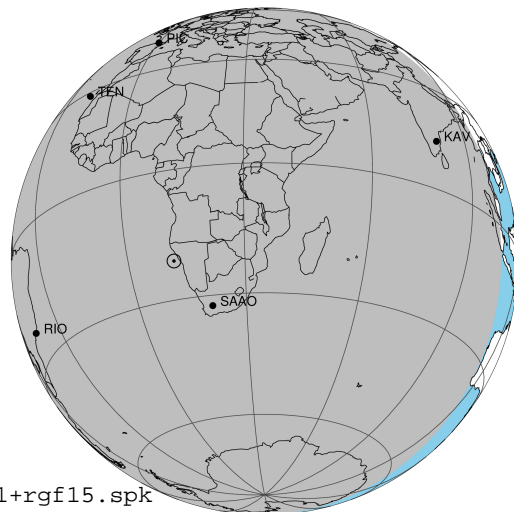


target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-05-26T23:08:04.930  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4116884109325851392  
 2Mass ID (if available) : 17424617-2252212

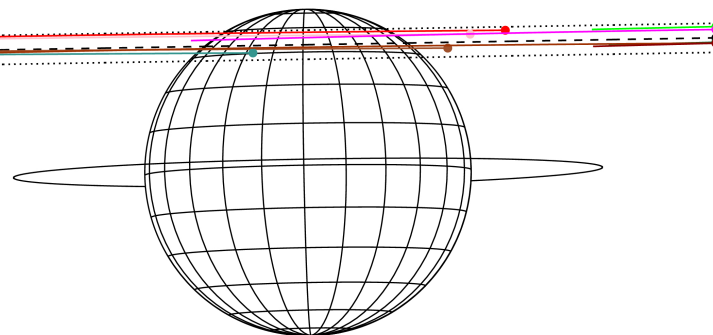
Jupiter 2031-05-26T23:08:04 K8.45 G14.83 Pgt

ICRS Star Coord at Epoch: 17h 42m 46.16547s -22:52:21.57842s  
 RUWE (>1.4 is poor) : 0.97  
 K magnitude : 8.449  
 G magnitude : 14.835  
 RP magnitude : 13.305  
 BP magnitude : 18.202  
 DUPflag : 0  
 Distance (au) : 4.329  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -14.50  
 Sun-Target sep (deg) : 159.04  
 Sun-Moon sep (deg) : 138.79  
 B (ring opening deg) : -2.61  
 PA of pole (deg) : 1.02  
 Pole direction: RA (deg): 268.05694  
 Dec (deg): 64.49651  
 C/A sky separation (") : 17.830  
 C/A sky separation (km) : 55975.1  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk



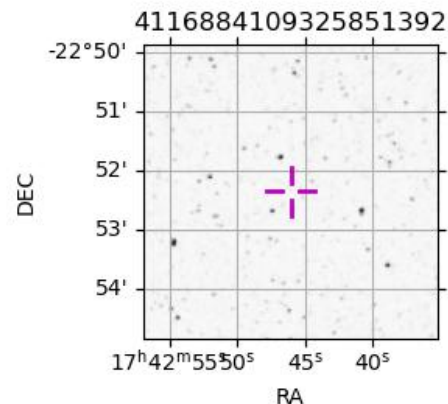
2031-05-26T23:08:04.9300 a: 17 42 46.1655 s: -22 52 21.578 C/A \*\*\*\*\* PA 180.96 deg v\_sky -14.50 km/s D 04.33 AU  
 Credit: Styled after SORA/Lucky Star

