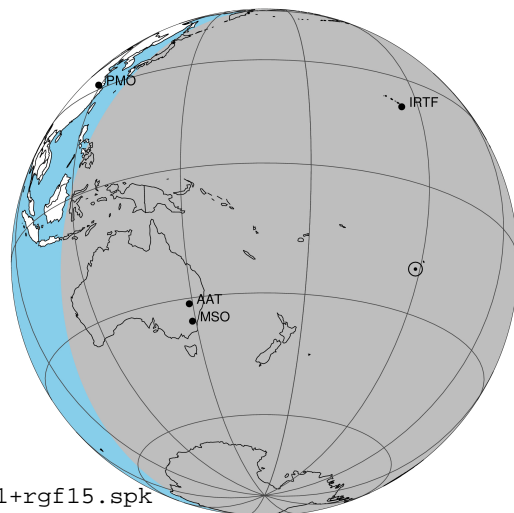


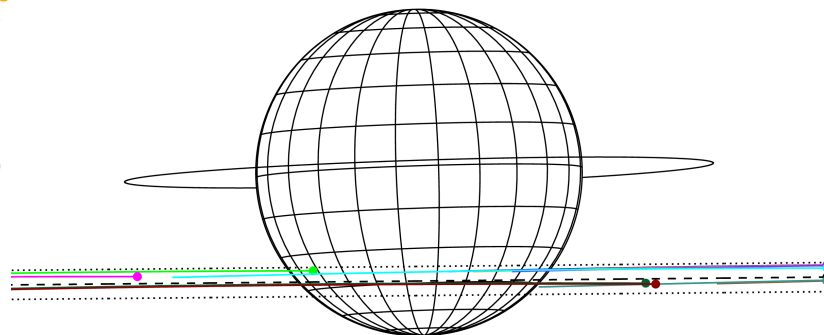
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2043-07-24T10:11:49.890  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4116690316015349120  
 2Mass ID (if available) : 17350611-2303314

Jupiter 2043-07-24T10:11:49 K9.82 G14.63 Pgt

ICRS Star Coord at Epoch: 17h 35m 06.11270s -23°03'31.47273s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 9.818  
 G magnitude : 14.626  
 RP magnitude : 13.396  
 BP magnitude : 16.288  
 DUPflag : 0  
 Distance (au) : 4.404  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -10.69  
 Sun-Target sep (deg) : 143.43  
 Sun-Moon sep (deg) : 64.06  
 B (ring opening deg) : -2.38  
 PA of pole (deg) : 1.84  
 Pole direction: RA (deg): 268.05670  
 Dec (deg): 64.49731  
 C/A sky separation (") : 14.882  
 C/A sky separation (km) : 47532.6  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk



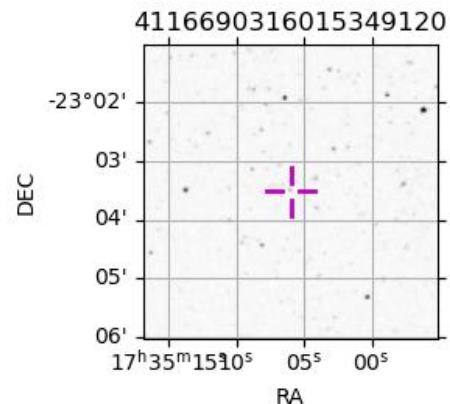
Earth  
 PAL  
 PMO  
 KPNO  
 MCD  
 IRTF  
 KAV  
 RIO  
 ESO  
 AAT  
 MSO



2043-07-24T10:11:49.8900 α: 17 35 06.1127 δ: -23 03 31.473 C/A \*\*\*\*\* PA 0.55 deg v\_sky -10.69 km/s D 04.40 AU  
 Credit: Styled after SORA/Lucky Star

