

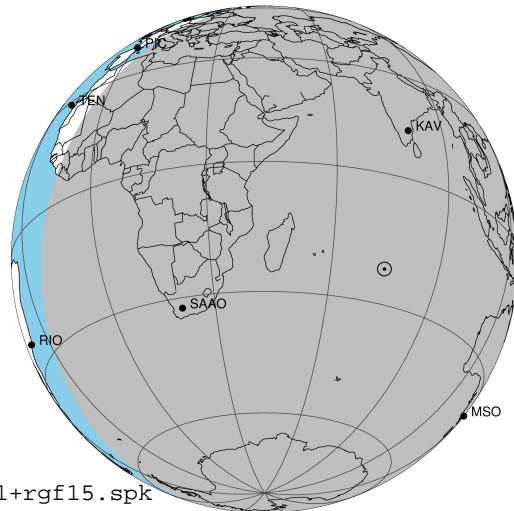
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-07-11T19:09:25.270
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4114691545671620608
 2Mass ID (if available) : 17185891-2242196

Jupiter 2031-07-11T19:09:25 K9.45 G14.35 Pgt

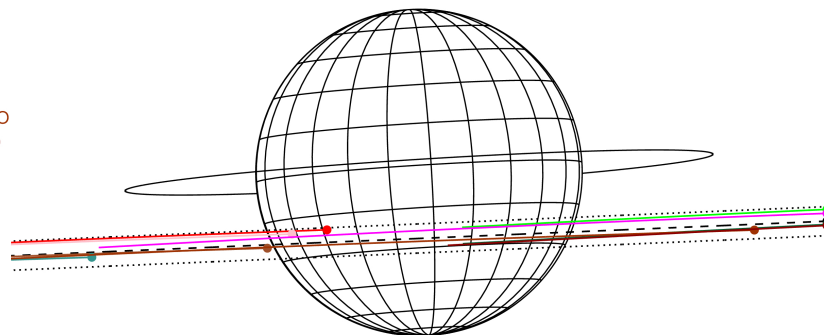
ICRS Star Coord at Epoch: 17h 18m 58.91575s -22:42:19.86819s

RUWE (>1.4 is poor) : 0.95
 K magnitude : 9.451
 G magnitude : 14.352
 RP magnitude : 13.060
 BP magnitude : 16.234
 DUPflag : 0
 Distance (au) : 4.354
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -13.01
 Sun-Target sep (deg) : 151.68
 Sun-Moon sep (deg) : 121.89
 B (ring opening deg) : -2.56
 PA of pole (deg) : 3.57
 Pole direction: RA (deg): 268.05690
 Dec (deg): 64.49651
 C/A sky separation (") : 9.142
 C/A sky separation (km) : 28870.6
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-07-11T19:09:25 K9.45 G14.35
 Pgt



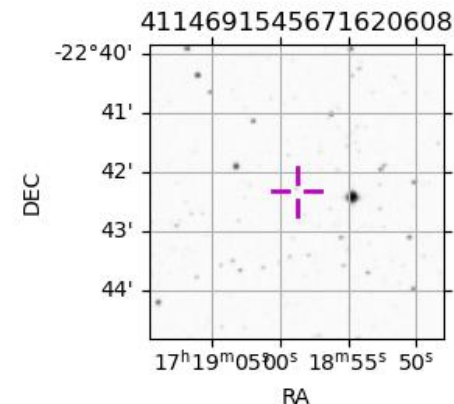
Earth
 PIC
 PMO
 TEN
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



2031-07-11T19:09:25.2700 a: 17 18 58.9157 s: -22 42 19.868 C/A 9.153° PA 2.43 deg v_sky -13.01 km/s D 04.35 AU
 Credit: Styled after SORA/Lucky Star

