5.269
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : 16.55
 Sun-Target sep (deg) : 83.27
 Sun-Moon sep (deg) : 32.83
 B (ring opening deg) : -2.36
 PA of pole (deg) : 3.55
 Pole direction: RA (deg): 268.05684
 Dec (deg): 64.49652
 C/A sky separation (") : 12.490
 C/A sky separation (km) : 47726.5
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-09-20T23:01:14 K9.87 G13.59
 Pgt



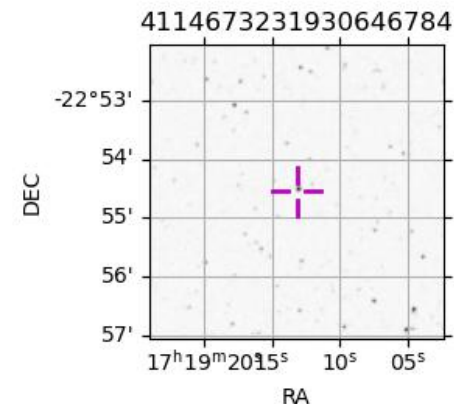
Earth
 PIC
 KPNO
 MCD
 TEN
 RIO
 ESO
 SAAO



2031-09-20T23:01:14.6100 α: 17 19 13.1413 δ: -22 54 33.282 C/A ***** PA 5.36 deg v_sky +16.55 km/s D 05.27 AU
 Credit: Styled after SORA/Lucky Star

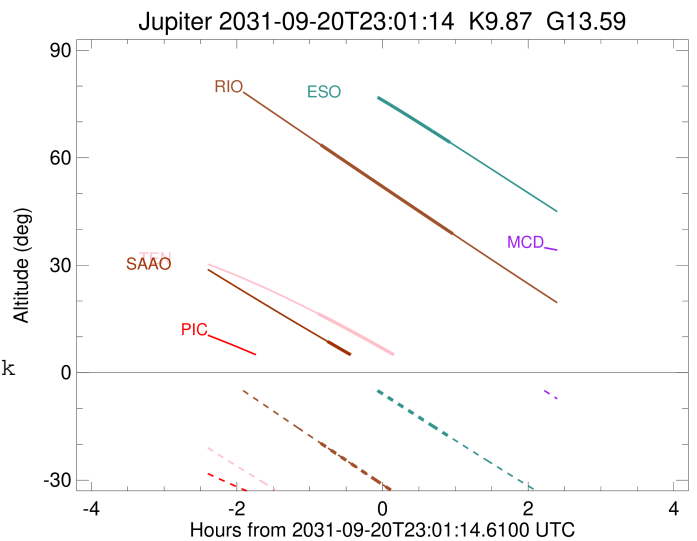
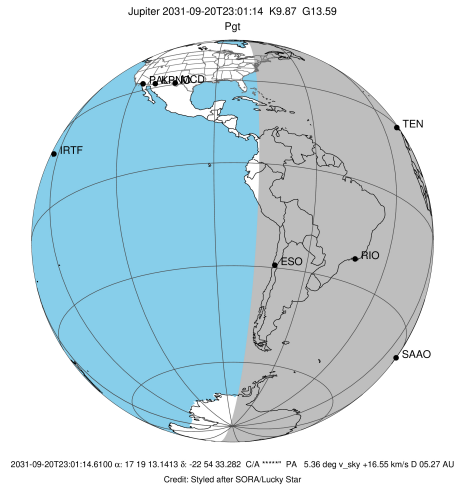
Observable events with sun below -5 deg and altitude above 5 deg

