

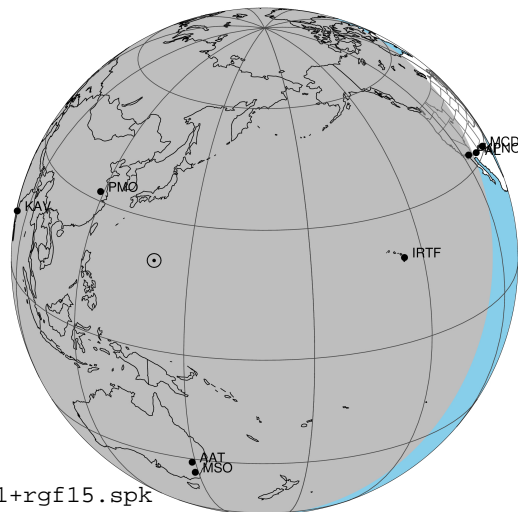
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2048-11-24T14:23:29.660
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 3427393458513463936
 2Mass ID (if available) : 05515747+2257349

Jupiter 2048-11-24T14:23:29 K7.91 G13.63 Pgt

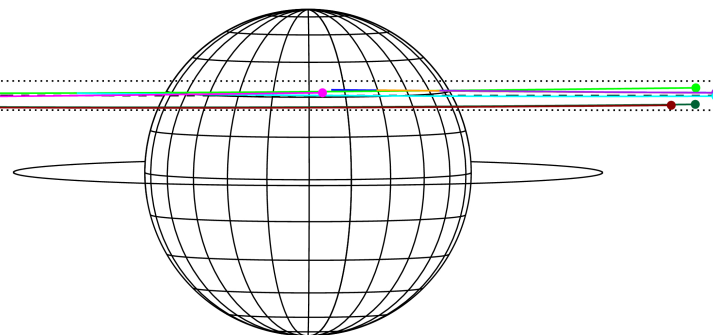
ICRS Star Coord at Epoch: 05h 51m 57.47288s +22:57:34.81230s

RUWE (>1.4 is poor) : 0.94
 K magnitude : 7.912
 G magnitude : 13.628
 RP magnitude : 12.289
 BP magnitude : 15.780
 DUPflag : 0
 Distance (au) : 4.192
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -14.06
 Sun-Target sep (deg) : 154.15
 Sun-Moon sep (deg) : 19.06
 B (ring opening deg) : 2.54
 PA of pole (deg) : -0.03
 Pole direction: RA (deg): 268.05736
 Dec (deg): 64.49721
 C/A sky separation (") : 11.085
 C/A sky separation (km) : 33697.6
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2048-11-24T14:23:29 K7.91 G13.63
 Pgt



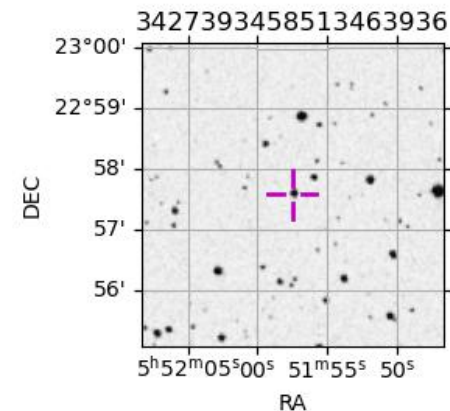
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 KAV
 AAT
 MSO



2048-11-24T14:23:29.6600 a: 05 51 57.4729 s: +22 57 34.812 C/A ***** PA 179.99 deg v_sky -14.06 km/s D 04.19 AU
 Credit: Styled after SORA/Lucky Star

