

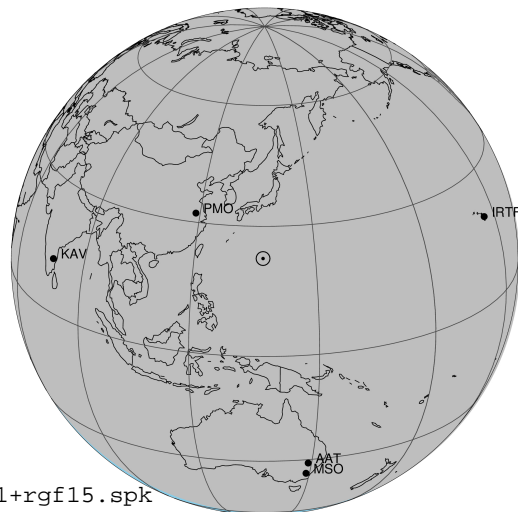
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2024-12-07T14:43:20.530
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 3412271462778788992
 2Mass ID (if available) : 04591338+2201420

Jupiter 2024-12-07T14:43:20 K9.13 G12.67 Pgt

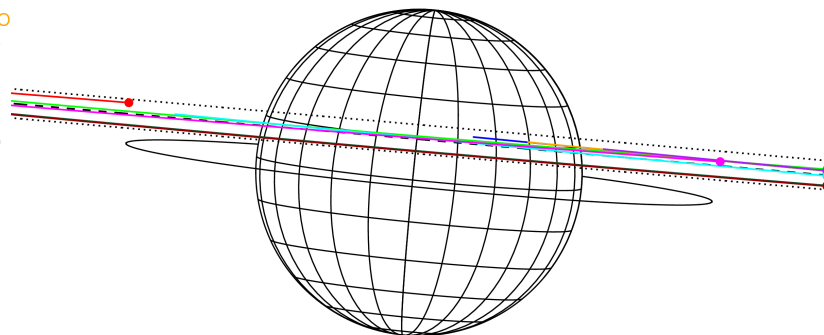
ICRS Star Coord at Epoch: 04h 59m 13.39093s +22:01:42.02082s

RUWE (>1.4 is poor) : 1.09
 K magnitude : 9.135
 G magnitude : 12.672
 RP magnitude : 11.697
 BP magnitude : 13.658
 DUPflag : 0
 Distance (au) : 4.090
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.86
 Sun-Target sep (deg) : 179.27
 Sun-Moon sep (deg) : 103.44
 B (ring opening deg) : 2.87
 PA of pole (deg) : -5.67
 Pole direction: RA (deg): 268.05785
 Dec (deg): 64.49672
 C/A sky separation (") : 4.887
 C/A sky separation (km) : 14494.6
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2024-12-07T14:43:20 K9.13 G12.67
 Pgt



Earth
 PIC
 PAL
 PMO
 KPNO
 MCD
 IRTF
 KAV
 AAT
 MSO

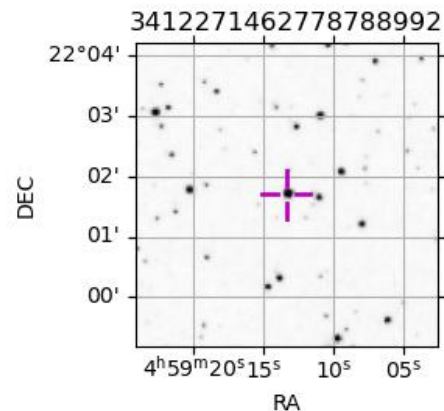


2024-12-07T14:43:20.5300 ex: 04 59 13.3909 s : +22 01 42.021 C/A 4.900" PA 174.97 deg v_sky -16.86 km/s D 04.09 AU