Earth  
 PIC  
 PMO  
 TEN  
 KAV  
 RIO  
 ESO  
 AAT  
 SAAO  
 MSO



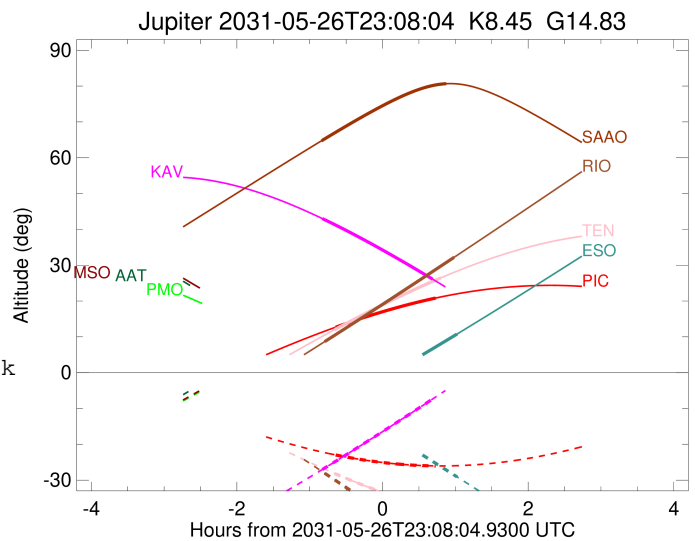
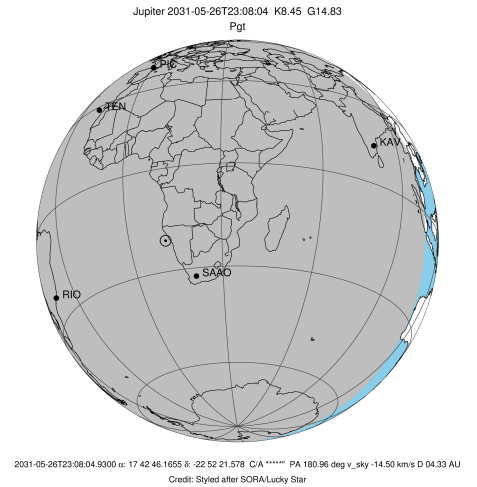
Observable events with sun below -5 deg and altitude above 5 deg

| Obs  | Location                          | lat   | Elon  | Target | Observed Events Interval    | OCode |
|------|-----------------------------------|-------|-------|--------|-----------------------------|-------|
| PIC  | Pic du Midi                       | 42.9  | 0.1   | + +    | MAY 26 22:29 - MAY 26 23:52 | Pie   |
| 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 26 22:28 - MAY 26 23:56 | Pie   |
| IRTF | Mauna Kea/IRTF                    | 19.8  | 204.5 |        |                             | Pnn   |
| KAV  | Kavalur Observatory               | 12.6  | 78.8  | + +    | MAY 26 22:18 - MAY 26 23:49 | Pie   |
| RIO  | Rio de Janeiro                    | -22.9 | 316.8 | + +    | MAY 26 22:20 - MAY 27 00:07 | Pie   |
| ESO  | European Southern Obs. (3.6m)     | -29.3 | 289.3 | +      | MAY 27 00:09 - MAY 27 00:09 | Pne   |
| AAT  | Siding Spring (AAT)               | -31.3 | 149.1 |        |                             | Pnn   |
| SAAO | So. Afr. Astro. Obs. (Sutherland) | -32.4 | 20.8  | + +    | MAY 26 22:17 - MAY 27 00:00 | Pie   |
| MSO  | Mt. Stromlo Observatory           | -35.3 | 149.0 |        |                             | Pnn   |



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-26T23:10:48.050
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     : 4116884109325851392
2Mass ID (if available) : 17424617-2252212
ICRS Star Coord at Epoch: 17h 42m 46.16547s -22:52:21.57842s
RUWE (>1.4 is poor) : 0.97
K magnitude        : 8.449
G magnitude        : 14.835
RP magnitude       : 13.305
BP magnitude       : 18.202
DUPflag           : 0
Distance (au)     : 4.329
f0 (km)           : 0.00
g0 (km)           : 0.00
skyplane vel. (km/s) : -14.50
Sun-Target sep (deg) : 159.04
Sun-Moon sep (deg) : 139.19
B (ring opening deg) : -2.61
PA of pole (deg)  : 1.02
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 19.568
C/A sky separation (km) : 61432.6
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
    
