

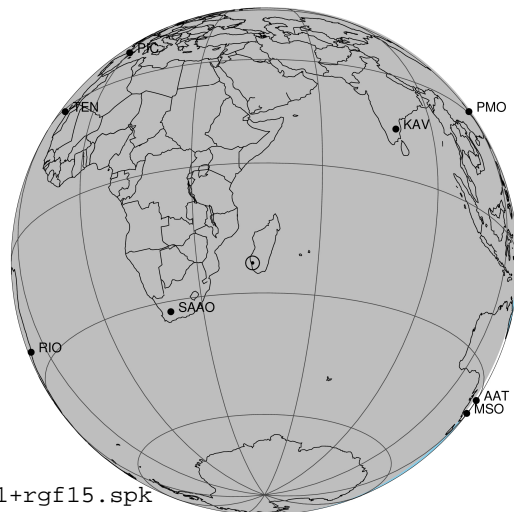
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-12T21:04:35.190
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4117454103005400960
 2Mass ID (if available) : 17335288-2249510

Jupiter 2031-06-12T21:04:35 K7.26 G14.48 Pgt

ICRS Star Coord at Epoch: 17h 33m 52.87867s -22:49:51.21827s

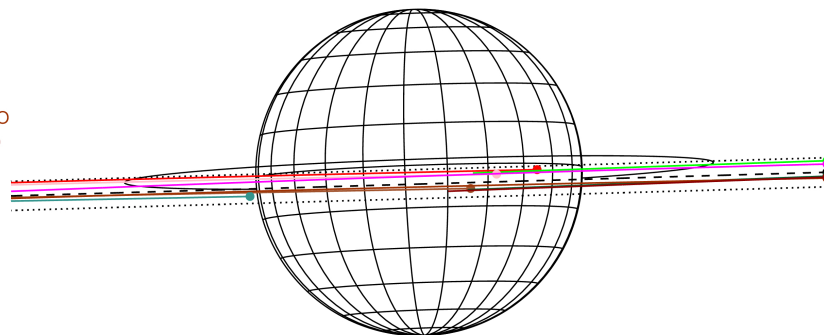
RUWE (>1.4 is poor) : 1.06
 K magnitude : 7.262
 G magnitude : 14.485
 RP magnitude : 12.841
 BP magnitude : 18.515
 DUPflag : 0
 Distance (au) : 4.267
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.43
 Sun-Target sep (deg) : 177.25
 Sun-Moon sep (deg) : 96.91
 B (ring opening deg) : -2.60
 PA of pole (deg) : 1.98
 Pole direction: RA (deg): 268.05692
 Dec (deg): 64.49651
 C/A sky separation (") : 1.638
 C/A sky separation (km) : 5067.7
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-06-12T21:04:35 K7.26 G14.48
 Pgt



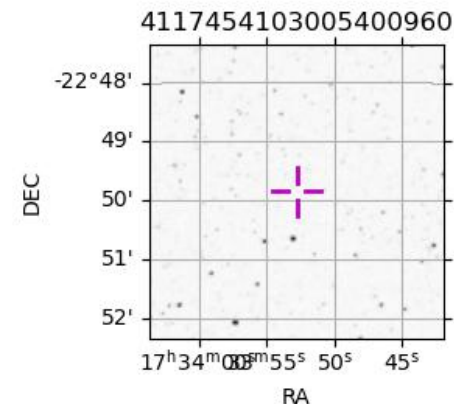
2031-06-12T21:04:35.1900 a: 17 33 52.8787 & -22 49 51.218 C/A 1.650" PA 1.66 deg v_sky -16.43 km/s D 04.27 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PMO
 TEN
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