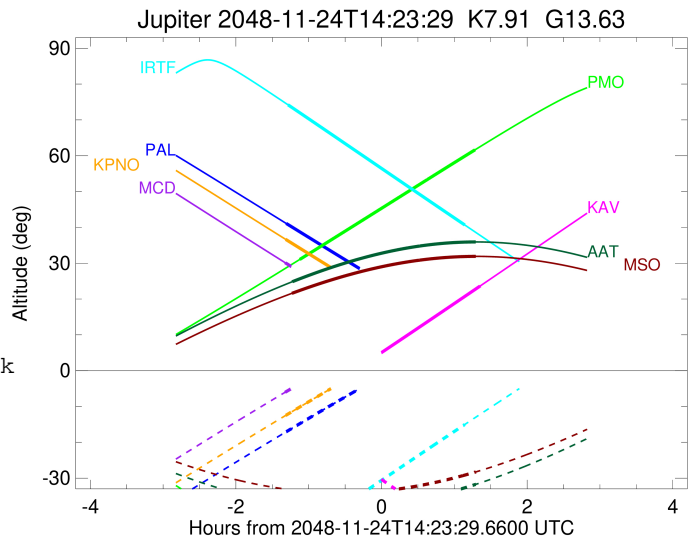
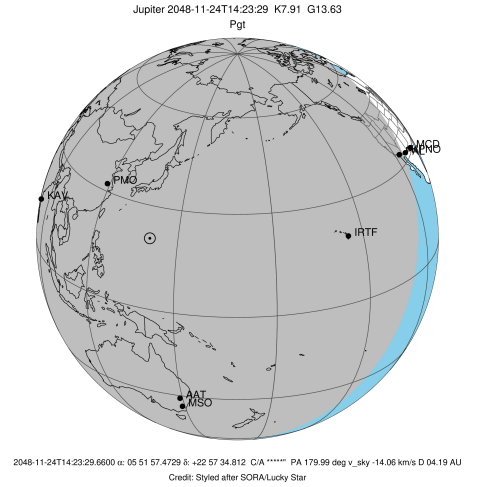
Observable events with sun below -5 deg and altitude above 5 deg

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	+	NOV 24 13:04 - NOV 24 13:04	Pin
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+ +	NOV 24 13:16 - NOV 24 15:40	Pie
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	NOV 24 13:04 - NOV 24 13:04	Pin
MCD	McDonald Obs. 2.7m	30.7	256.0	+	NOV 24 13:04 - NOV 24 13:04	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	NOV 24 13:06 - NOV 24 15:32	Pie
KAV	Kavalur Observatory	12.6	78.8	+	NOV 24 15:44 - NOV 24 15:44	Pne
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	+ +	NOV 24 13:09 - NOV 24 15:41	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	NOV 24 13:09 - NOV 24 15:41	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2048-11-24T14:17:01.460
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      : 3427393458513463936
2Mass ID (if available) : 05515747+2257349
ICRS Star Coord at Epoch: 05h 51m 57.47288s +22:57:34.81230s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 7.912
G magnitude          : 13.628
RP magnitude         : 12.289
BP magnitude         : 15.780
DUPflag             : 0
Distance (au)       : 4.192
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.06
Sun-Target sep (deg) : 154.15
Sun-Moon sep (deg)  : 18.54
B (ring opening deg) : 2.54
PA of pole (deg)    : -0.03
Pole direction: RA (deg): 268.05736
Dec (deg): 64.49721
C/A sky separation (") : 11.949
C/A sky separation (km) : 36325.2
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
    