| Obs | Location | lat | Elon | Target | Observed Events Interval | OCode |
|------|-----------------------------------|-------|-------|--------|-----------------------------|-------|
| PIC | Pic du Midi | 42.9 | 0.1 | | | Pnn |
| PAL | Palomar Mt (200") | 33.4 | 243.1 | | | Pnn |
| PMO | Purple Mtn Obs. Nanking | 32.1 | 118.8 | | | Pnn |
| 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 | + | SEP 20 22:08 - SEP 20 22:08 | Pin |
| IRTF | Mauna Kea/IRTF | 19.8 | 204.5 | | | Pnn |
| KAV | Kavalur Observatory | 12.6 | 78.8 | | | Pnn |
| RIO | Rio de Janeiro | -22.9 | 316.8 | + | SEP 20 22:10 - SEP 20 23:59 | Pie |
| ESO | European Southern Obs. (3.6m) | -29.3 | 289.3 | + | SEP 20 23:56 - SEP 20 23:56 | Pne |
| AAT | Siding Spring (AAT) | -31.3 | 149.1 | | | Pnn |
| SAAO | So. Afr. Astro. Obs. (Sutherland) | -32.4 | 20.8 | + | SEP 20 22:15 - SEP 20 22:15 | Pin |
| MSO | Mt. Stromlo Observatory | -35.3 | 149.0 | | | Pnn |



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-09-20T23:05:49.980
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        : 4114673231930646784
2Mass ID (if available) : 17191314-2254331
ICRS Star Coord at Epoch: 17h 19m 13.14128s -22:54:33.28219s
RUWE (>1.4 is poor) : 1.06
K magnitude           : 9.867
G magnitude           : 13.591
RP magnitude          : 12.556
BP magnitude          : 14.697
DUPflag              : 0
Distance (au)         : 5.269
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 16.55
Sun-Target sep (deg) : 83.27
Sun-Moon sep (deg)   : 33.53
B (ring opening deg) : -2.36
PA of pole (deg)     : 3.55
Pole direction: RA (deg): 268.05684
Dec (deg): 64.49652
C/A sky separation (") : 11.443
C/A sky separation (km) : 43726.6
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
    
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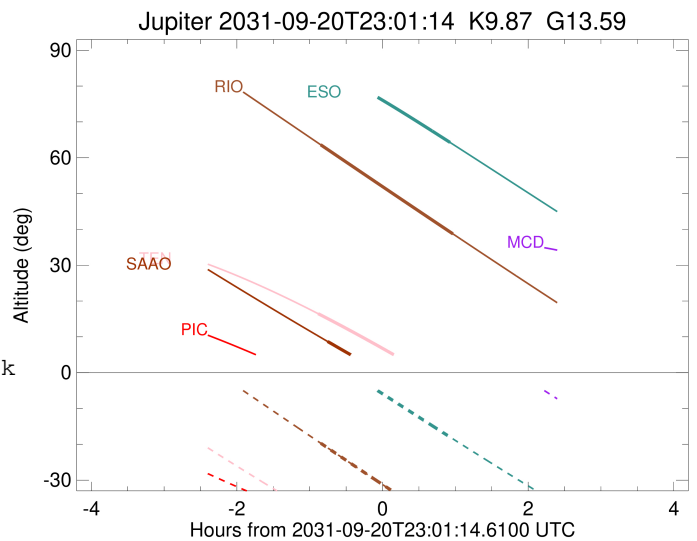
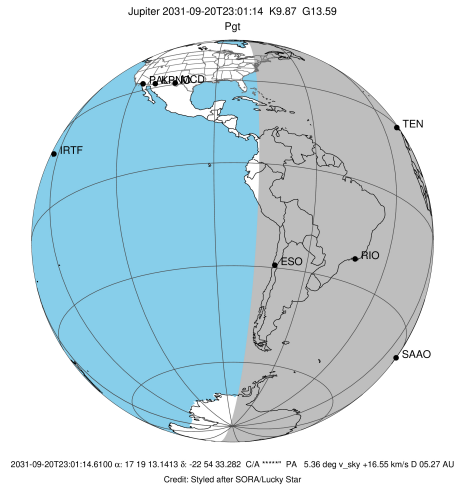