Credit: Styled after SORA/Lucky Star

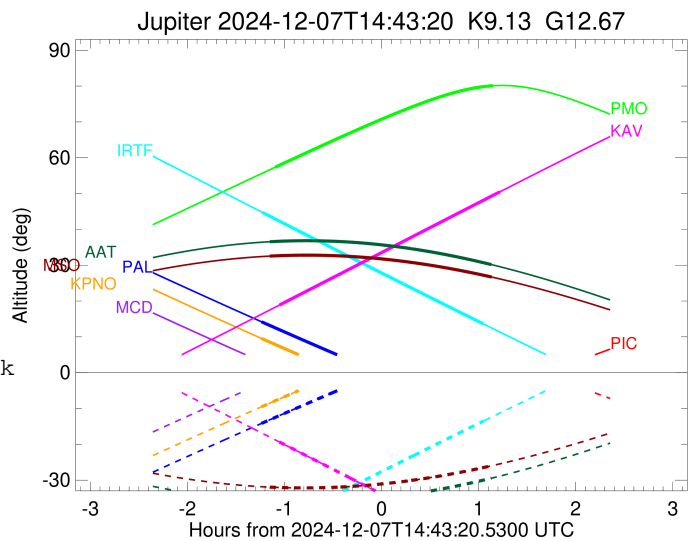
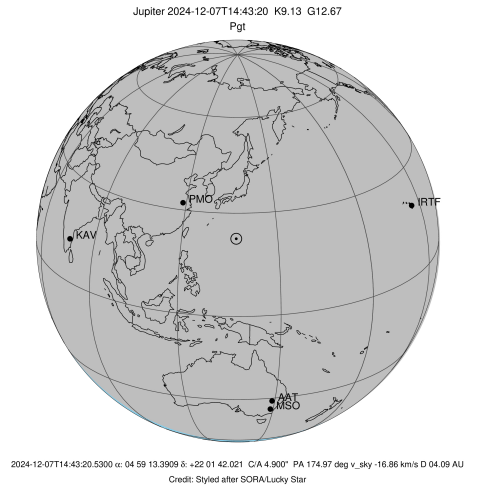
Observable events with sun below -5 deg and altitude above 5 deg

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	+	DEC 07 13:29 - DEC 07 13:29	Pin
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+ +	DEC 07 13:37 - DEC 07 15:52	Pie
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	DEC 07 13:29 - DEC 07 13:29	Pin
MCD	McDonald Obs. 2.7m	30.7	256.0			Pnn
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	DEC 07 13:29 - DEC 07 15:46	Pie
KAV	Kavalur Observatory	12.6	78.8	+ +	DEC 07 13:40 - DEC 07 15:56	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	+ +	DEC 07 13:34 - DEC 07 15:51	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	DEC 07 13:34 - DEC 07 15:51	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2024-12-07T14:37:46.830
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : PAL
Location            : Palomar Mt (200")
Latitude (deg)      : 33.35622
E. Longitude (deg) : 243.13601
Altitude (km)       : 1.706
Gaia source ID      : 3412271462778788992
2Mass ID (if available) : 04591338+2201420
ICRS Star Coord at Epoch: 04h 59m 13.39093s +22:01:42.02082s
RUWE (>1.4 is poor) : 1.09
K magnitude          : 9.135
G magnitude          : 12.672
RP magnitude         : 11.697
BP magnitude         : 13.658
DUPflag             : 0
Distance (au)       : 4.090
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.86
Sun-Target sep (deg) : 179.27
Sun-Moon sep (deg)  : 103.24
B (ring opening deg) : 2.87
PA of pole (deg)    : -5.67
Pole direction: RA (deg): 268.05785
Dec (deg): 64.49672
C/A sky separation ("): 5.990
C/A sky separation (km): 17767.3
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
    