```

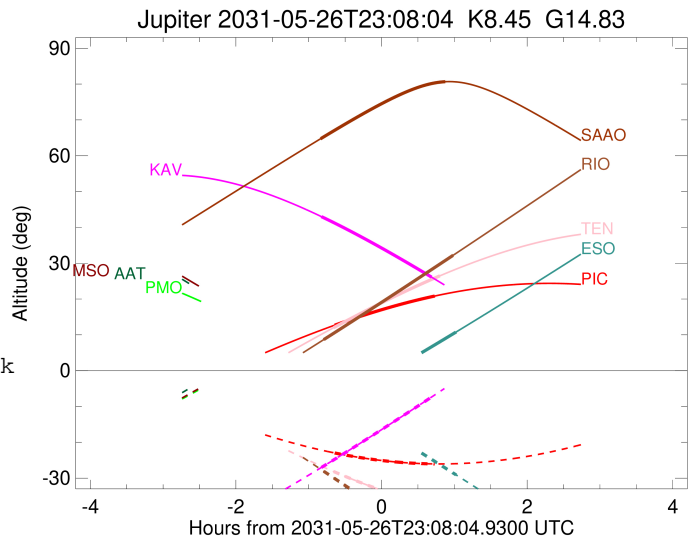
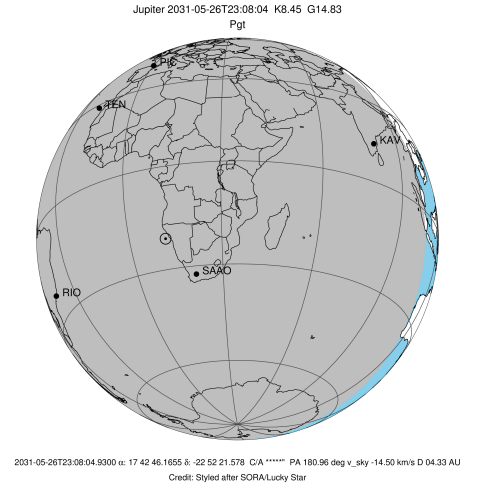


x: target alt < 5.0 deg or sun > -5.0 deg

| Target  | I/E | UTC                     | alt   | alt-sun | radius  | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I   | 2031-05-26T22:29:29.788 | 12.70 | -22.97  | 71485.2 | 58.75   | 61.90        |
| Jupiter | E   | 2031-05-26T23:51:59.882 | 20.83 | -26.02  | 71485.1 | 59.46   | 62.56        |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-26T23:12:31.250
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      : 4116884109325851392
2Mass ID (if available) : 17424617-2252212
ICRS Star Coord at Epoch: 17h 42m 46.16547s -22:52:21.57842s
RUWE (>1.4 is poor) : 0.97
K magnitude          : 8.449
G magnitude          : 14.835
RP magnitude         : 13.305
BP magnitude         : 18.202
DUPflag             : 0
Distance (au)       : 4.329
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.50
Sun-Target sep (deg) : 159.04
Sun-Moon sep (deg)  : 139.41
B (ring opening deg) : -2.61
PA of pole (deg)    : 1.02
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (" ) : 19.140
C/A sky separation (km) : 60087.6
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
    
```