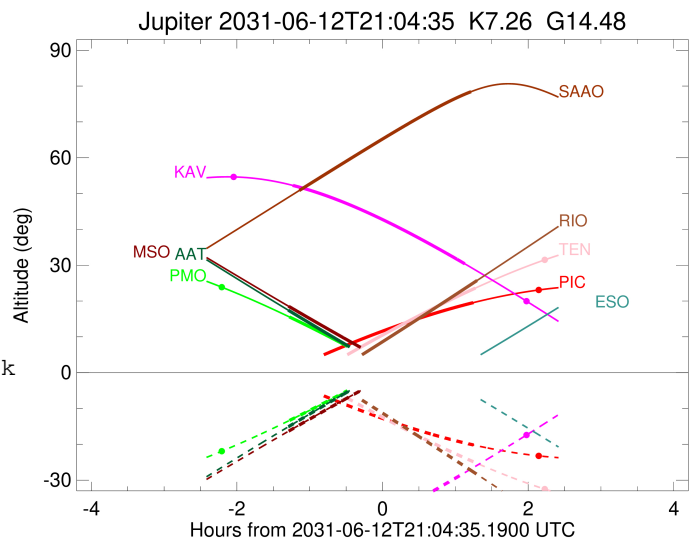
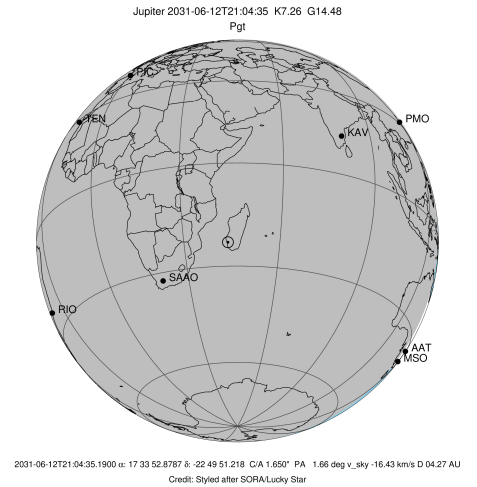
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+	JUN 12 22:19 - JUN 12 22:19	Pne
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+	JUN 12 19:47 - JUN 12 19:47	Pin
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	+	JUN 12 22:21 - JUN 12 22:21	Pne
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+ +	JUN 12 19:50 - JUN 12 22:12	Pie
RIO	Rio de Janeiro	-22.9	316.8	+ +	JUN 12 22:22 - JUN 12 22:22	Pne
ESO	European Southern Obs. (3.6m)	-29.3	289.3			Pnn
AAT	Siding Spring (AAT)	-31.3	149.1	+	JUN 12 19:46 - JUN 12 19:46	Pin
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	JUN 12 19:56 - JUN 12 22:17	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	JUN 12 19:47 - JUN 12 19:47	Pin



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-12T21:08:07.340
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       : 4117454103005400960
2Mass ID (if available) : 17335288-2249510
ICRS Star Coord at Epoch: 17h 33m 52.87867s -22:49:51.21827s
RUWE (>1.4 is poor) : 1.06
K magnitude           : 7.262
G magnitude           : 14.485
RP magnitude          : 12.841
BP magnitude          : 18.515
DUPflag              : 0
Distance (au)         : 4.267
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.43
Sun-Target sep (deg)  : 177.25
Sun-Moon sep (deg)    : 97.04
B (ring opening deg) : -2.60
PA of pole (deg)      : 1.98
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (" ) : 0.031
C/A sky separation (km) : 96.9
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
    