```

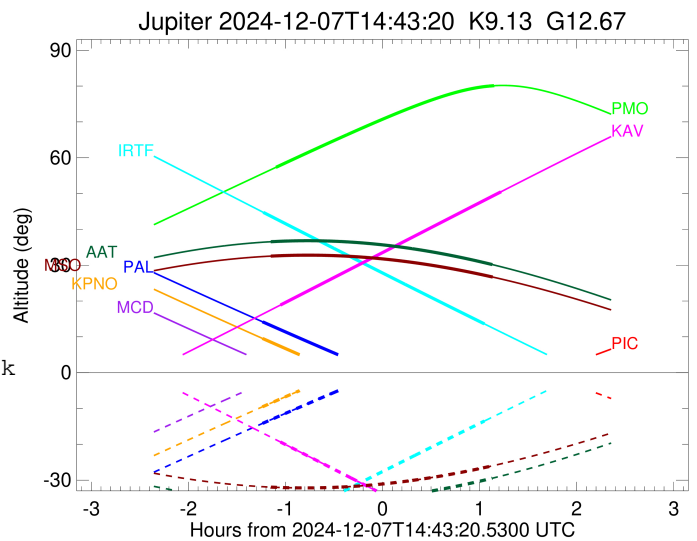
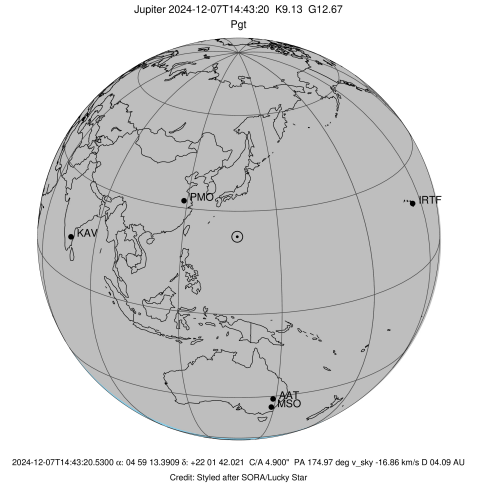


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2024-12-07T13:29:13.917	14.20	-14.16	71491.3	14.51	16.48
Jupiter	E	2024-12-07T15:46:47.816	-11.57x	11.34x	71491.3	14.24	16.17

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2024-12-07T14:44:58.910
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      : 3412271462778788992
2Mass ID (if available) : 04591338+2201420
ICRS Star Coord at Epoch: 04h 59m 13.39093s +22:01:42.02082s
RUWE (>1.4 is poor) : 1.09
K magnitude         : 9.135
G magnitude         : 12.672
RP magnitude        : 11.697
BP magnitude        : 13.658
DUPflag            : 0
Distance (au)       : 4.090
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.86
Sun-Target sep (deg) : 179.27
Sun-Moon sep (deg)  : 104.38
B (ring opening deg) : 2.87
PA of pole (deg)    : -5.67
Pole direction: RA (deg): 268.05785
Dec (deg): 64.49672
C/A sky separation (") : 5.335
C/A sky separation (km) : 15824.6
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
    
```

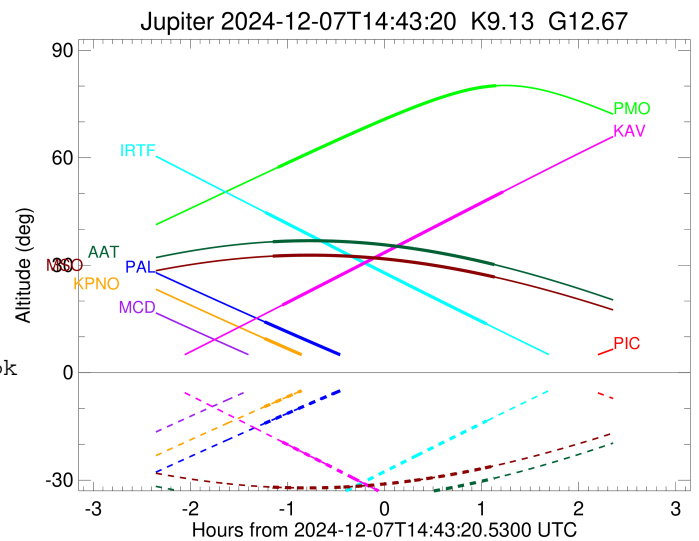
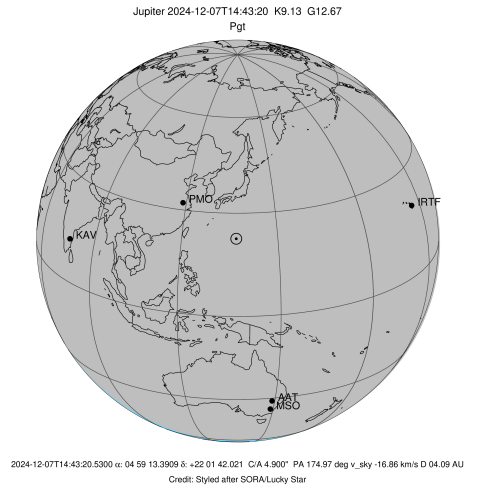


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2024-12-07T13:37:27.881	57.31	-57.95	71491.4	13.73	15.60
Jupiter	E	2024-12-07T15:52:20.544	80.10	-80.77	71491.5	11.94	13.59