```

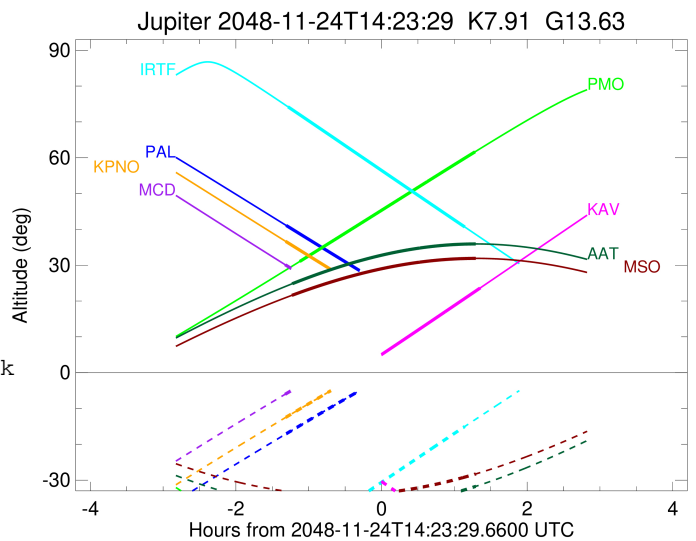
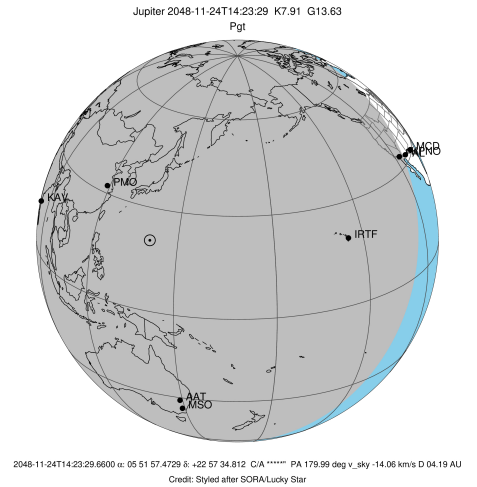


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-11-24T13:04:54.961	41.10	-17.07	71489.8	29.98	33.35
Jupiter	E	2048-11-24T15:29:41.066	11.44	10.59x	71489.6	31.09	34.52

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2048-11-24T14:28:38.430
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        : 3427393458513463936
2Mass ID (if available) : 05515747+2257349
ICRS Star Coord at Epoch: 05h 51m 57.47288s +22:57:34.81230s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 7.912
G magnitude           : 13.628
RP magnitude          : 12.289
BP magnitude          : 15.780
DUPflag              : 0
Distance (au)         : 4.191
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -14.06
Sun-Target sep (deg)  : 154.15
Sun-Moon sep (deg)    : 19.85
B (ring opening deg) : 2.54
PA of pole (deg)      : -0.03
Pole direction: RA (deg): 268.05736
Dec (deg): 64.49721
C/A sky separation (") : 11.638
C/A sky separation (km) : 35379.0
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
    
```

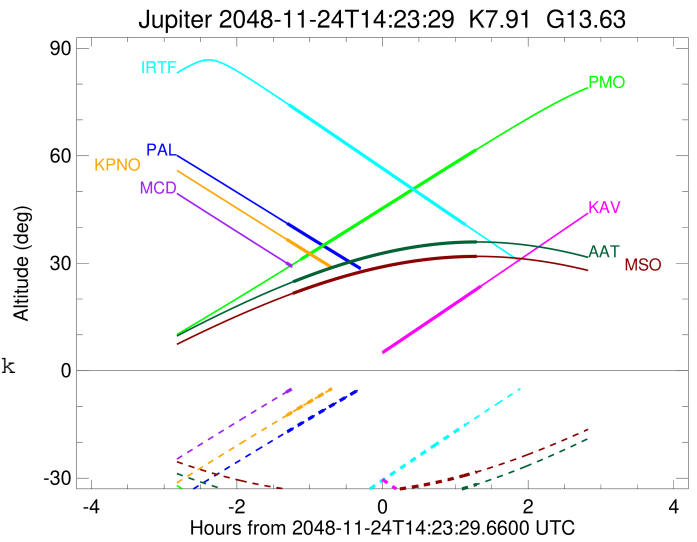
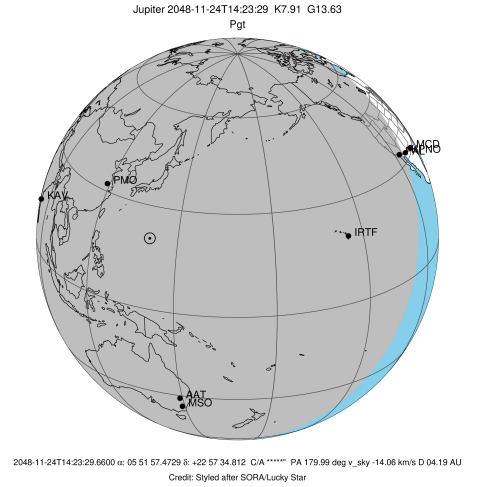