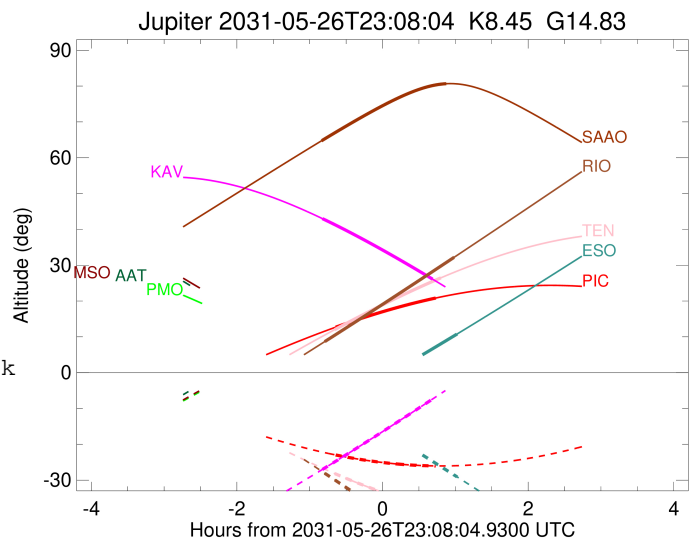
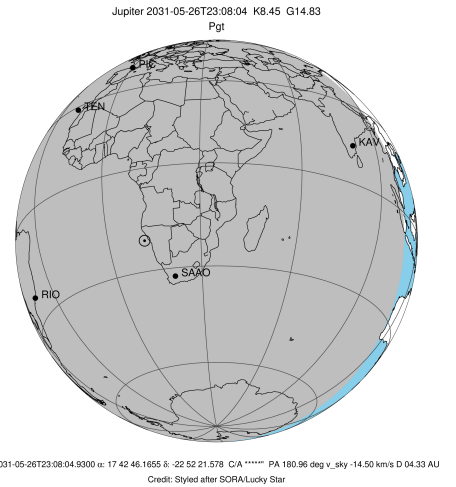


x: target alt < 5.0 deg or sun > -5.0 deg

| Target  | I/E | UTC                     | alt   | alt-sun | radius  | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I   | 2031-05-26T22:28:40.098 | 12.00 | -28.15  | 71485.5 | 56.53   | 59.81        |
| Jupiter | E   | 2031-05-26T23:56:11.111 | 26.47 | -38.07  | 71485.4 | 57.61   | 60.83        |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-26T23:03:47.160
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        : 4116884109325851392
2Mass ID (if available) : 17424617-2252212
ICRS Star Coord at Epoch: 17h 42m 46.16547s -22:52:21.57842s
RUWE (>1.4 is poor)  : 0.97
K magnitude           : 8.449
G magnitude           : 14.835
RP magnitude          : 13.305
BP magnitude          : 18.202
DUPflag              : 0
Distance (au)         : 4.329
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s)  : -14.50
Sun-Target sep (deg)  : 159.04
Sun-Moon sep (deg)    : 138.64
B (ring opening deg)  : -2.61
PA of pole (deg)      : 1.02
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 18.818
C/A sky separation (km) : 59077.7
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
    
```

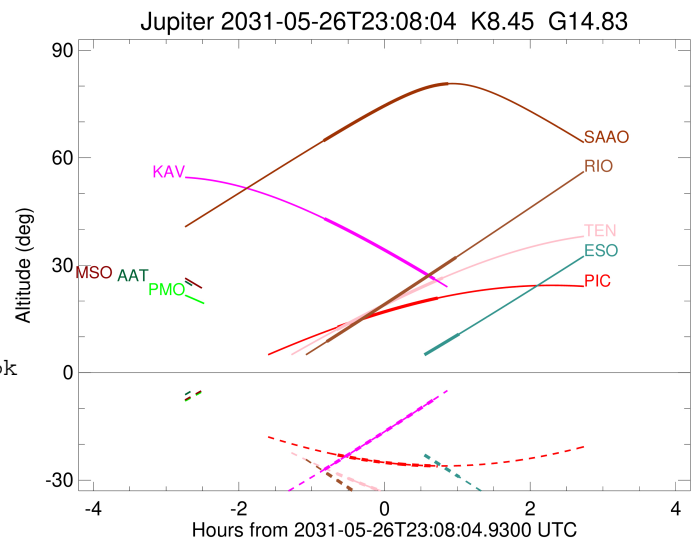
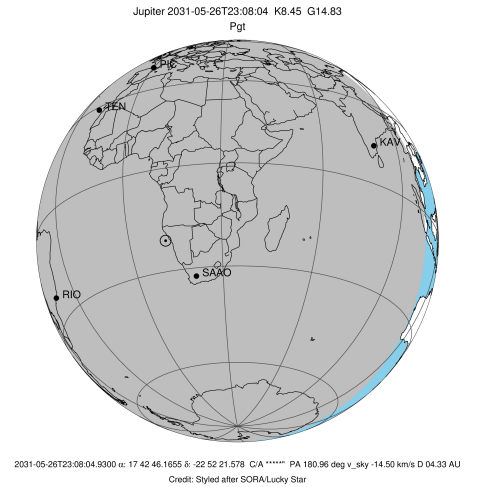


x: target alt < 5.0 deg or sun > -5.0 deg

| Target  | I/E | UTC                     | alt   | alt-sun | radius  | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I   | 2031-05-26T22:18:35.478 | 42.99 | -27.01  | 71485.6 | 55.98   | 59.30        |
| Jupiter | E   | 2031-05-26T23:49:08.530 | 26.14 | -7.41   | 71485.7 | 55.21   | 58.57        |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-26T23:13:55.700
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     : 4116884109325851392
2Mass ID (if available) : 17424617-2252212
ICRS Star Coord at Epoch: 17h 42m 46.16547s -22:52:21.57842s
RUWE (>1.4 is poor) : 0.97
K magnitude        : 8.449
G magnitude        : 14.835
RP magnitude       : 13.305
BP magnitude       : 18.202
DUPflag           : 0
Distance (au)     : 4.329
f0 (km)           : 0.00
g0 (km)           : 0.00
skyplane vel. (km/s) : -14.50
Sun-Target sep (deg) : 159.04
Sun-Moon sep (deg) : 139.62
B (ring opening deg) : -2.61
PA of pole (deg)  : 1.02
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 17.252
C/A sky separation (km) : 54160.2
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
    
```