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2024-12-07T14:37:50.120
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : KPNO
Location              : Kitt Peak Natl Obs
Latitude (deg)        : 31.96333
E. Longitude (deg)    : 248.40000
Altitude (km)         : 2.120
Gaia source ID        : 3412271462778788992
2Mass ID (if available) : 04591338+2201420
ICRS Star Coord at Epoch: 04h 59m 13.39093s +22:01:42.02082s
RUWE (>1.4 is poor) : 1.09
K magnitude           : 9.135
G magnitude           : 12.672
RP magnitude          : 11.697
BP magnitude          : 13.658
DUPflag              : 0
Distance (au)         : 4.090
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.86
Sun-Target sep (deg) : 179.27
Sun-Moon sep (deg)   : 103.16
B (ring opening deg) : 2.87
PA of pole (deg)     : -5.67
Pole direction: RA (deg): 268.05785
Dec (deg): 64.49672
C/A sky separation (") : 6.014
C/A sky separation (km) : 17839.3
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
    
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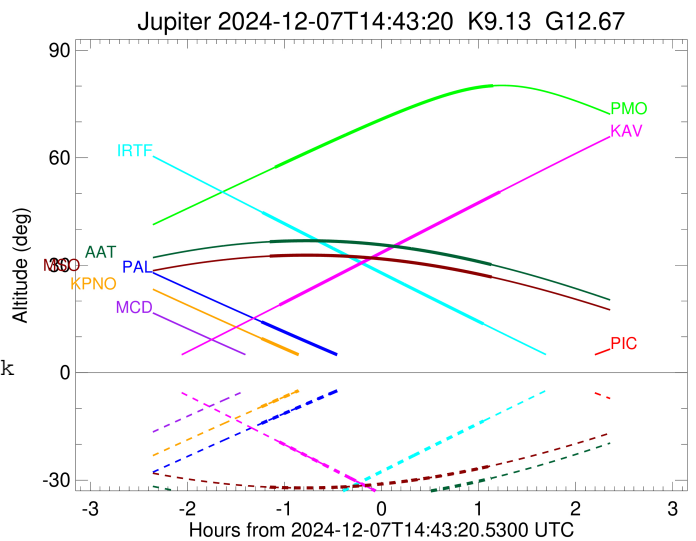
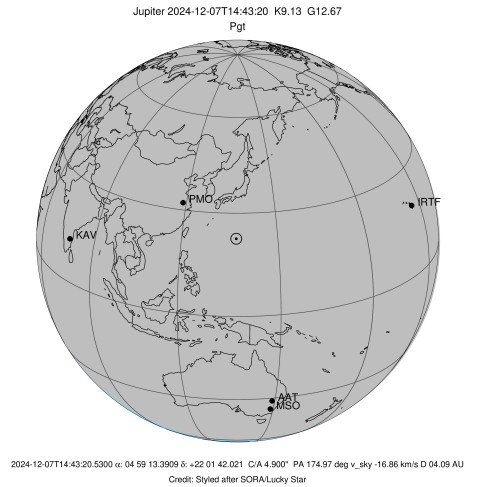


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2024-12-07T13:29:09.329	9.56	-9.53	71491.3	14.56	16.53
Jupiter	E	2024-12-07T15:46:58.912	-15.95x	15.71x	71491.3	14.29	16.23

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2024-12-07T14:37:44.810
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : IRTF
Location            : Mauna Kea/IRTF
Latitude (deg)      : 19.82622
E. Longitude (deg)  : 204.52800
Altitude (km)       : 4.168
Gaia source ID      : 3412271462778788992
2Mass ID (if available) : 04591338+2201420
ICRS Star Coord at Epoch: 04h 59m 13.39093s +22:01:42.02082s
RUWE (>1.4 is poor) : 1.09
K magnitude          : 9.135
G magnitude          : 12.672
RP magnitude         : 11.697
BP magnitude         : 13.658
DUPflag             : 0
Distance (au)       : 4.090
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.86
Sun-Target sep (deg) : 179.27
Sun-Moon sep (deg)  : 103.68
B (ring opening deg) : 2.87
PA of pole (deg)    : -5.67
Pole direction: RA (deg): 268.05785
Dec (deg): 64.49672
C/A sky separation ("): 5.087
C/A sky separation (km): 15087.8
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
    