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-11-24T13:16:07.404	31.04	-53.67	71489.8	30.17	33.55
Jupiter	E	2048-11-24T15:40:37.479	61.66	-78.61	71489.9	29.23	32.55

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2048-11-24T14:16:45.910
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      : 3427393458513463936
2Mass ID (if available) : 05515747+2257349
ICRS Star Coord at Epoch: 05h 51m 57.47288s +22:57:34.81230s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 7.912
G magnitude          : 13.628
RP magnitude         : 12.289
BP magnitude         : 15.780
DUPflag             : 0
Distance (au)       : 4.192
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.06
Sun-Target sep (deg) : 154.15
Sun-Moon sep (deg)  : 18.49
B (ring opening deg) : 2.54
PA of pole (deg)    : -0.03
Pole direction: RA (deg): 268.05736
Dec (deg): 64.49721
C/A sky separation (" ) : 11.968
C/A sky separation (km) : 36382.9
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
    
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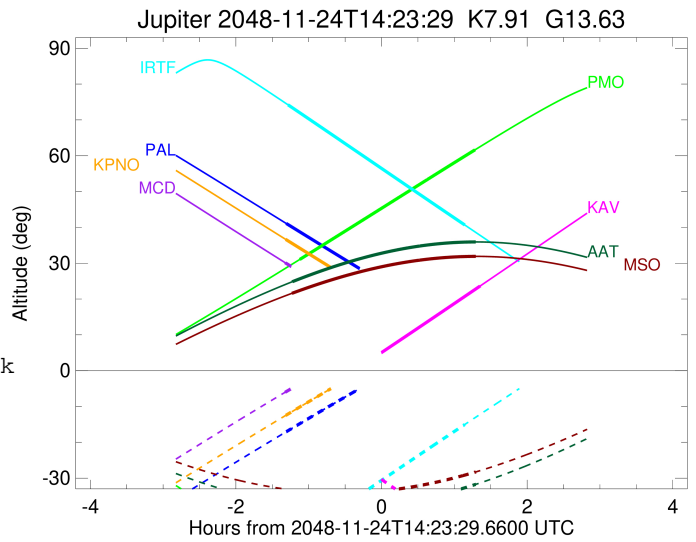
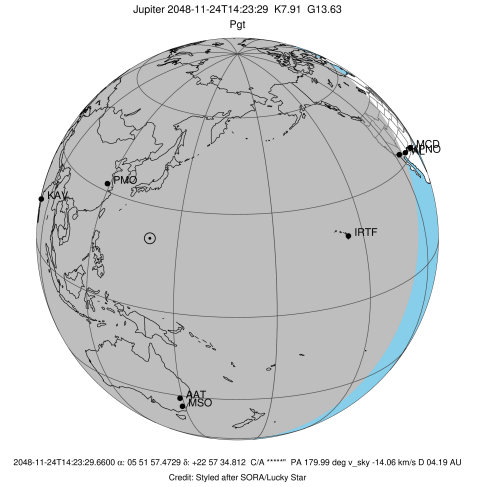


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-11-24T13:04:32.351	36.65	-12.49	71489.8	30.00	33.37
Jupiter	E	2048-11-24T15:29:34.253	6.82	15.00x	71489.6	31.16	34.59

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2048-11-24T14:16:32.450
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : MCD
Location            : McDonald Obs. 2.7m
Latitude (deg)      : 30.67158
E. Longitude (deg)  : 255.97844
Altitude (km)       : 2.075
Gaia source ID      : 3427393458513463936
2Mass ID (if available) : 05515747+2257349
ICRS Star Coord at Epoch: 05h 51m 57.47288s +22:57:34.81230s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 7.912
G magnitude          : 13.628
RP magnitude         : 12.289
BP magnitude         : 15.780
DUPflag             : 0
Distance (au)       : 4.192
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.06
Sun-Target sep (deg) : 154.15
Sun-Moon sep (deg)  : 18.44
B (ring opening deg) : 2.54
PA of pole (deg)    : -0.03
Pole direction: RA (deg): 268.05736
Dec (deg): 64.49721
C/A sky separation (") : 12.021
C/A sky separation (km) : 36543.6
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
    