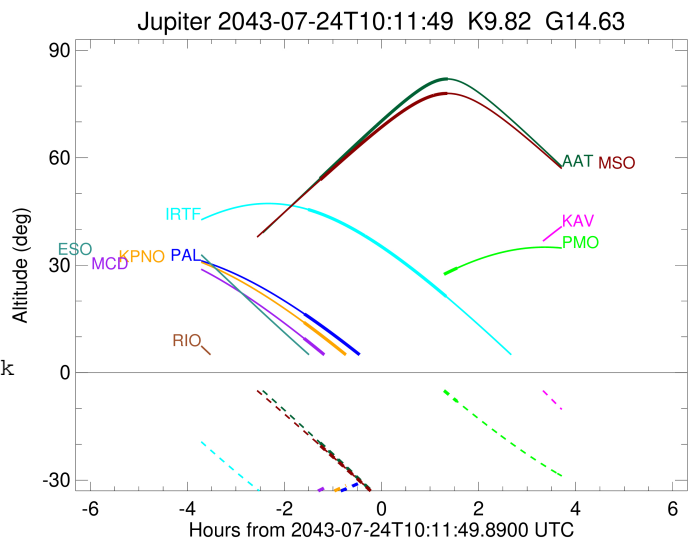
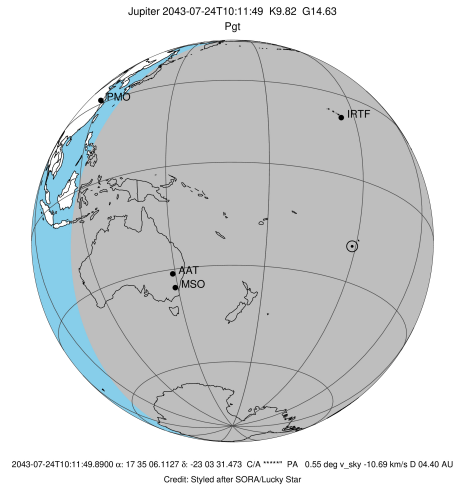
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1			Pnn
PAL	Palomar Mt (200")	33.4	243.1	+	JUL 24 08:36 - JUL 24 08:36	Pin
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+	JUL 24 11:45 - JUL 24 11:45	Pne
KPNO	Kitt Peak Natl Obs	32.0	248.4	+	JUL 24 08:36 - JUL 24 08:36	Pin
MCD	McDonald Obs. 2.7m	30.7	256.0	+	JUL 24 08:35 - JUL 24 08:35	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+	JUL 24 08:41 - JUL 24 11:31	Pie
KAV	Kavalur Observatory	12.6	78.8			Pnn
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 24 08:56 - JUL 24 11:33	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	JUL 24 08:56 - JUL 24 11:33	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-24T10:03:04.280
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      : 4116690316015349120
2Mass ID (if available) : 17350611-2303314
ICRS Star Coord at Epoch: 17h 35m 06.11270s -23:03:31.47273s
RUWE (>1.4 is poor) : 0.98
K magnitude          : 9.818
G magnitude          : 14.626
RP magnitude         : 13.396
BP magnitude         : 16.288
DUPflag             : 0
Distance (au)       : 4.404
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -10.69
Sun-Target sep (deg) : 143.43
Sun-Moon sep (deg)  : 63.75
B (ring opening deg) : -2.38
PA of pole (deg)    : 1.84
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49731
C/A sky separation (" ) : 13.663
C/A sky separation (km) : 43639.5
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
    