```

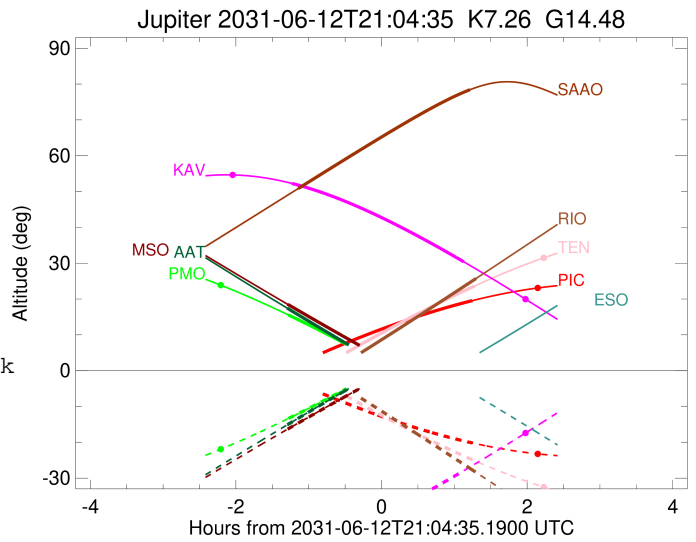
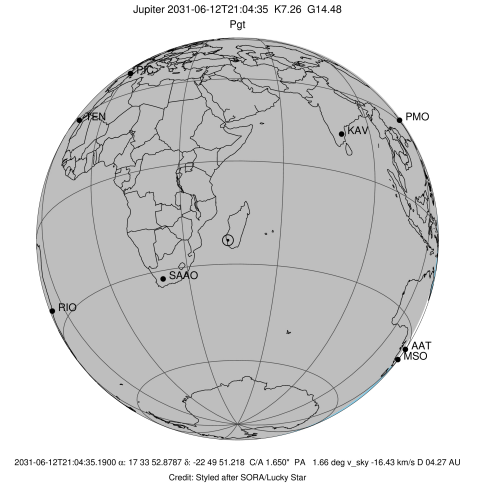


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-12T19:56:26.783	2.05x	-3.62x	71492.0	-0.63	-0.72
Jupiter	E	2031-06-12T22:19:27.909	19.55	-20.17	71492.0	0.69	0.78

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-12T20:59:29.760
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : PMO
Location              : Purple Mtn Obs. Nanking
Latitude (deg)       : 32.06667
E. Longitude (deg)   : 118.82089
Altitude (km)        : 0.364
Gaia source ID       : 4117454103005400960
2Mass ID (if available) : 17335288-2249510
ICRS Star Coord at Epoch: 17h 33m 52.87867s -22:49:51.21827s
RUWE (>1.4 is poor) : 1.06
K magnitude           : 7.262
G magnitude           : 14.485
RP magnitude          : 12.841
BP magnitude          : 18.515
DUPflag              : 0
Distance (au)        : 4.267
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.43
Sun-Target sep (deg) : 177.25
Sun-Moon sep (deg)   : 97.04
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.98
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 0.369
C/A sky separation (km): 1142.5
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
    
```

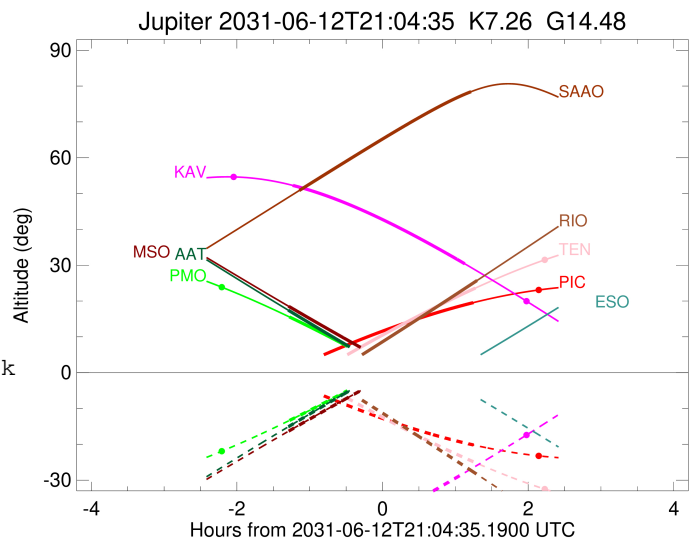
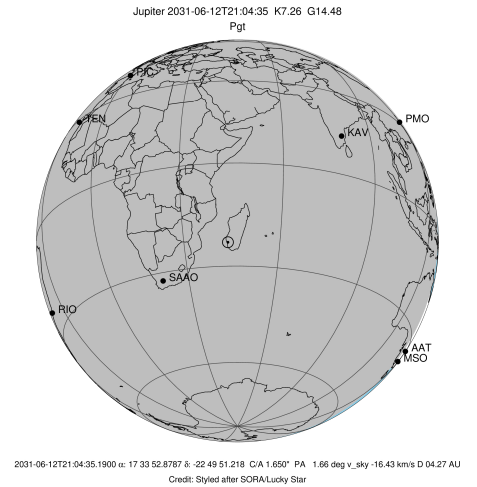