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|--------|---------|---------|---------|--------------|
| Jupiter | I | 2031-09-20T22:08:10.703 | 16.47 | -39.78 | 71489.0 | -39.05 | -42.75 |
| Jupiter | E | 2031-09-21T00:03:05.709 | -5.41x | -58.03 | 71489.3 | -36.37 | -40.01 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-09-20T23:05:01.300
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        : 4114673231930646784
2Mass ID (if available) : 17191314-2254331
ICRS Star Coord at Epoch: 17h 19m 13.14128s -22:54:33.28219s
RUWE (>1.4 is poor) : 1.06
K magnitude           : 9.867
G magnitude           : 13.591
RP magnitude          : 12.556
BP magnitude          : 14.697
DUPflag              : 0
Distance (au)         : 5.269
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : 16.55
Sun-Target sep (deg)  : 83.27
Sun-Moon sep (deg)   : 33.75
B (ring opening deg) : -2.36
PA of pole (deg)     : 3.55
Pole direction: RA (deg): 268.05684
Dec (deg): 64.49652
C/A sky separation (") : 12.548
C/A sky separation (km) : 47946.8
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
    
```

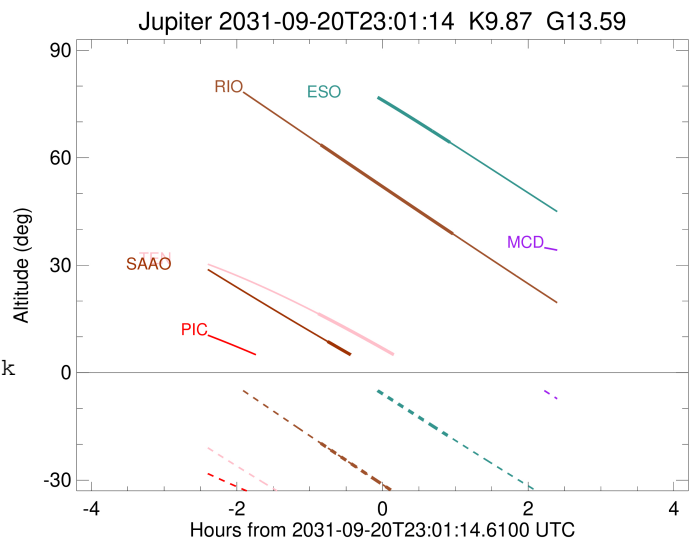
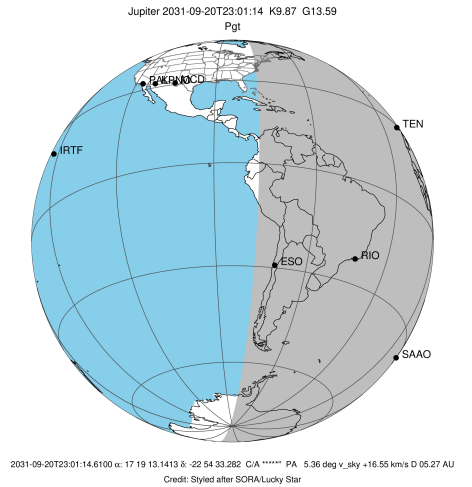


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2031-09-20T22:10:28.997 | 63.57 | -19.72 | 71488.4 | -43.66 | -47.37 |
| Jupiter | E | 2031-09-20T23:59:16.943 | 38.74 | -43.94 | 71488.8 | -40.62 | -44.34 |