```

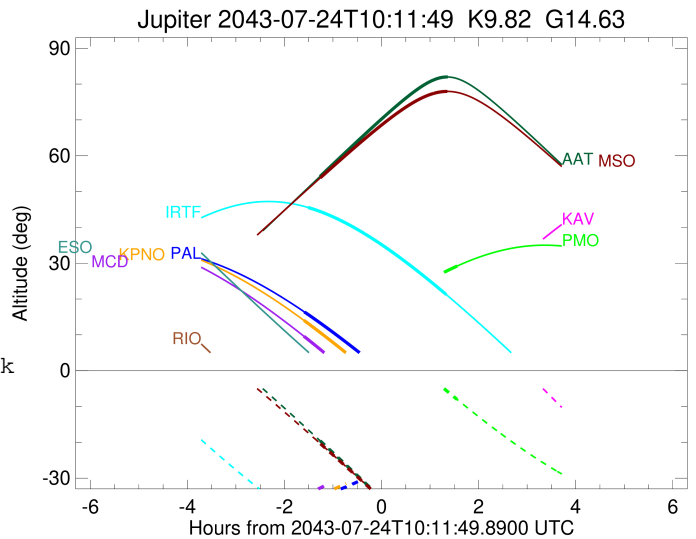
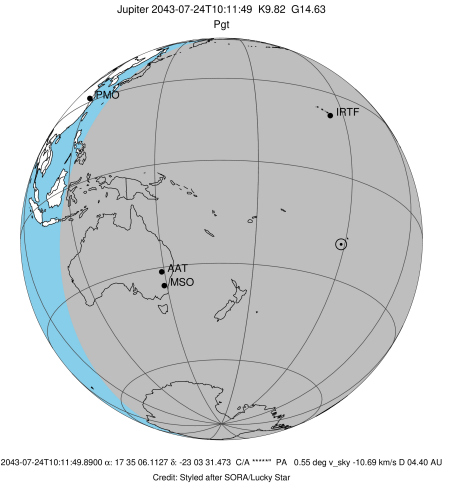


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-24T08:36:31.911	16.39	-36.01	71489.0	-38.19	-41.87
Jupiter	E	2043-07-24T11:30:54.807	-15.20x	-15.94	71489.2	-37.09	-40.75

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-07-24T10:18:56.140
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       : 4116690316015349120
2Mass ID (if available) : 17350611-2303314
ICRS Star Coord at Epoch: 17h 35m 06.11270s -23:03:31.47273s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 9.818
G magnitude           : 14.626
RP magnitude         : 13.396
BP magnitude         : 16.288
DUPflag              : 0
Distance (au)        : 4.404
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.69
Sun-Target sep (deg) : 143.43
Sun-Moon sep (deg)   : 64.60
B (ring opening deg) : -2.38
PA of pole (deg)     : 1.84
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49731
C/A sky separation ("): 13.482
C/A sky separation (km): 43061.3
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
    
```

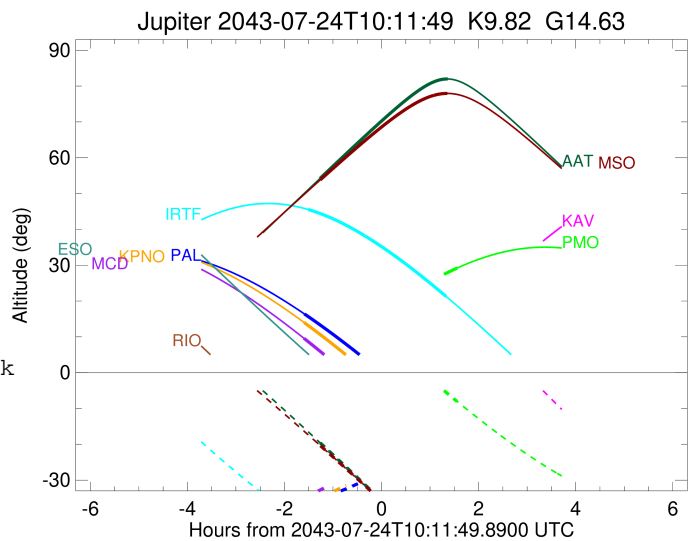
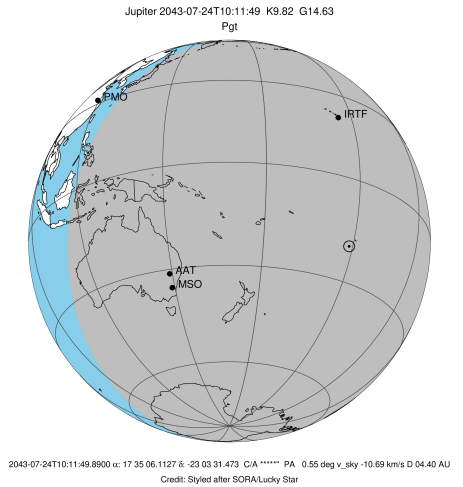


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-24T08:51:46.062	2.94x	26.79x	71488.9	-39.00	-42.69
Jupiter	E	2043-07-24T11:45:19.858	29.20	-8.03	71489.4	-35.21	-38.81

