

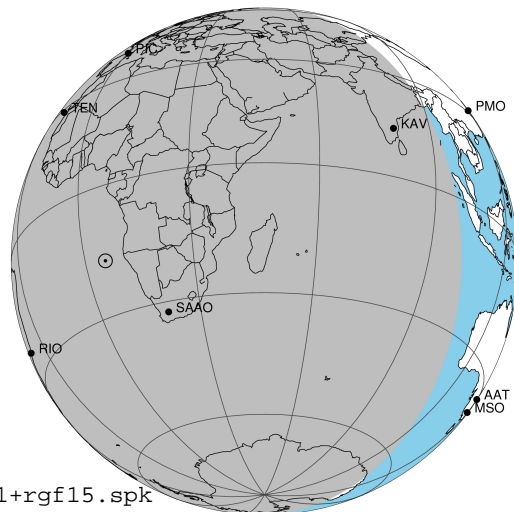
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-09T23:31:25.520
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068877915438787456
 2Mass ID (if available) : 17493976-2253315

Jupiter 2031-05-09T23:31:25 K7.99 G14.96 Pgt

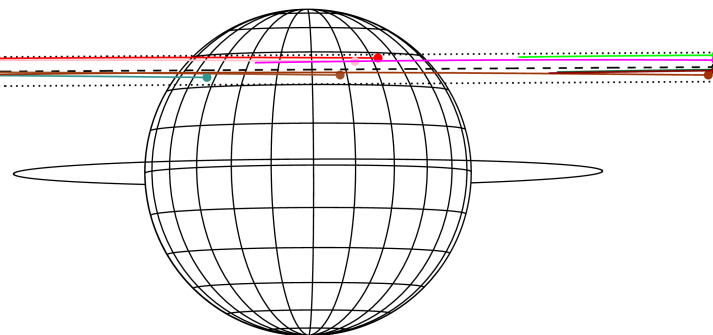
ICRS Star Coord at Epoch: 17h 49m 39.75759s -22:53:31.51994s

RUWE (>1.4 is poor) : 1.01
 K magnitude : 7.993
 G magnitude : 14.964
 RP magnitude : 13.370
 BP magnitude : 18.996
 DUPflag : 0
 Distance (au) : 4.469
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -9.89
 Sun-Target sep (deg) : 141.09
 Sun-Moon sep (deg) : 2.12
 B (ring opening deg) : -2.61
 PA of pole (deg) : 0.28
 Pole direction: RA (deg): 268.05695
 Dec (deg): 64.49651
 C/A sky separation (") : 13.905
 C/A sky separation (km) : 45070.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-05-09T23:31:25 K7.99 G14.96
 Pgt



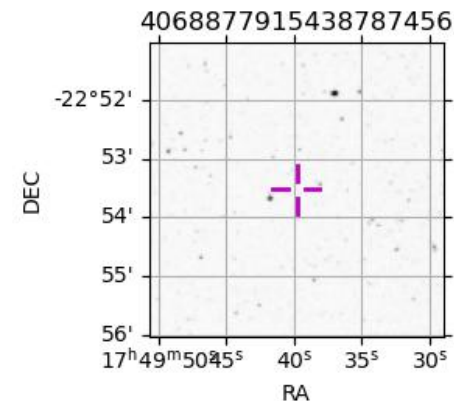
Earth
 PIC
 PMO
 TEN
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



2031-05-09T23:31:25.5200 α: 17 49 39.7576 δ: -22 53 31.520 C/A ***** PA 180.36 deg v_sky - 9.89 km/s D 04.47 AU
 Credit: Styled after SORA/Lucky Star