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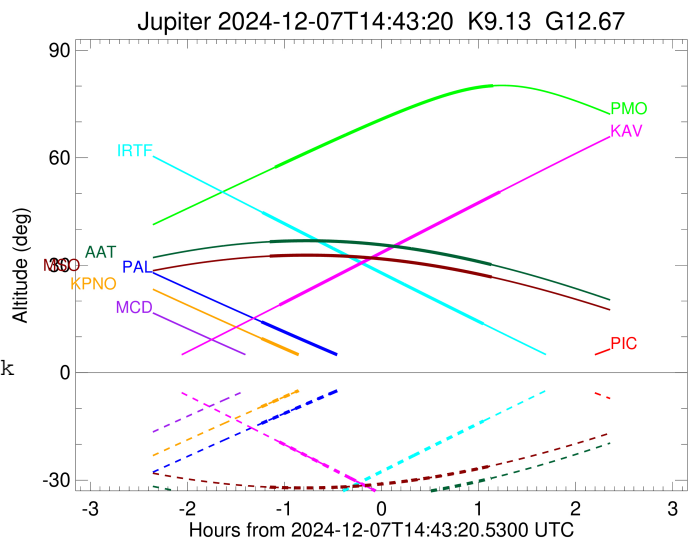
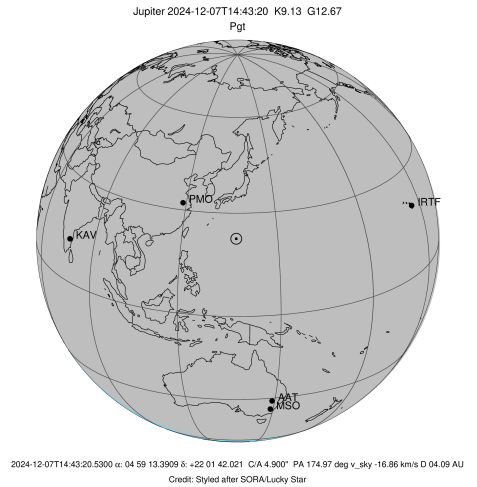


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2024-12-07T13:29:41.369	44.74	-44.40	71491.5	12.42	14.13
Jupiter	E	2024-12-07T15:46:16.278	13.62	-13.51	71491.5	12.03	13.68

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2024-12-07T14:48:38.680
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      : 3412271462778788992
2Mass ID (if available) : 04591338+2201420
ICRS Star Coord at Epoch: 04h 59m 13.39093s +22:01:42.02082s
RUWE (>1.4 is poor) : 1.09
K magnitude          : 9.135
G magnitude          : 12.672
RP magnitude         : 11.697
BP magnitude         : 13.658
DUPflag             : 0
Distance (au)       : 4.090
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.86
Sun-Target sep (deg) : 179.27
Sun-Moon sep (deg)  : 104.15
B (ring opening deg) : 2.87
PA of pole (deg)    : -5.67
Pole direction: RA (deg): 268.05785
Dec (deg): 64.49672
C/A sky separation (") : 5.043
C/A sky separation (km) : 14957.4
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
    
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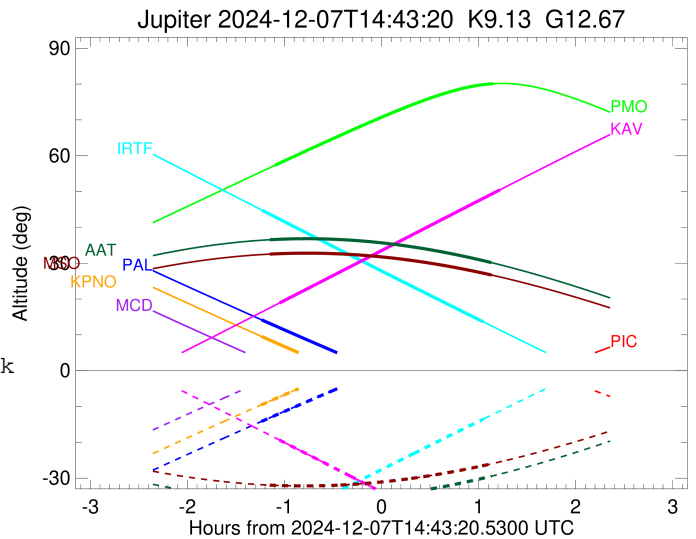
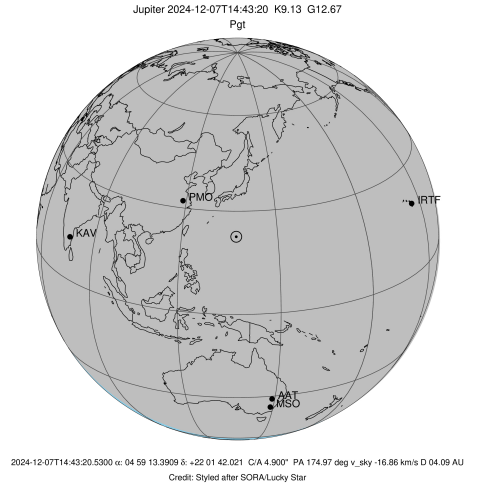