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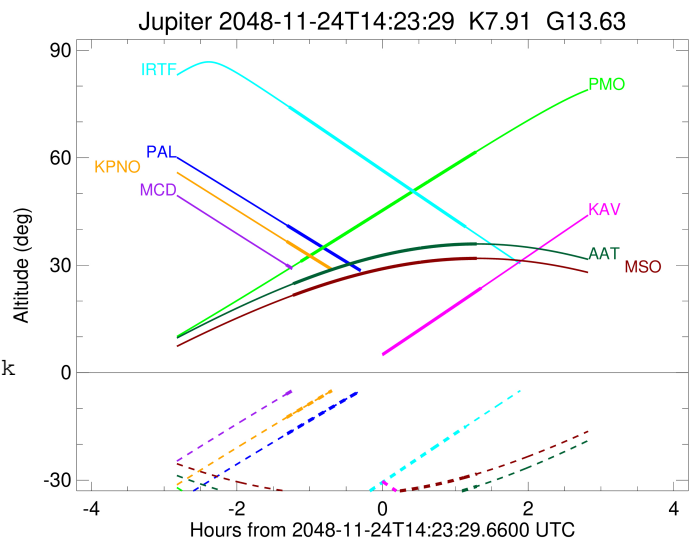
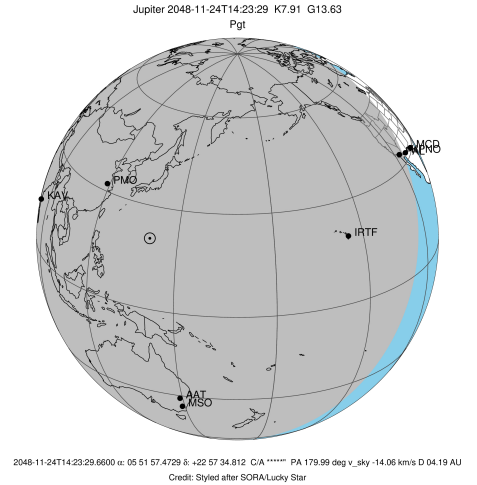


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-11-24T13:04:10.406	30.12	-6.01	71489.8	30.12	33.50
Jupiter	E	2048-11-24T15:29:30.839	0.40x	20.84x	71489.6	31.32	34.76

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2048-11-24T14:19:09.140
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      : 3427393458513463936
2Mass ID (if available) : 05515747+2257349
ICRS Star Coord at Epoch: 05h 51m 57.47288s +22:57:34.81230s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 7.912
G magnitude          : 13.628
RP magnitude         : 12.289
BP magnitude         : 15.780
DUPflag             : 0
Distance (au)       : 4.192
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.06
Sun-Target sep (deg) : 154.15
Sun-Moon sep (deg)  : 18.84
B (ring opening deg) : 2.54
PA of pole (deg)    : -0.03
Pole direction: RA (deg): 268.05736
Dec (deg): 64.49721
C/A sky separation ("): 11.109
C/A sky separation (km): 33772.7
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
    
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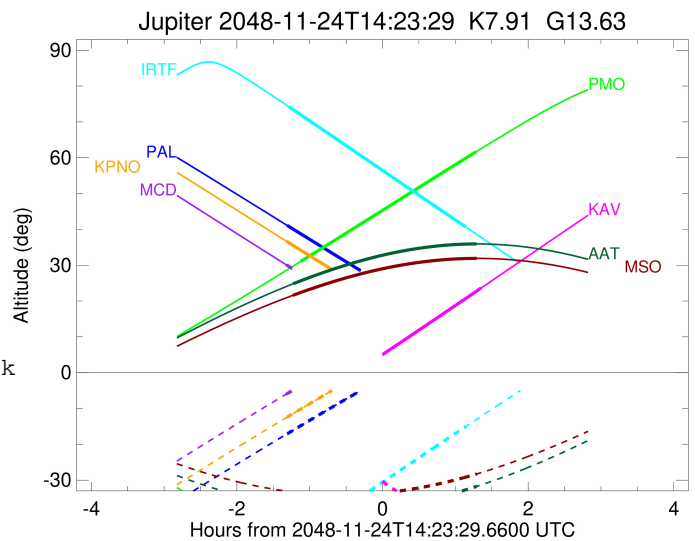
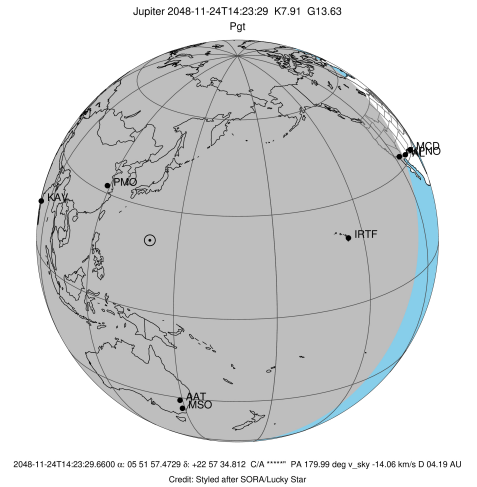