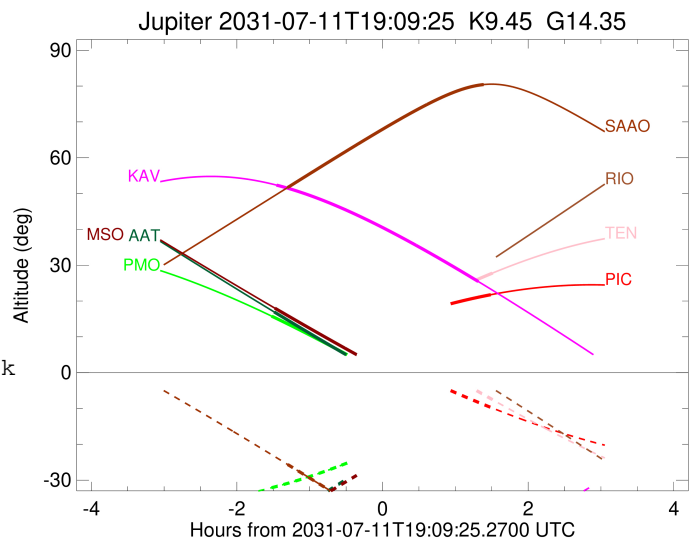
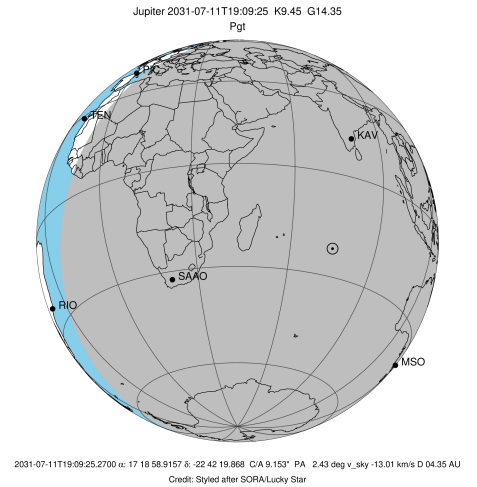
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	JUL 11 20:38 - JUL 11 20:38	Pne
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+	JUL 11 17:38 - JUL 11 17:38	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	+	JUL 11 20:40 - JUL 11 20:40	Pne
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+ +	JUL 11 17:42 - JUL 11 20:28	Pie
RIO	Rio de Janeiro	-22.9	316.8			Pnn
ESO	European Southern Obs. (3.6m)	-29.3	289.3			Pnn
AAT	Siding Spring (AAT)	-31.3	149.1	+	JUL 11 17:40 - JUL 11 17:40	Pin
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	JUL 11 17:51 - JUL 11 20:32	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	JUL 11 17:40 - JUL 11 17:40	Pin



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-07-11T19:13:55.680
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       : 4114691545671620608
2Mass ID (if available) : 17185891-2242196
ICRS Star Coord at Epoch: 17h 18m 58.91575s -22:42:19.86819s
RUWE (>1.4 is poor) : 0.95
K magnitude           : 9.451
G magnitude           : 14.352
RP magnitude          : 13.060
BP magnitude          : 16.234
DUPflag              : 0
Distance (au)        : 4.354
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.01
Sun-Target sep (deg) : 151.68
Sun-Moon sep (deg)   : 121.82
B (ring opening deg) : -2.56
PA of pole (deg)     : 3.57
Pole direction: RA (deg): 268.05690
Dec (deg): 64.49651
C/A sky separation ("): 7.494
C/A sky separation (km): 23667.5
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
    