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2024-12-07T13:40:14.718	18.87	-19.35	71491.4	13.27	15.09
Jupiter	E	2024-12-07T15:56:34.875	50.49	-50.70	71491.6	10.91	12.43

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2024-12-07T14:42:42.360
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        : 3412271462778788992
2Mass ID (if available) : 04591338+2201420
ICRS Star Coord at Epoch: 04h 59m 13.39093s +22:01:42.02082s
RUWE (>1.4 is poor) : 1.09
K magnitude           : 9.135
G magnitude           : 12.672
RP magnitude          : 11.697
BP magnitude          : 13.658
DUPflag              : 0
Distance (au)         : 4.090
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.86
Sun-Target sep (deg) : 179.27
Sun-Moon sep (deg)   : 103.97
B (ring opening deg) : 2.87
PA of pole (deg)     : -5.67
Pole direction: RA (deg): 268.05785
Dec (deg): 64.49672
C/A sky separation ("): 3.156
C/A sky separation (km): 9359.7
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
    
```

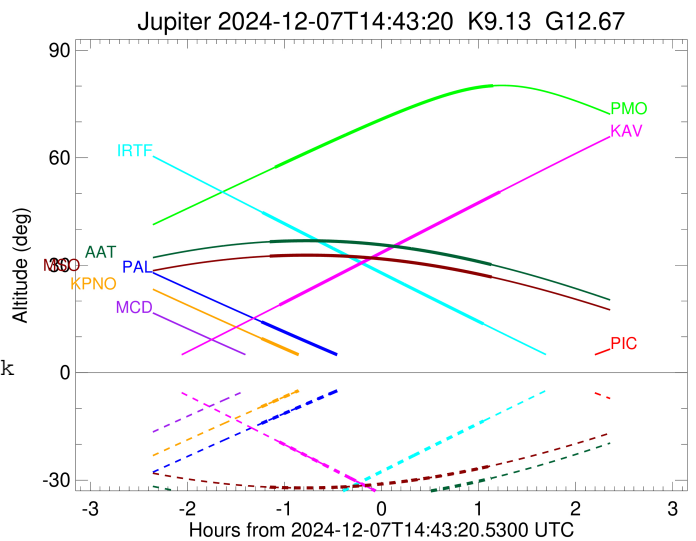
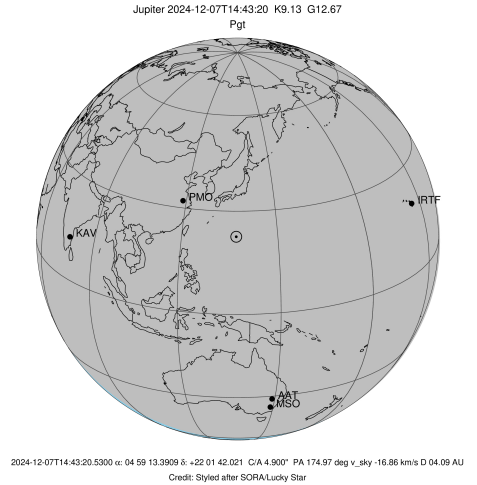


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2024-12-07T13:34:15.846	36.54	-35.96	71491.8	8.24	9.40
Jupiter	E	2024-12-07T15:51:13.525	30.17	-29.46	71491.8	6.94	7.92


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2024-12-07T14:42:46.740
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      : 3412271462778788992
2Mass ID (if available) : 04591338+2201420
ICRS Star Coord at Epoch: 04h 59m 13.39093s +22:01:42.02082s
RUWE (>1.4 is poor) : 1.09
K magnitude          : 9.135
G magnitude          : 12.672
RP magnitude        : 11.697
BP magnitude        : 13.658
DUPflag            : 0
Distance (au)       : 4.090
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.86
Sun-Target sep (deg) : 179.27
Sun-Moon sep (deg)  : 103.92
B (ring opening deg) : 2.87
PA of pole (deg)    : -5.67
Pole direction: RA (deg): 268.05785
Dec (deg): 64.49672
C/A sky separation ("): 3.071
C/A sky separation (km): 9108.5
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	2024-12-07T13:34:14.030	32.53	-31.94	71491.8	8.03	9.17
Jupiter	E	2024-12-07T15:51:23.897	26.69	-25.99	71491.8	6.73	7.69