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-12T19:47:48.783	15.56	-13.35	71492.0	-0.78	-0.90
Jupiter	E	2031-06-12T22:11:40.585	-10.92x	13.40x	71492.0	-1.12	-1.28

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-12T21:09:43.930
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       : 4117454103005400960
2Mass ID (if available) : 17335288-2249510
ICRS Star Coord at Epoch: 17h 33m 52.87867s -22:49:51.21827s
RUWE (>1.4 is poor) : 1.06
K magnitude           : 7.262
G magnitude           : 14.485
RP magnitude         : 12.841
BP magnitude         : 18.515
DUPflag              : 0
Distance (au)        : 4.267
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.43
Sun-Target sep (deg) : 177.25
Sun-Moon sep (deg)   : 97.00
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.98
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 0.453
C/A sky separation (km): 1401.4
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
    
```

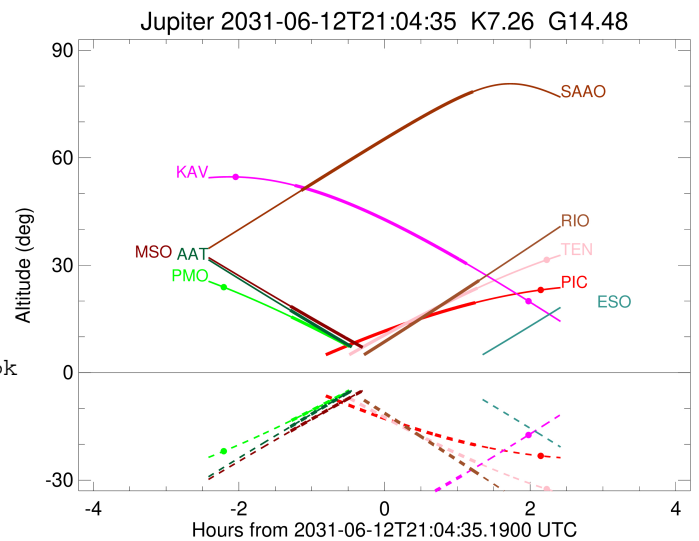
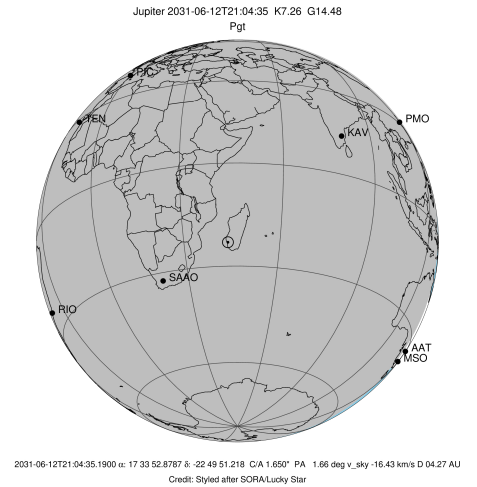


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-12T19:57:47.616	-2.44x	0.20x	71492.0	-1.97	-2.25
Jupiter	E	2031-06-12T22:21:10.644	23.62	-25.12	71492.0	-0.35	-0.40

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-12T21:01:23.510
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      : 4117454103005400960
2Mass ID (if available) : 17335288-2249510
ICRS Star Coord at Epoch: 17h 33m 52.87867s -22:49:51.21827s
RUWE (>1.4 is poor) : 1.06
K magnitude          : 7.262
G magnitude          : 14.485
RP magnitude         : 12.841
BP magnitude         : 18.515
DUPflag             : 0
Distance (au)        : 4.267
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.43
Sun-Target sep (deg) : 177.25
Sun-Moon sep (deg)   : 97.62
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.98
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 0.532
C/A sky separation (km): 1647.1
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
    
```