```

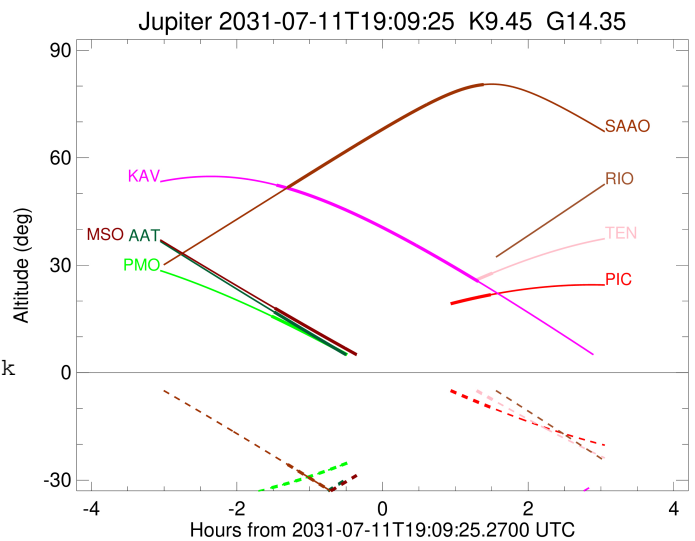
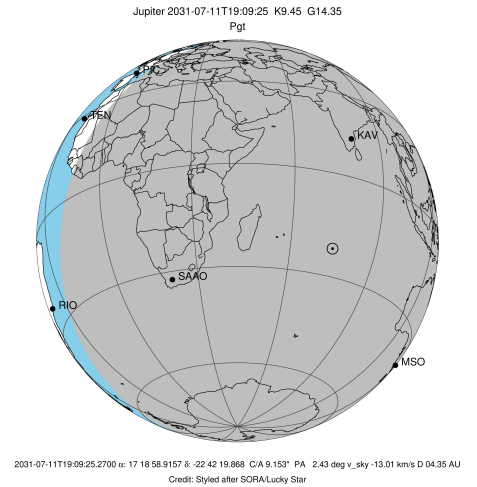


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-11T17:48:52.798	2.34x	17.61x	71490.9	-20.94	-23.61
Jupiter	E	2031-07-11T20:38:30.542	21.75	-9.67	71491.2	-17.82	-20.17

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-07-11T19:02:36.540
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       : 4114691545671620608
2Mass ID (if available) : 17185891-2242196
ICRS Star Coord at Epoch: 17h 18m 58.91575s -22:42:19.86819s
RUWE (>1.4 is poor) : 0.95
K magnitude          : 9.451
G magnitude          : 14.352
RP magnitude         : 13.060
BP magnitude         : 16.234
DUPflag             : 0
Distance (au)        : 4.354
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.01
Sun-Target sep (deg) : 151.68
Sun-Moon sep (deg)   : 122.30
B (ring opening deg) : -2.56
PA of pole (deg)     : 3.57
Pole direction: RA (deg): 268.05690
Dec (deg): 64.49651
C/A sky separation ("): 7.910
C/A sky separation (km): 24981.9
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
    
```

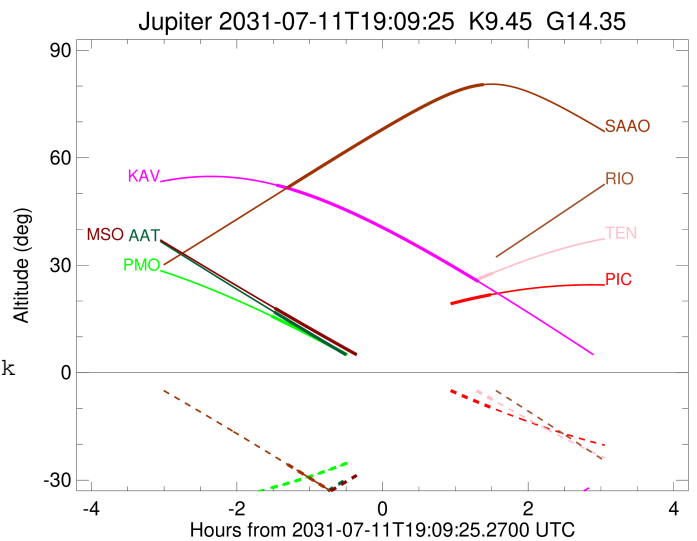
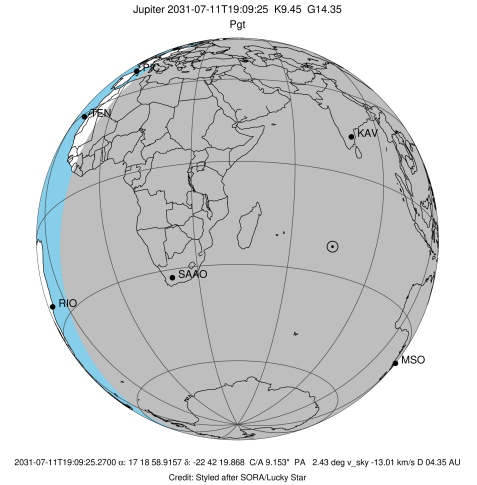


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-11T17:38:03.299	15.78	-32.11	71490.8	-21.02	-23.70
Jupiter	E	2031-07-11T20:28:09.789	-15.97x	-8.11	71491.0	-19.94	-22.51