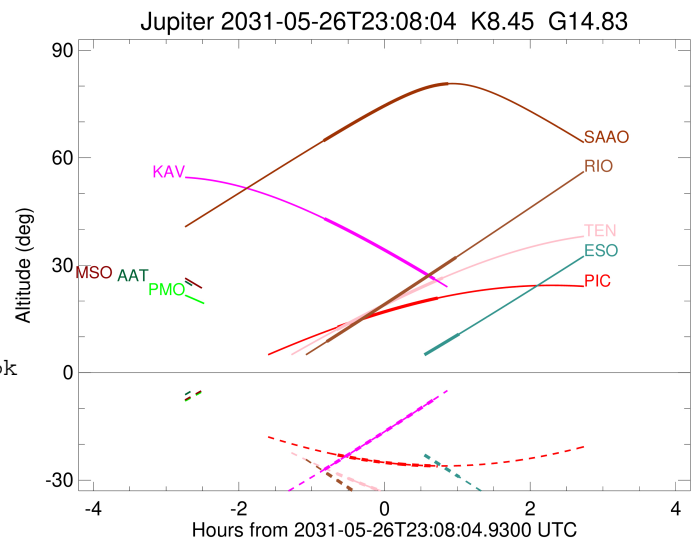
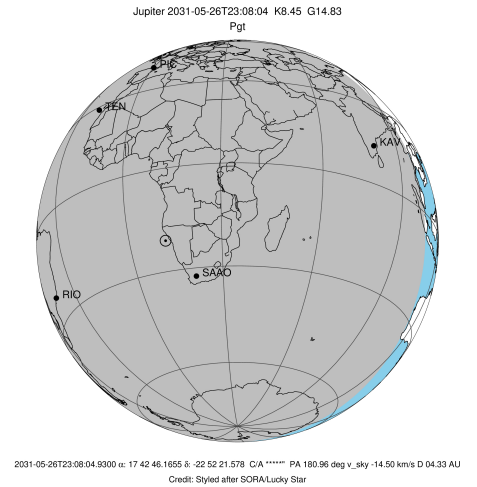


x: target alt < 5.0 deg or sun > -5.0 deg

| Target  | I/E | UTC                     | alt   | alt-sun | radius  | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I   | 2031-05-26T22:20:28.305 | 8.67  | -28.07  | 71486.8 | 48.48   | 52.11        |
| Jupiter | E   | 2031-05-27T00:07:01.161 | 32.18 | -52.31  | 71486.6 | 49.86   | 53.45        |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-26T23:13:35.960
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        : 4116884109325851392
2Mass ID (if available) : 17424617-2252212
ICRS Star Coord at Epoch: 17h 42m 46.16547s -22:52:21.57842s
RUWE (>1.4 is poor) : 0.97
K magnitude           : 8.449
G magnitude           : 14.835
RP magnitude          : 13.305
BP magnitude          : 18.202
DUPflag              : 0
Distance (au)         : 4.329
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -14.50
Sun-Target sep (deg)  : 159.04
Sun-Moon sep (deg)   : 139.39
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.02
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 16.729
C/A sky separation (km) : 52518.9
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
    