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-07-24T10:02:41.300
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        : 4116690316015349120
2Mass ID (if available) : 17350611-2303314
ICRS Star Coord at Epoch: 17h 35m 06.11270s -23:03:31.47273s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 9.818
G magnitude           : 14.626
RP magnitude          : 13.396
BP magnitude          : 16.288
DUPflag              : 0
Distance (au)         : 4.404
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.69
Sun-Target sep (deg)  : 143.43
Sun-Moon sep (deg)   : 63.69
B (ring opening deg) : -2.38
PA of pole (deg)     : 1.84
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49731
C/A sky separation (" ) : 13.755
C/A sky separation (km) : 43932.1
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
    
```

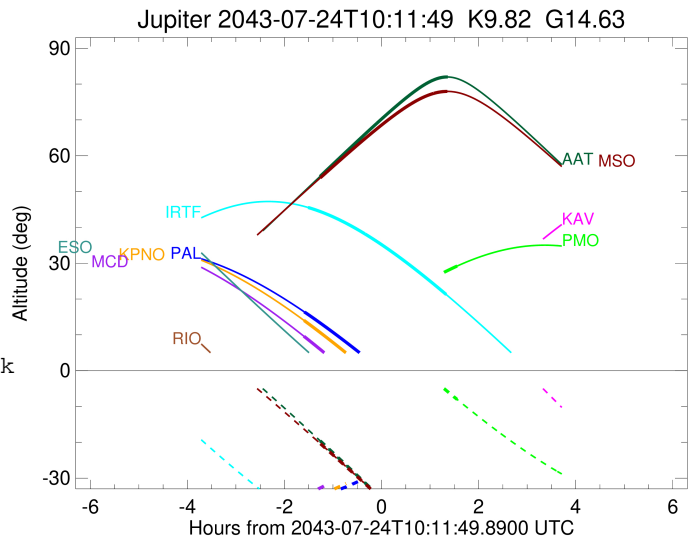
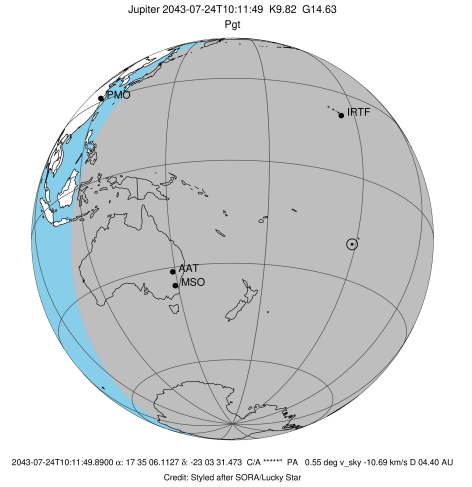


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-24T08:36:15.423	13.99	-36.18	71489.0	-38.43	-42.12
Jupiter	E	2043-07-24T11:30:28.434	-18.96x	-13.21	71489.1	-37.41	-41.07

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-07-24T10:02:20.220
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        : 4116690316015349120
2Mass ID (if available) : 17350611-2303314
ICRS Star Coord at Epoch: 17h 35m 06.11270s -23:03:31.47273s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 9.818
G magnitude           : 14.626
RP magnitude          : 13.396
BP magnitude          : 16.288
DUPflag              : 0
Distance (au)         : 4.404
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.69
Sun-Target sep (deg)  : 143.43
Sun-Moon sep (deg)   : 63.59
B (ring opening deg) : -2.38
PA of pole (deg)     : 1.84
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49731
C/A sky separation (") : 13.875
C/A sky separation (km) : 44314.9
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
    
```