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-07-11T19:16:05.020
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       : 4114691545671620608
2Mass ID (if available) : 17185891-2242196
ICRS Star Coord at Epoch: 17h 18m 58.91575s -22:42:19.86819s
RUWE (>1.4 is poor) : 0.95
K magnitude           : 9.451
G magnitude           : 14.352
RP magnitude          : 13.060
BP magnitude          : 16.234
DUPflag              : 0
Distance (au)        : 4.354
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.01
Sun-Target sep (deg) : 151.68
Sun-Moon sep (deg)   : 121.69
B (ring opening deg) : -2.56
PA of pole (deg)     : 3.57
Pole direction: RA (deg): 268.05690
Dec (deg): 64.49651
C/A sky separation ("): 7.962
C/A sky separation (km): 25143.5
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
    
```

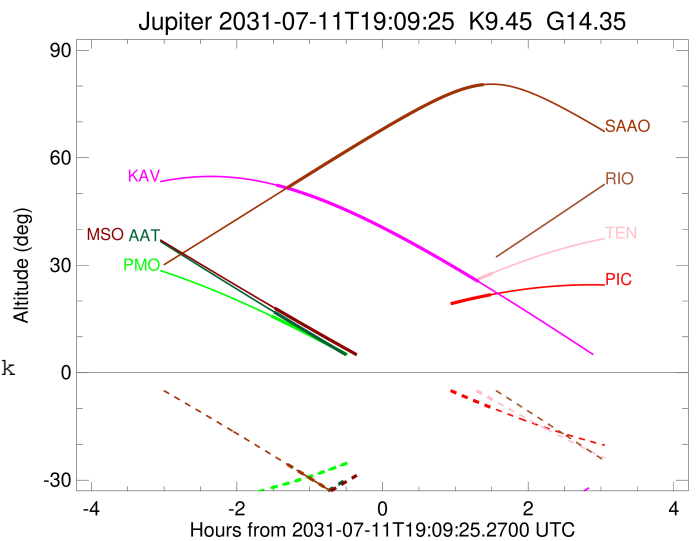
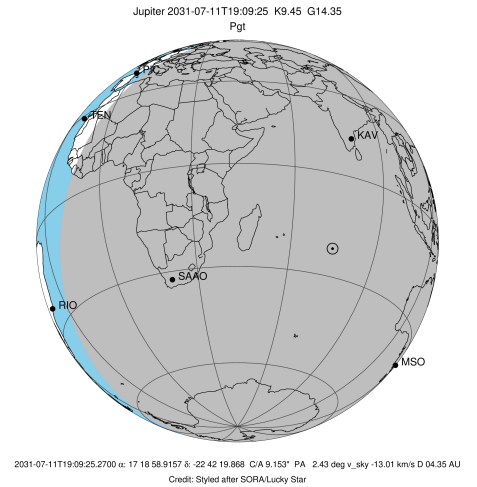


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-11T17:51:19.313	-1.90x	27.21x	71490.7	-22.38	-25.18
Jupiter	E	2031-07-11T20:40:05.926	27.80	-7.54	71491.1	-18.88	-21.33

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-07-11T19:04:52.960
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       : 4114691545671620608
2Mass ID (if available) : 17185891-2242196
ICRS Star Coord at Epoch: 17h 18m 58.91575s -22:42:19.86819s
RUWE (>1.4 is poor) : 0.95
K magnitude          : 9.451
G magnitude          : 14.352
RP magnitude         : 13.060
BP magnitude         : 16.234
DUPflag             : 0
Distance (au)        : 4.354
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.01
Sun-Target sep (deg) : 151.68
Sun-Moon sep (deg)   : 122.69
B (ring opening deg) : -2.56
PA of pole (deg)     : 3.57
Pole direction: RA (deg): 268.05690
Dec (deg): 64.49651
C/A sky separation ("): 8.067
C/A sky separation (km): 25476.8
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
    
```