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-11-24T13:06:31.970	74.19	-48.38	71490.1	27.88	31.12
Jupiter	E	2048-11-24T15:32:07.258	40.66	-15.02	71490.0	28.62	31.90

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2048-11-24T14:31:23.680
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      : 3427393458513463936
2Mass ID (if available) : 05515747+2257349
ICRS Star Coord at Epoch: 05h 51m 57.47288s +22:57:34.81230s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 7.912
G magnitude          : 13.628
RP magnitude         : 12.289
BP magnitude         : 15.780
DUPflag             : 0
Distance (au)       : 4.191
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.06
Sun-Target sep (deg) : 154.15
Sun-Moon sep (deg)  : 19.93
B (ring opening deg) : 2.54
PA of pole (deg)    : -0.03
Pole direction: RA (deg): 268.05736
Dec (deg): 64.49721
C/A sky separation (") : 11.463
C/A sky separation (km) : 34845.5
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
    
```

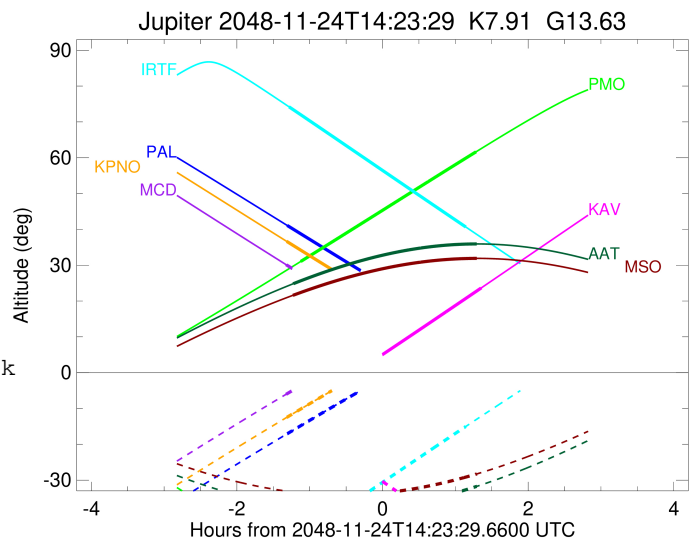
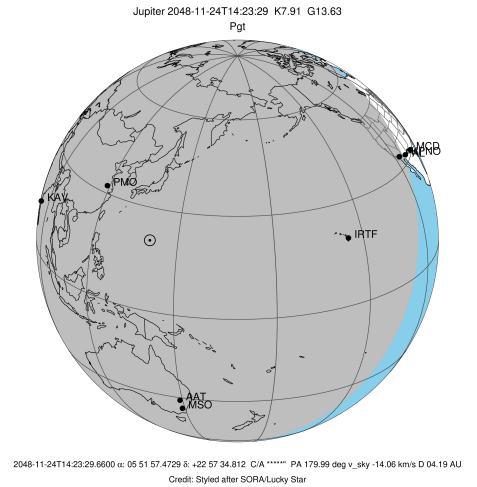


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-11-24T13:17:05.945	-9.77x	-14.92	71489.8	29.88	33.24
Jupiter	E	2048-11-24T15:44:50.951	23.65	-49.37	71490.0	28.42	31.70


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2048-11-24T14:25:40.980
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       : 3427393458513463936
2Mass ID (if available) : 05515747+2257349
ICRS Star Coord at Epoch: 05h 51m 57.47288s +22:57:34.81230s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 7.912
G magnitude           : 13.628
RP magnitude         : 12.289
BP magnitude         : 15.780
DUPflag              : 0
Distance (au)        : 4.191
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.06
Sun-Target sep (deg) : 154.15
Sun-Moon sep (deg)   : 19.41
B (ring opening deg) : 2.54
PA of pole (deg)     : -0.03
Pole direction: RA (deg): 268.05736
Dec (deg): 64.49721
C/A sky separation (") : 9.422
C/A sky separation (km) : 28643.5
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
    
```