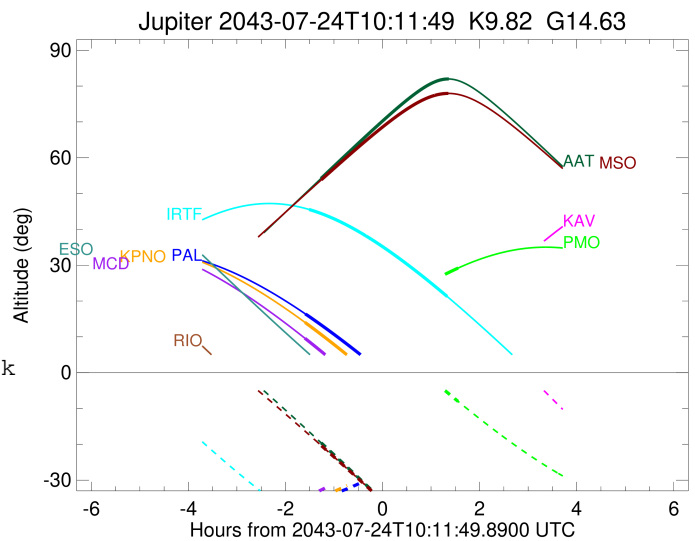
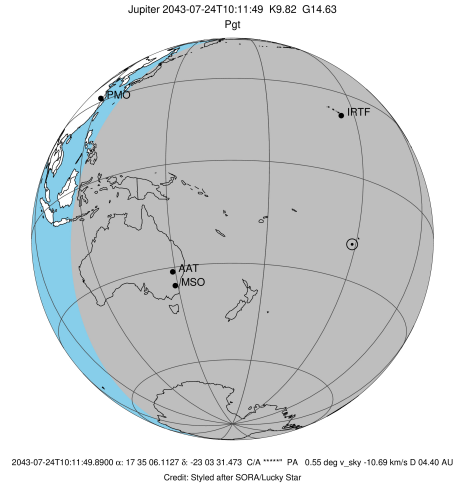


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-24T08:35:58.627	9.59	-34.87	71488.9	-38.77	-42.46
Jupiter	E	2043-07-24T11:30:06.147	-24.83x	-8.41	71489.1	-37.81	-41.49

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-24T10:06:05.930
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       : 4116690316015349120
2Mass ID (if available) : 17350611-2303314
ICRS Star Coord at Epoch: 17h 35m 06.11270s -23:03:31.47273s
RUWE (>1.4 is poor) : 0.98
K magnitude          : 9.818
G magnitude          : 14.626
RP magnitude         : 13.396
BP magnitude         : 16.288
DUPflag             : 0
Distance (au)        : 4.404
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.69
Sun-Target sep (deg) : 143.43
Sun-Moon sep (deg)   : 64.36
B (ring opening deg) : -2.38
PA of pole (deg)     : 1.84
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49731
C/A sky separation (") : 13.644
C/A sky separation (km) : 43578.7
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
    
```

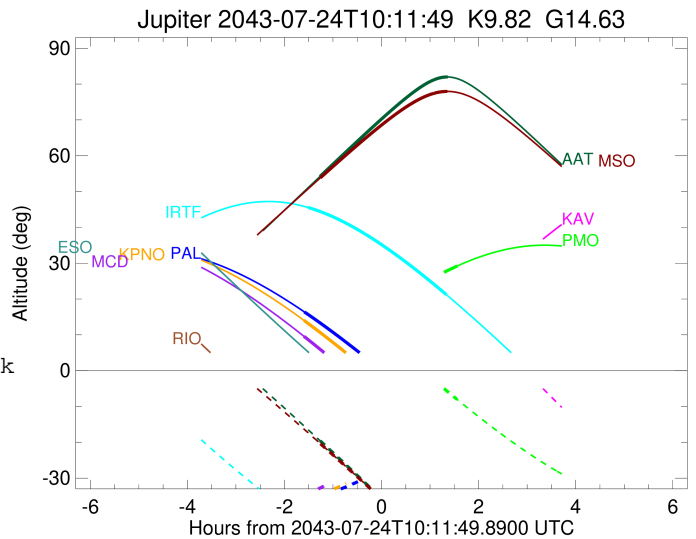
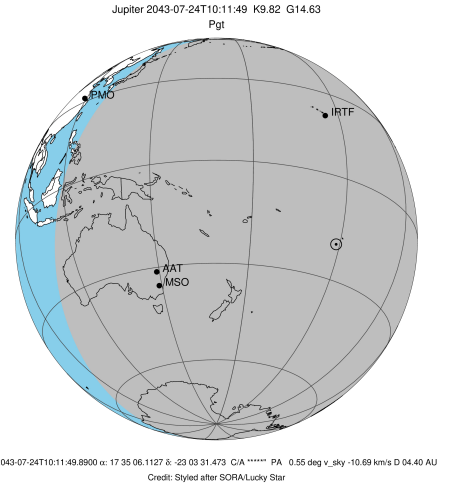


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-24T08:41:12.633	45.54	-42.53	71489.0	-38.48	-42.17
Jupiter	E	2043-07-24T11:31:49.809	21.25	-47.53	71489.2	-36.84	-40.49

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2043-07-24T10:15:02.400
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        : 4116690316015349120
2Mass ID (if available) : 17350611-2303314
ICRS Star Coord at Epoch: 17h 35m 06.11270s -23:03:31.47273s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 9.818
G magnitude           : 14.626
RP magnitude          : 13.396
BP magnitude          : 16.288
DUPflag              : 0
Distance (au)         : 4.404
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.69
Sun-Target sep (deg)  : 143.43
Sun-Moon sep (deg)    : 64.98
B (ring opening deg) : -2.38
PA of pole (deg)      : 1.84
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49731
C/A sky separation (") : 15.202
C/A sky separation (km) : 48554.9
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
    
```