```

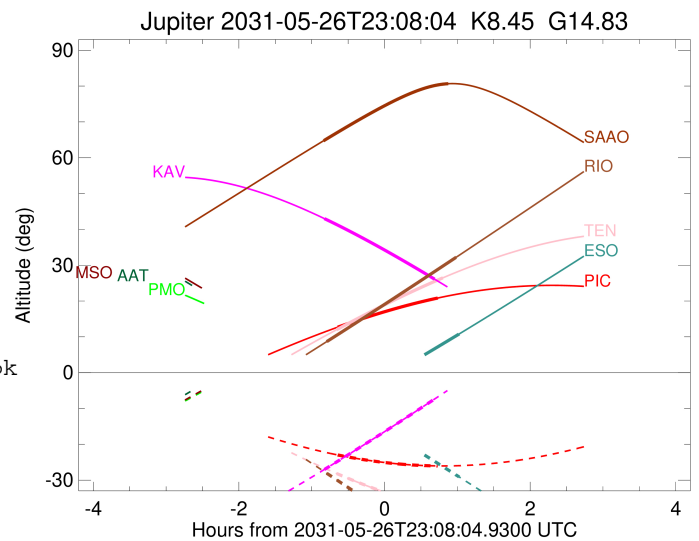
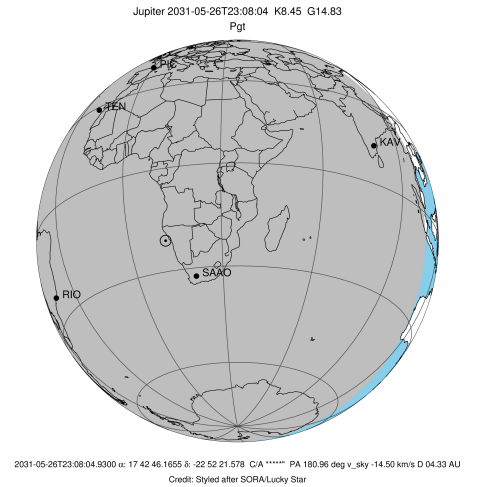


x: target alt < 5.0 deg or sun > -5.0 deg

| Target  | I/E | UTC                     | alt     | alt-sun | radius  | lat-geo | lat-geodetic |
|---------|-----|-------------------------|---------|---------|---------|---------|--------------|
| Jupiter | I   | 2031-05-26T22:17:18.739 | -11.09x | -5.47   | 71487.1 | 46.58   | 50.26        |
| Jupiter | E   | 2031-05-27T00:09:29.873 | 10.78   | -29.08  | 71486.9 | 47.88   | 51.53        |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-26T23:09:21.420
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       : 4116884109325851392
2Mass ID (if available) : 17424617-2252212
ICRS Star Coord at Epoch: 17h 42m 46.16547s -22:52:21.57842s
RUWE (>1.4 is poor) : 0.97
K magnitude           : 8.449
G magnitude           : 14.835
RP magnitude          : 13.305
BP magnitude          : 18.202
DUPflag              : 0
Distance (au)        : 4.329
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -14.50
Sun-Target sep (deg) : 159.04
Sun-Moon sep (deg)   : 139.51
B (ring opening deg) : -2.61
PA of pole (deg)     : 1.02
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 17.477
C/A sky separation (km): 54866.1
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   | 2031-05-26T22:17:55.459 | 64.74 | -78.45  | 71486.6 | 49.78   | 53.38        |
| Jupiter | E   | 2031-05-27T00:00:41.810 | 80.65 | -67.79  | 71486.5 | 50.21   | 53.79        |