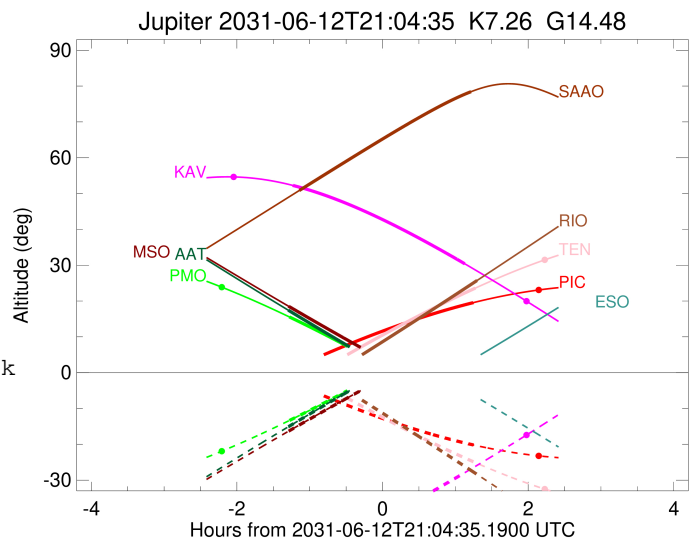
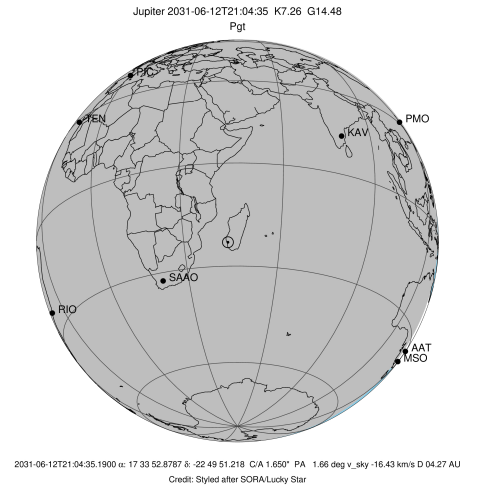


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-12T19:50:41.952	52.26	-50.84	71492.0	-1.44	-1.65
Jupiter	E	2031-06-12T22:12:22.722	30.39	-27.92	71492.0	-1.36	-1.56

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-12T21:10:33.870
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      : 4117454103005400960
2Mass ID (if available) : 17335288-2249510
ICRS Star Coord at Epoch: 17h 33m 52.87867s -22:49:51.21827s
RUWE (>1.4 is poor) : 1.06
K magnitude          : 7.262
G magnitude          : 14.485
RP magnitude         : 12.841
BP magnitude         : 18.515
DUPflag             : 0
Distance (au)        : 4.267
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.43
Sun-Target sep (deg) : 177.25
Sun-Moon sep (deg)   : 96.95
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.98
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 2.402
C/A sky separation (km): 7431.9
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
    