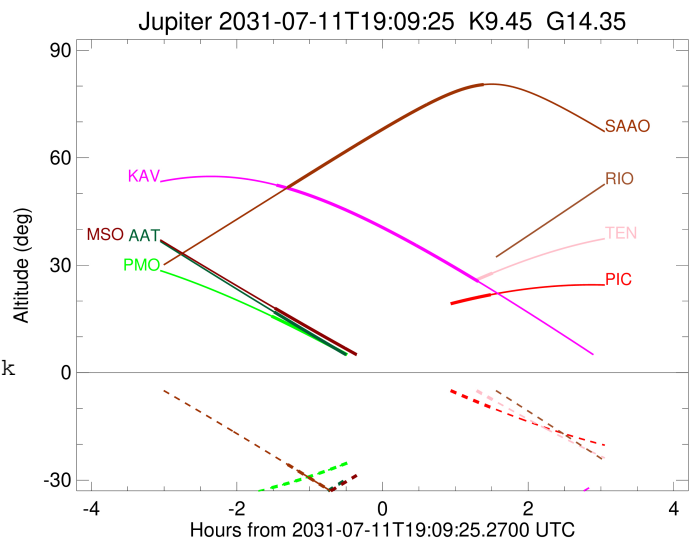
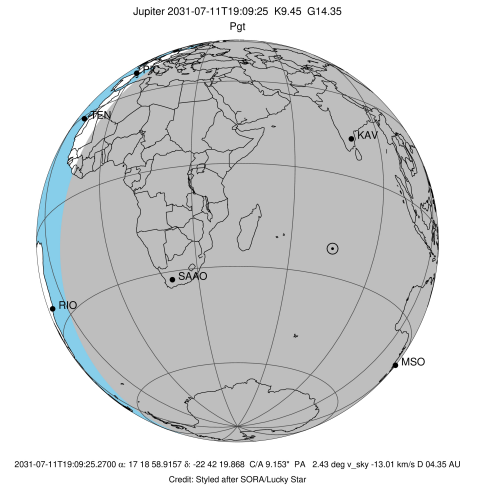


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-11T17:42:03.370	52.35	-51.62	71490.8	-21.77	-24.51
Jupiter	E	2031-07-11T20:28:21.429	25.44	-47.92	71490.9	-20.18	-22.78

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-07-11T19:01:58.300
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      : 4114691545671620608
2Mass ID (if available) : 17185891-2242196
ICRS Star Coord at Epoch: 17h 18m 58.91575s -22:42:19.86819s
RUWE (>1.4 is poor) : 0.95
K magnitude          : 9.451
G magnitude          : 14.352
RP magnitude         : 13.060
BP magnitude         : 16.234
DUPflag             : 0
Distance (au)       : 4.354
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.01
Sun-Target sep (deg) : 151.68
Sun-Moon sep (deg)  : 122.30
B (ring opening deg) : -2.56
PA of pole (deg)    : 3.57
Pole direction: RA (deg): 268.05690
Dec (deg): 64.49651
C/A sky separation (" ) : 10.198
C/A sky separation (km) : 32204.8
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
    
```

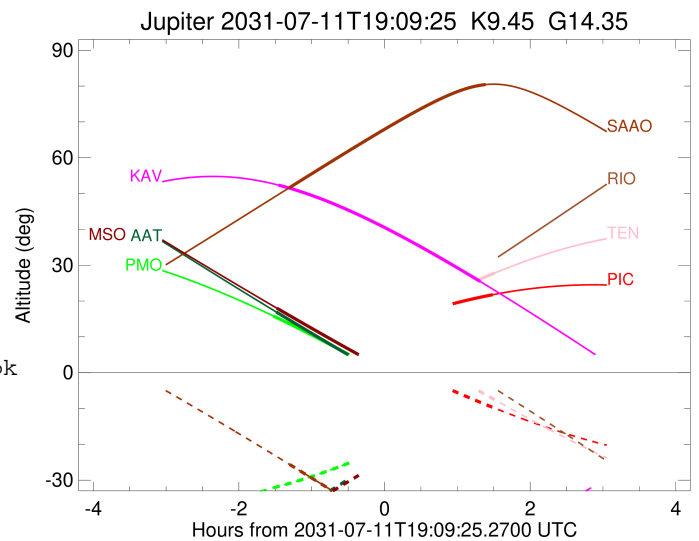
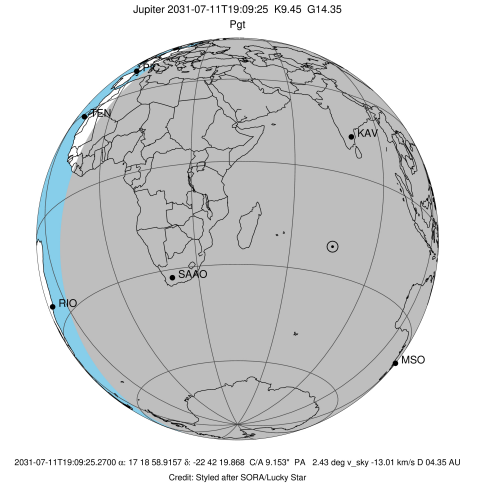


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-11T17:40:07.615	16.95	-42.44	71490.1	-27.22	-30.41
Jupiter	E	2031-07-11T20:24:48.103	-14.41x	-8.06	71490.2	-26.25	-29.37

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-07-11T19:12:08.320
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       : 4114691545671620608
2Mass ID (if available) : 17185891-2242196
ICRS Star Coord at Epoch: 17h 18m 58.91575s -22:42:19.86819s
RUWE (>1.4 is poor) : 0.95
K magnitude           : 9.451
G magnitude           : 14.352
RP magnitude         : 13.060
BP magnitude         : 16.234
DUPflag              : 0
Distance (au)        : 4.354
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.01
Sun-Target sep (deg) : 151.68
Sun-Moon sep (deg)   : 122.46
B (ring opening deg) : -2.56
PA of pole (deg)     : 3.57
Pole direction: RA (deg): 268.05690
Dec (deg): 64.49651
C/A sky separation ("): 9.546
C/A sky separation (km): 30147.3
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
    
```