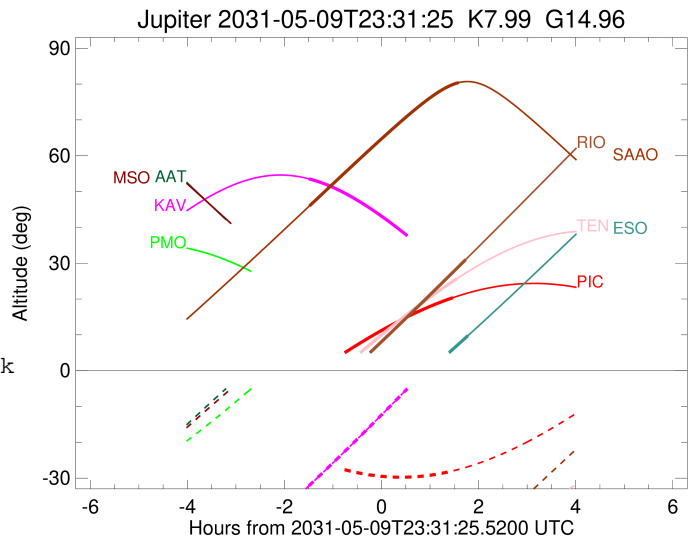
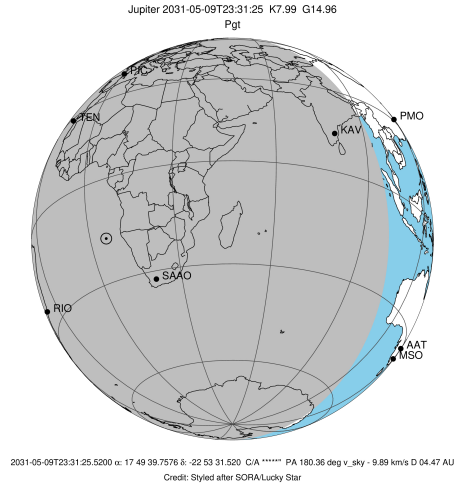
Observable events with sun below -5 deg and altitude above 5 deg

| Obs | Location | lat | Elon | Target | Observed Events Interval | OCode |
|------|-----------------------------------|-------|-------|--------|-----------------------------|-------|
| PIC | Pic du Midi | 42.9 | 0.1 | + | MAY 10 00:59 - MAY 10 00:59 | Pne |
| 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 | + | MAY 10 01:04 - MAY 10 01:04 | Pne |
| IRTF | Mauna Kea/IRTF | 19.8 | 204.5 | | | Pnn |
| KAV | Kavalur Observatory | 12.6 | 78.8 | + | MAY 09 22:01 - MAY 09 22:01 | Pin |
| RIO | Rio de Janeiro | -22.9 | 316.8 | + | MAY 10 01:15 - MAY 10 01:15 | Pne |
| ESO | European Southern Obs. (3.6m) | -29.3 | 289.3 | + | MAY 10 01:18 - MAY 10 01:18 | Pne |
| AAT | Siding Spring (AAT) | -31.3 | 149.1 | | | Pnn |
| SAAO | So. Afr. Astro. Obs. (Sutherland) | -32.4 | 20.8 | + | MAY 09 22:02 - MAY 10 01:06 | Pie |
| MSO | Mt. Stromlo Observatory | -35.3 | 149.0 | | | Pnn |



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-09T23:36:19.550
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        : 4068877915438787456
2Mass ID (if available) : 17493976-2253315
ICRS Star Coord at Epoch: 17h 49m 39.75759s -22:53:31.51994s
RUWE (>1.4 is poor)  : 1.01
K magnitude           : 7.993
G magnitude           : 14.964
RP magnitude          : 13.370
BP magnitude          : 18.996
DUPflag              : 0
Distance (au)         : 4.469
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -9.89
Sun-Target sep (deg)  : 141.09
Sun-Moon sep (deg)   : 1.36
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.28
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 15.521
C/A sky separation (km) : 50309.0
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
    
```

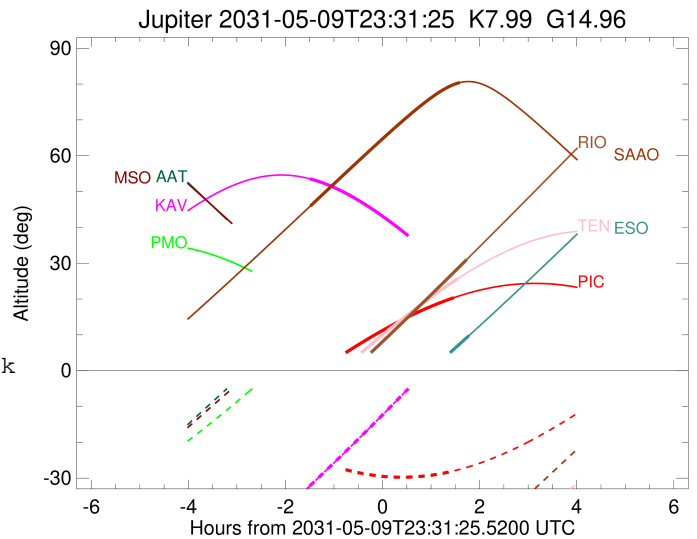
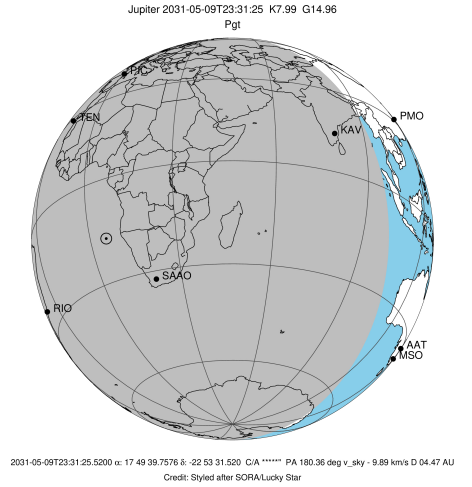


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|--------|---------|---------|---------|--------------|
| Jupiter | I | 2031-05-09T22:12:05.985 | -0.11x | -25.20 | 71487.5 | 44.12 | 47.83 |
| Jupiter | E | 2031-05-10T00:59:41.773 | 20.37 | -27.97 | 71487.3 | 45.02 | 48.72 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-09T23:38:39.970
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        : 4068877915438787456
2Mass ID (if available) : 17493976-2253315
ICRS Star Coord at Epoch: 17h 49m 39.75759s -22:53:31.51994s
RUWE (>1.4 is poor)  : 1.01
K magnitude           : 7.993
G magnitude           : 14.964
RP magnitude          : 13.370
BP magnitude          : 18.996
DUPflag              : 0
Distance (au)         : 4.469
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -9.89
Sun-Target sep (deg)  : 141.09
Sun-Moon sep (deg)    : 1.68
B (ring opening deg) : -2.61
PA of pole (deg)      : 0.28
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 15.072
C/A sky separation (km) : 48852.4
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
    
```