```

target           : Jupiter
target radius (km) : 71492.00
C/A epoch       : 2031-09-20T23:02:40.840
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  : 4114673231930646784
2Mass ID (if available) : 17191314-2254331
ICRS Star Coord at Epoch: 17h 19m 13.14128s -22:54:33.28219s
RUWE (>1.4 is poor) : 1.06
K magnitude     : 9.867
G magnitude     : 13.591
RP magnitude    : 12.556
BP magnitude    : 14.697
DUPflag        : 0
Distance (au)   : 5.269
f0 (km)        : 0.00
g0 (km)        : 0.00
skyplane vel. (km/s) : 16.55
Sun-Target sep (deg) : 83.27
Sun-Moon sep (deg) : 33.52
B (ring opening deg) : -2.36
PA of pole (deg) : 3.55
Pole direction: RA (deg): 268.05684
Dec (deg): 64.49652
C/A sky separation (") : 12.653
C/A sky separation (km) : 48350.8
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
    
```

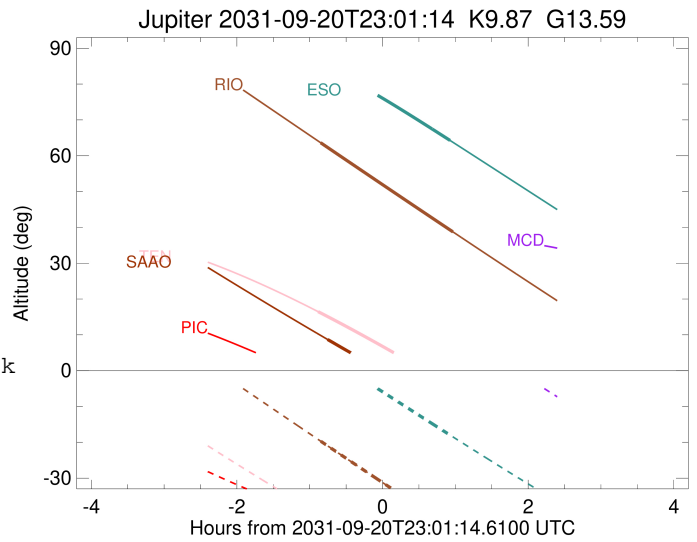
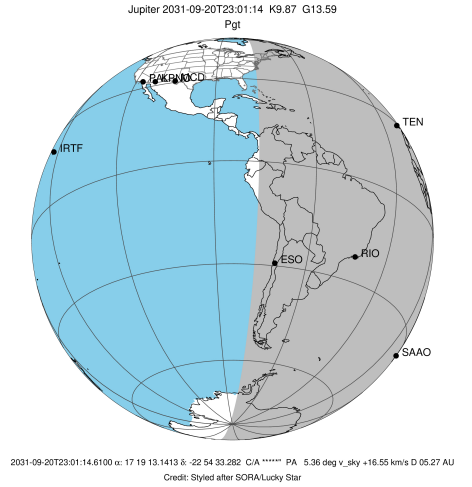


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2031-09-20T22:08:21.879 | 83.81 | 5.65x | 71488.3 | -44.38 | -48.09 |
| Jupiter | E | 2031-09-20T23:56:51.966 | 64.27 | -17.97 | 71488.7 | -40.79 | -44.50 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-09-20T23:06:16.750
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      : 4114673231930646784
2Mass ID (if available) : 17191314-2254331
ICRS Star Coord at Epoch: 17h 19m 13.14128s -22:54:33.28219s
RUWE (>1.4 is poor) : 1.06
K magnitude          : 9.867
G magnitude          : 13.591
RP magnitude         : 12.556
BP magnitude         : 14.697
DUPflag             : 0
Distance (au)       : 5.269
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : 16.55
Sun-Target sep (deg) : 83.27
Sun-Moon sep (deg)  : 33.52
B (ring opening deg) : -2.36
PA of pole (deg)    : 3.55
Pole direction: RA (deg): 268.05684
Dec (deg): 64.49652
C/A sky separation (") : 13.342
C/A sky separation (km) : 50982.5
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 | 2031-09-20T22:15:58.205 | 8.71 | -58.51 | 71488.0 | -46.71 | -50.39 |
| Jupiter | E | 2031-09-20T23:56:17.650 | -9.98x | -52.65 | 71488.3 | -44.16 | -47.88 |