```

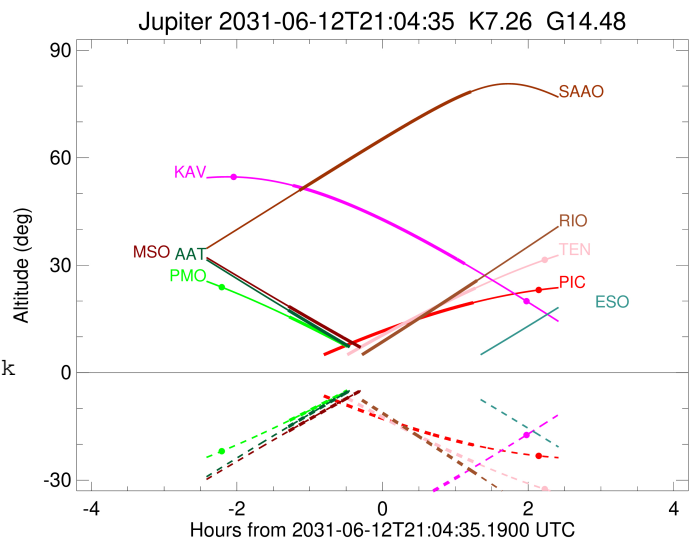
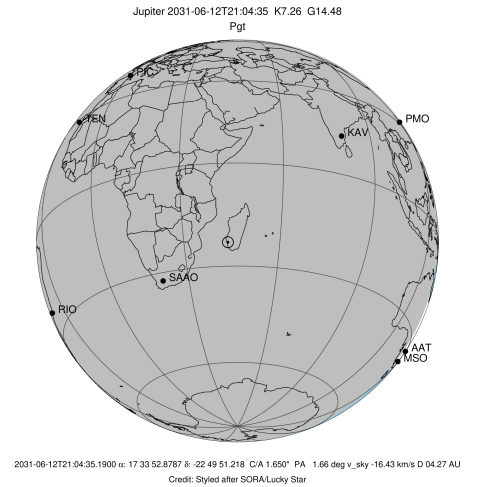


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-12T19:58:10.320	-5.38x	2.75x	71491.9	-6.85	-7.82
Jupiter	E	2031-06-12T22:22:21.678	25.70	-28.36	71491.9	-5.08	-5.80

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-12T20:58:58.980
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : AAT
Location             : Siding Spring (AAT)
Latitude (deg)       : -31.27703
E. Longitude (deg)   : 149.06608
Altitude (km)        : 1.164
Gaia source ID       : 4117454103005400960
2Mass ID (if available) : 17335288-2249510
ICRS Star Coord at Epoch: 17h 33m 52.87867s -22:49:51.21827s
RUWE (>1.4 is poor) : 1.06
K magnitude           : 7.262
G magnitude           : 14.485
RP magnitude          : 12.841
BP magnitude          : 18.515
DUPflag              : 0
Distance (au)        : 4.267
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.43
Sun-Target sep (deg) : 177.25
Sun-Moon sep (deg)   : 97.04
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.98
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 2.703
C/A sky separation (km): 8363.2
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
    
```

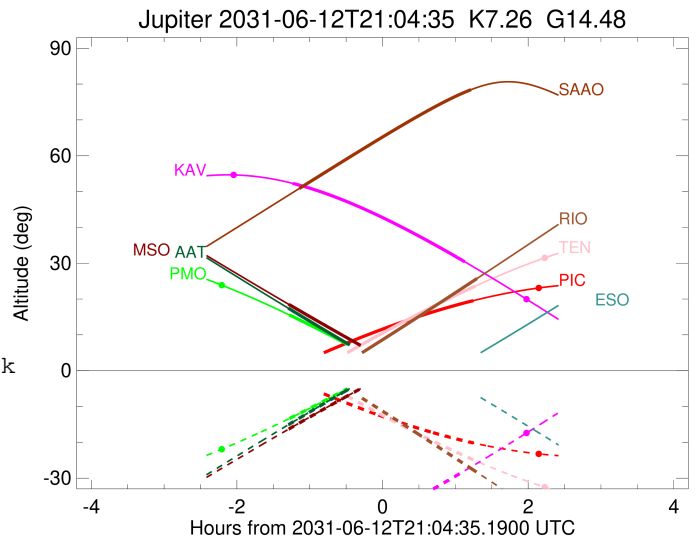
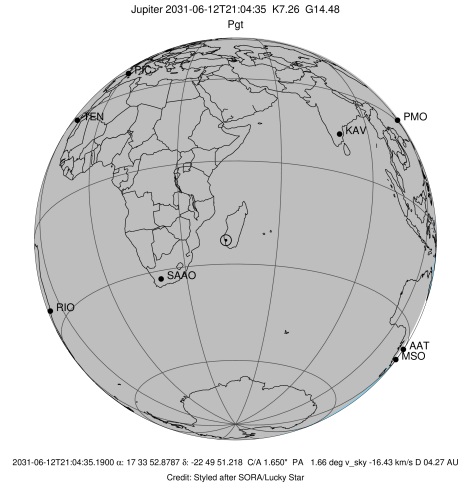


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-12T19:46:55.501	17.44	-15.11	71491.9	-6.49	-7.41
Jupiter	E	2031-06-12T22:11:34.888	-10.53x	12.32x	71491.9	-6.92	-7.90