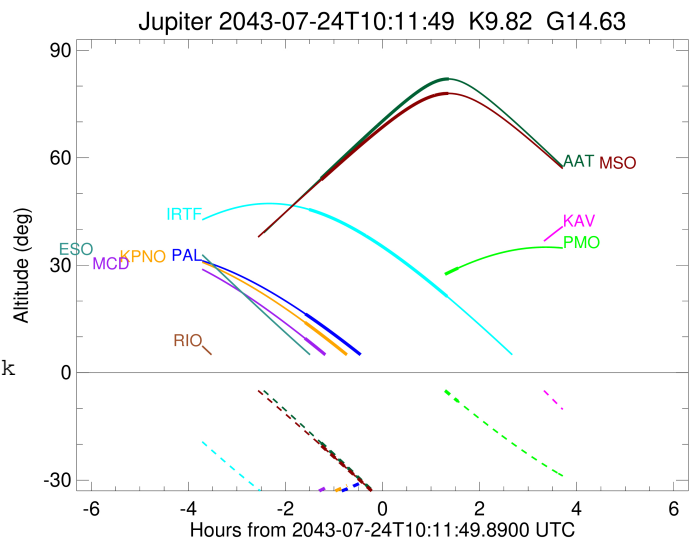
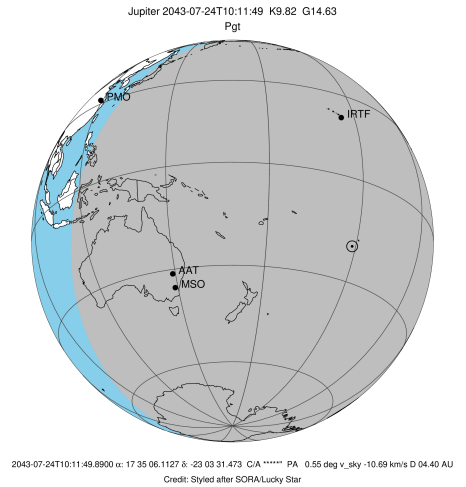


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2043-07-24T08:56:01.604	54.25	-19.59	71488.2	-44.43	-48.14
Jupiter	E	2043-07-24T11:33:49.843	81.97	-53.16	71488.6	-41.30	-45.01

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2043-07-24T10:14:54.520
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      : 4116690316015349120
2Mass ID (if available) : 17350611-2303314
ICRS Star Coord at Epoch: 17h 35m 06.11270s -23:03:31.47273s
RUWE (>1.4 is poor) : 0.98
K magnitude         : 9.818
G magnitude         : 14.626
RP magnitude        : 13.396
BP magnitude        : 16.288
DUPflag            : 0
Distance (au)       : 4.404
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -10.69
Sun-Target sep (deg) : 143.43
Sun-Moon sep (deg)  : 64.97
B (ring opening deg) : -2.38
PA of pole (deg)    : 1.84
Pole direction: RA (deg): 268.05670
Dec (deg): 64.49731
C/A sky separation (") : 15.339
C/A sky separation (km) : 48991.2
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	2043-07-24T08:56:23.507	53.86	-20.40	71488.1	-44.89	-48.59
Jupiter	E	2043-07-24T11:33:13.131	77.94	-52.22	71488.5	-41.78	-45.50