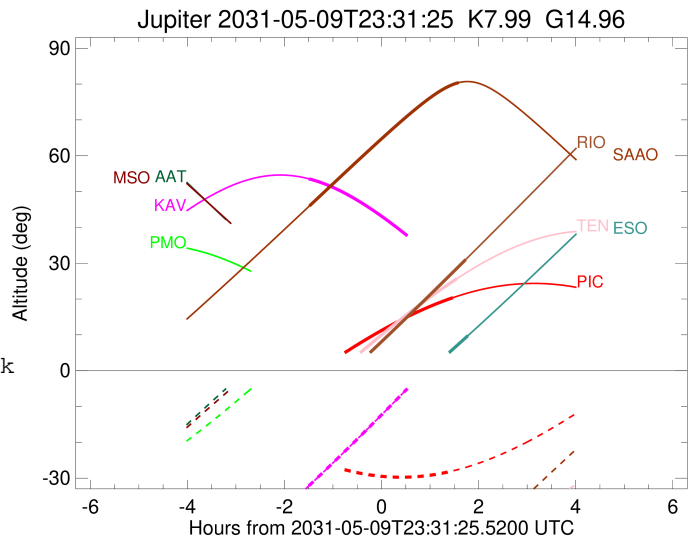
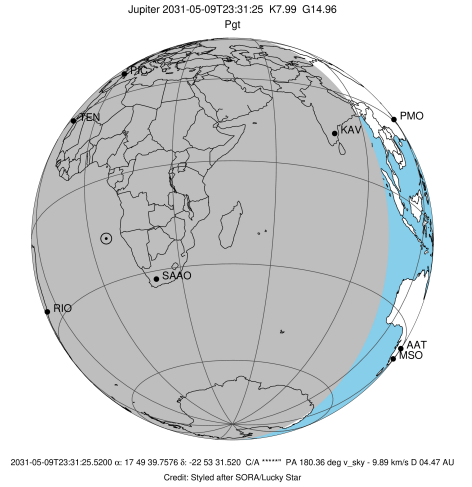


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|--------|---------|---------|---------|--------------|
| Jupiter | I | 2031-05-09T22:11:33.995 | -5.63x | -28.44 | 71487.8 | 42.26 | 45.98 |
| Jupiter | E | 2031-05-10T01:04:29.590 | 25.67 | -44.34 | 71487.6 | 43.67 | 47.38 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-09T23:26:51.220
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      : 4068877915438787456
2Mass ID (if available) : 17493976-2253315
ICRS Star Coord at Epoch: 17h 49m 39.75759s -22:53:31.51994s
RUWE (>1.4 is poor) : 1.01
K magnitude          : 7.993
G magnitude          : 14.964
RP magnitude         : 13.370
BP magnitude         : 18.996
DUPflag             : 0
Distance (au)       : 4.469
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -9.89
Sun-Target sep (deg) : 141.09
Sun-Moon sep (deg)  : 1.73
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.28
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (" ) : 14.946
C/A sky separation (km) : 48445.5
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
    