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-12T21:06:55.760
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       : 4117454103005400960
2Mass ID (if available) : 17335288-2249510
ICRS Star Coord at Epoch: 17h 33m 52.87867s -22:49:51.21827s
RUWE (>1.4 is poor) : 1.06
K magnitude           : 7.262
G magnitude           : 14.485
RP magnitude          : 12.841
BP magnitude          : 18.515
DUPflag              : 0
Distance (au)        : 4.267
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.43
Sun-Target sep (deg) : 177.25
Sun-Moon sep (deg)   : 97.72
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.98
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 2.057
C/A sky separation (km): 6365.5
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
    
```

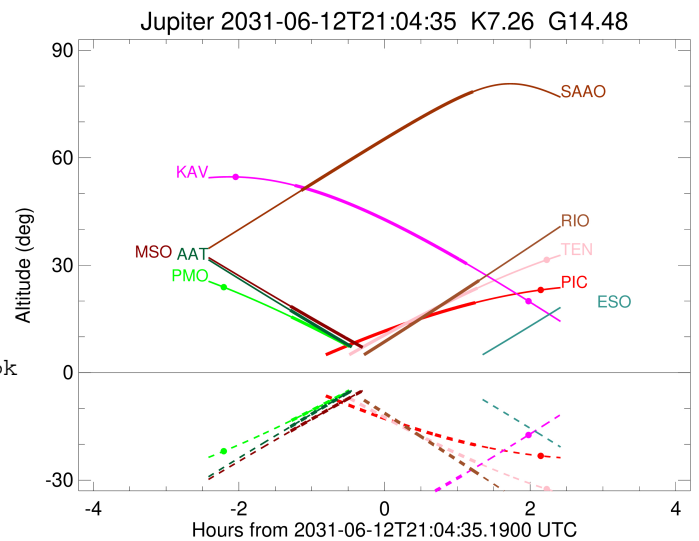
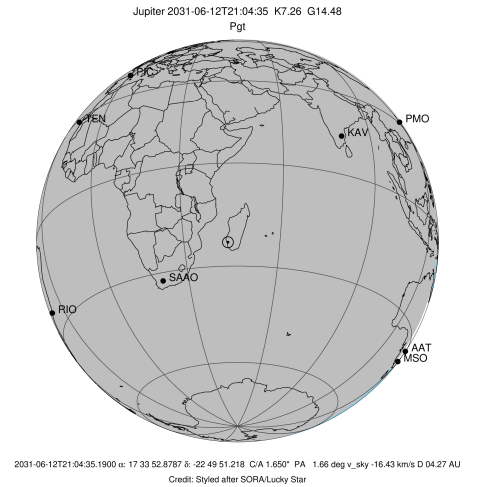


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-12T19:56:05.454	50.86	-53.55	71491.9	-5.74	-6.56
Jupiter	E	2031-06-12T22:17:32.380	78.43	-80.03	71491.9	-4.61	-5.27


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-12T20:59:13.230
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : MSO
Location              : Mt. Stromlo Observatory
Latitude (deg)        : -35.32000
E. Longitude (deg)    : 149.00833
Altitude (km)         : 0.770
Gaia source ID        : 4117454103005400960
2Mass ID (if available) : 17335288-2249510
ICRS Star Coord at Epoch: 17h 33m 52.87867s -22:49:51.21827s
RUWE (>1.4 is poor) : 1.06
K magnitude           : 7.262
G magnitude           : 14.485
RP magnitude          : 12.841
BP magnitude          : 18.515
DUPflag              : 0
Distance (au)         : 4.267
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.43
Sun-Target sep (deg)  : 177.25
Sun-Moon sep (deg)    : 97.07
B (ring opening deg) : -2.60
PA of pole (deg)      : 1.98
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 2.810
C/A sky separation (km) : 8696.5
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	2031-06-12T19:47:12.271	18.54	-16.33	71491.9	-6.78	-7.74
Jupiter	E	2031-06-12T22:11:45.104	-8.19x	9.87x	71491.9	-7.16	-8.18