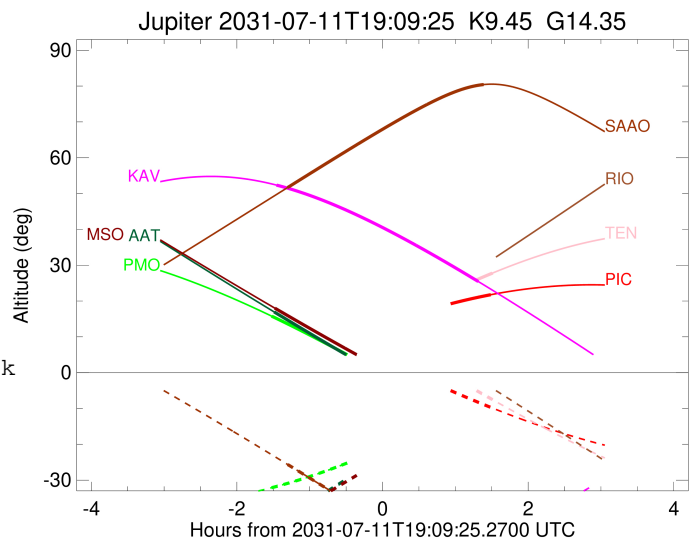
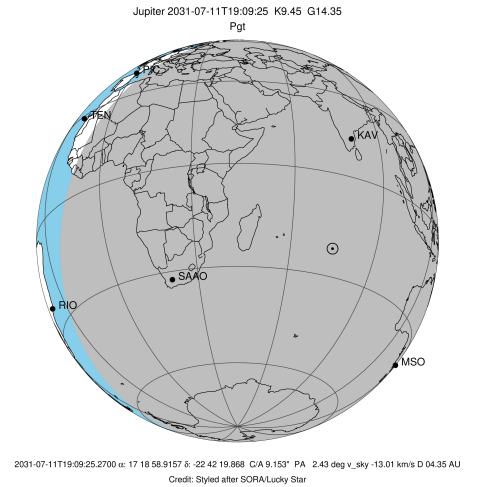


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-11T17:51:13.513	51.67	-25.62	71490.2	-26.46	-29.60
Jupiter	E	2031-07-11T20:32:48.150	80.41	-59.58	71490.6	-23.57	-26.48


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-07-11T19:02:16.790
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       : 4114691545671620608
2Mass ID (if available) : 17185891-2242196
ICRS Star Coord at Epoch: 17h 18m 58.91575s -22:42:19.86819s
RUWE (>1.4 is poor) : 0.95
K magnitude           : 9.451
G magnitude           : 14.352
RP magnitude         : 13.060
BP magnitude         : 16.234
DUPflag              : 0
Distance (au)        : 4.354
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.01
Sun-Target sep (deg) : 151.68
Sun-Moon sep (deg)   : 122.30
B (ring opening deg) : -2.56
PA of pole (deg)     : 3.57
Pole direction: RA (deg): 268.05690
Dec (deg): 64.49651
C/A sky separation ("): 10.303
C/A sky separation (km): 32537.0
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	2031-07-11T17:40:39.229	18.02	-42.42	71490.1	-27.54	-30.76
Jupiter	E	2031-07-11T20:24:50.694	-11.86x	-9.52	71490.2	-26.52	-29.66