```

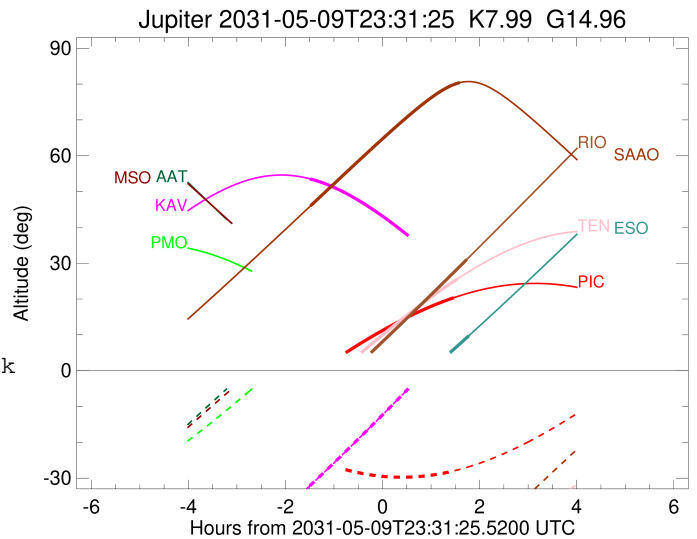
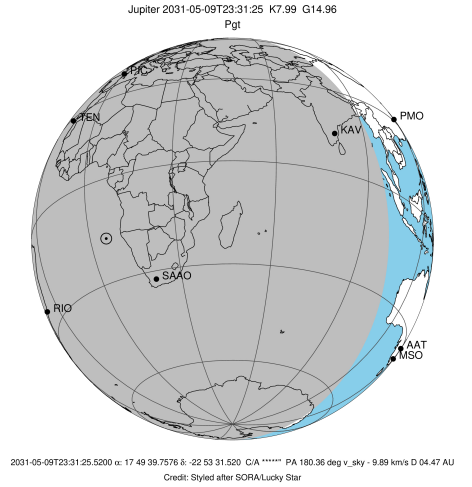


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2031-05-09T22:01:34.282 | 53.56 | -32.15 | 71487.7 | 43.01 | 46.73 |
| Jupiter | E | 2031-05-10T00:52:39.311 | 28.20 | 6.43x | 71487.9 | 41.89 | 45.60 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-09T23:40:06.240
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       : 4068877915438787456
2Mass ID (if available) : 17493976-2253315
ICRS Star Coord at Epoch: 17h 49m 39.75759s -22:53:31.51994s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 7.993
G magnitude           : 14.964
RP magnitude          : 13.370
BP magnitude          : 18.996
DUPflag              : 0
Distance (au)        : 4.469
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -9.89
Sun-Target sep (deg) : 141.09
Sun-Moon sep (deg)   : 2.61
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.28
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 13.219
C/A sky separation (km): 42847.4
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
    
```

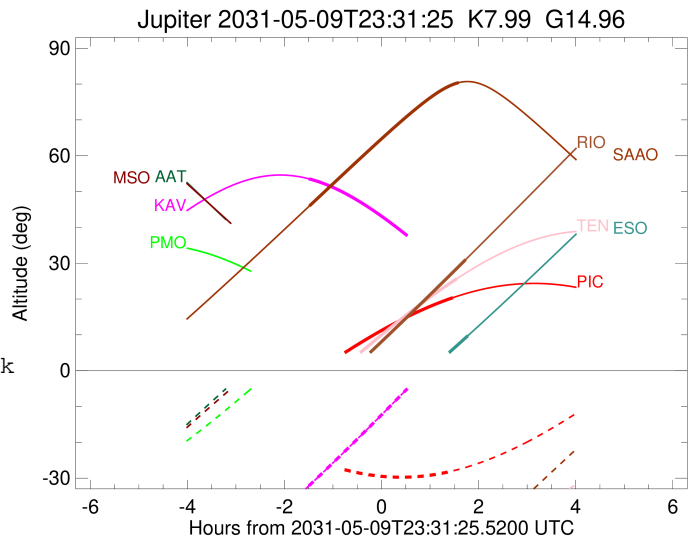
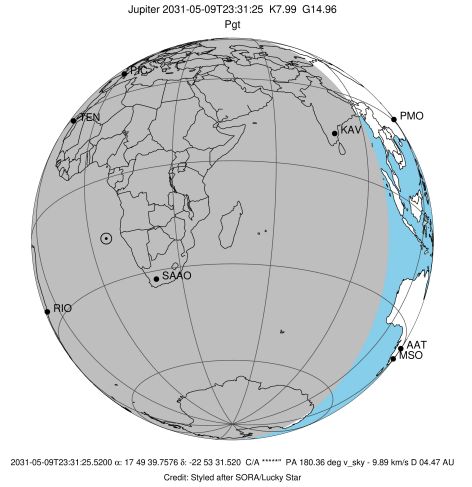