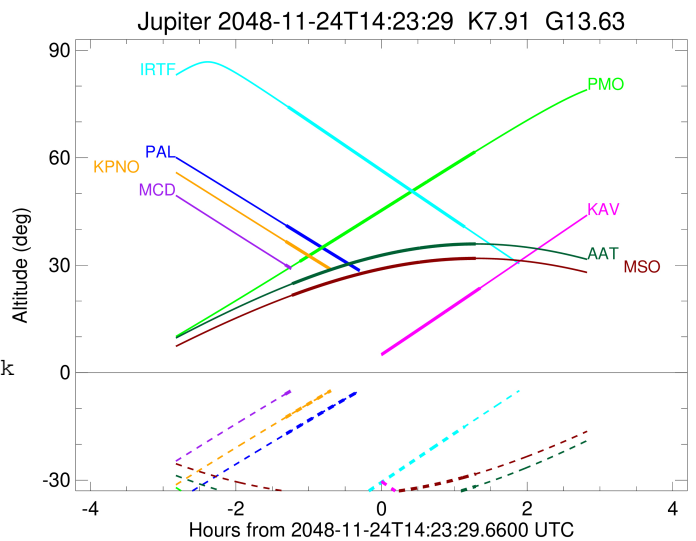
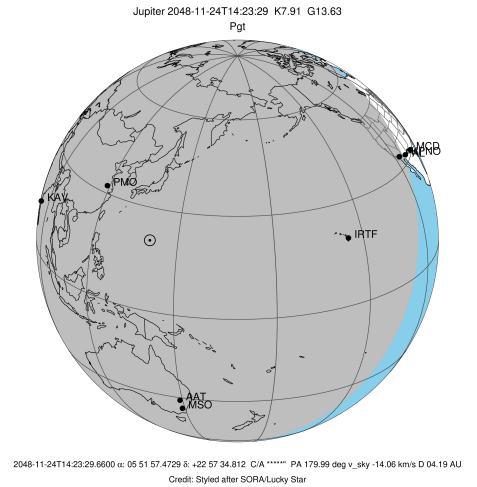


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2048-11-24T13:09:57.137	24.82	-37.25	71490.5	23.90	26.84
Jupiter	E	2048-11-24T15:41:07.639	35.93	-31.74	71490.6	23.48	26.38


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2048-11-24T14:25:35.350
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      : 3427393458513463936
2Mass ID (if available) : 05515747+2257349
ICRS Star Coord at Epoch: 05h 51m 57.47288s +22:57:34.81230s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 7.912
G magnitude          : 13.628
RP magnitude         : 12.289
BP magnitude         : 15.780
DUPflag             : 0
Distance (au)       : 4.191
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -14.06
Sun-Target sep (deg) : 154.15
Sun-Moon sep (deg)  : 19.38
B (ring opening deg) : 2.54
PA of pole (deg)    : -0.03
Pole direction: RA (deg): 268.05736
Dec (deg): 64.49721
C/A sky separation (" ) : 9.339
C/A sky separation (km) : 28390.9
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	2048-11-24T13:09:38.606	21.58	-33.28	71490.6	23.67	26.59
Jupiter	E	2048-11-24T15:41:15.344	31.90	-28.26	71490.6	23.26	26.14