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|---------|---------|---------|---------|--------------|
| Jupiter | I | 2031-05-09T22:02:47.727 | -10.37x | -23.17 | 71488.8 | 35.91 | 39.54 |
| Jupiter | E | 2031-05-10T01:15:32.816 | 31.02 | -67.40 | 71488.5 | 37.62 | 41.29 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-09T23:38:48.740
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      : 4068877915438787456
2Mass ID (if available) : 17493976-2253315
ICRS Star Coord at Epoch: 17h 49m 39.75759s -22:53:31.51994s
RUWE (>1.4 is poor) : 1.01
K magnitude          : 7.993
G magnitude          : 14.964
RP magnitude         : 13.370
BP magnitude         : 18.996
DUPflag             : 0
Distance (au)       : 4.469
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -9.89
Sun-Target sep (deg) : 141.09
Sun-Moon sep (deg)  : 2.80
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.28
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation ("): 12.724
C/A sky separation (km): 41242.6
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
    
```

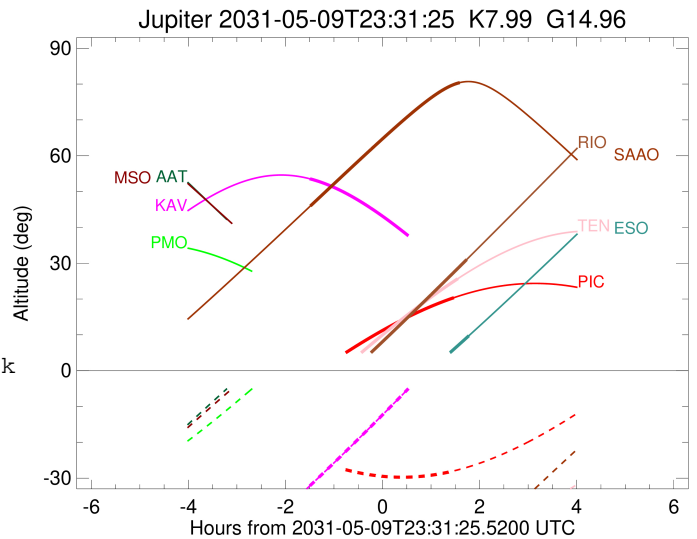
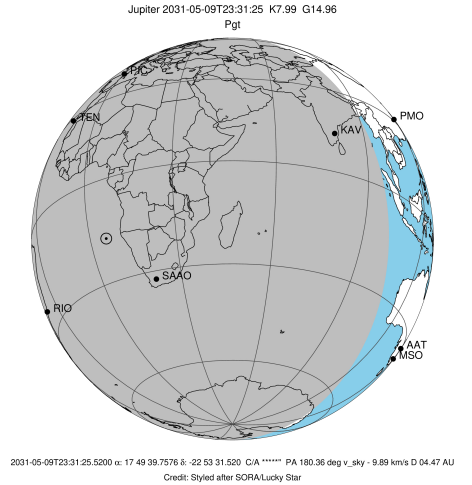


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|---------|---------|---------|---------|--------------|
| Jupiter | I | 2031-05-09T21:57:49.494 | -26.23x | 0.23x | 71489.0 | 34.55 | 38.14 |
| Jupiter | E | 2031-05-10T01:18:01.683 | 9.72 | -42.71 | 71488.8 | 35.99 | 39.62 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-09T23:34:53.090
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        : 4068877915438787456
2Mass ID (if available) : 17493976-2253315
ICRS Star Coord at Epoch: 17h 49m 39.75759s -22:53:31.51994s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 7.993
G magnitude           : 14.964
RP magnitude          : 13.370
BP magnitude          : 18.996
DUPflag              : 0
Distance (au)         : 4.469
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -9.89
Sun-Target sep (deg)  : 141.09
Sun-Moon sep (deg)    : 2.37
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.28
Pole direction: RA (deg): 268.05695
Dec (deg): 64.49651
C/A sky separation (") : 13.521
C/A sky separation (km) : 43824.7
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 | 2031-05-09T22:02:17.997 | 45.97 | -73.72 | 71488.6 | 37.32 | 40.99 |
| Jupiter | E | 2031-05-10T01:06:41.919 | 80.38 | -52.47 | 71488.5 | 37.89 | 41.57 |