

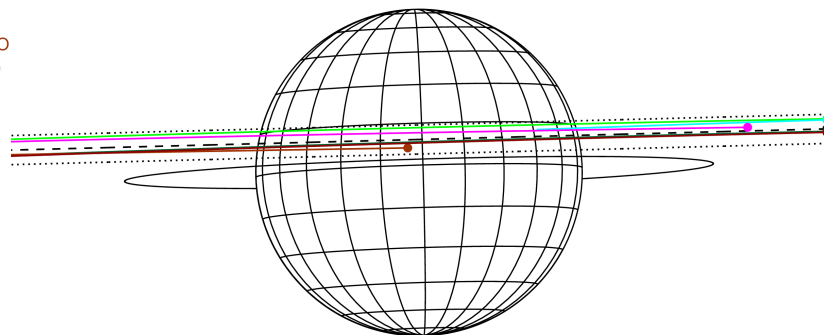
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-08T16:21:51.820
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116786218422503680
 2Mass ID (if available) : 17361119-2250373

Jupiter 2031-06-08T16:21:51 K8.08 G14.70 Pgt

ICRS Star Coord at Epoch: 17h 36m 11.17778s -22:50:37.50726s
 RUWE (>1.4 is poor) : 0.82
 K magnitude : 8.077
 G magnitude : 14.696
 RP magnitude : 13.137
 BP magnitude : 18.233
 DUPflag : 0
 Distance (au) : 4.274
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.21
 Sun-Target sep (deg) : 172.73
 Sun-Moon sep (deg) : 37.73
 B (ring opening deg) : -2.60
 PA of pole (deg) : 1.73
 Pole direction: RA (deg): 268.05692
 Dec (deg): 64.49651
 C/A sky separation (") : 4.663
 C/A sky separation (km) : 14455.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk



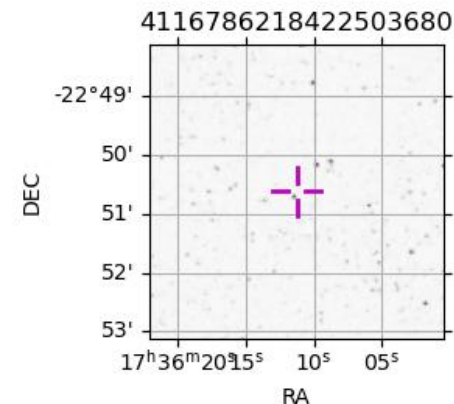
Earth
 PMO
 IRTF
 KAV
 AAT
 SAAO
 MSO



2031-06-08T16:21:51.8200 at: 17 36 11.1778 s: -22 50 37.507 C/A 4.651" PA 181.49 deg v_sky -16.21 km/s D 04.27 AU
 Credit: Styled after SORA/Lucky Star

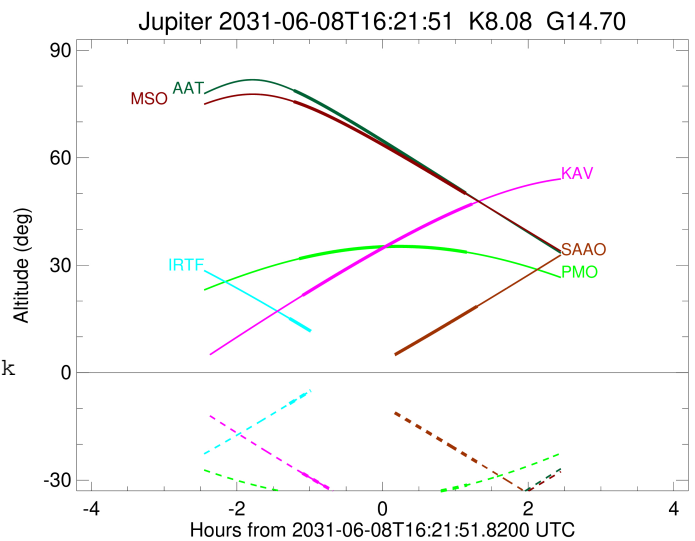
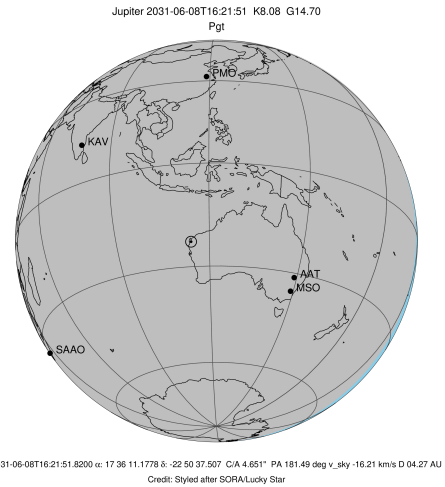
Observable events with sun below -5 deg and altitude above 5 deg

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			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+ +	JUN 08 15:13 - JUN 08 17:31	Pie
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			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+	JUN 08 15:05 - JUN 08 15:05	Pin
KAV	Kavalur Observatory	12.6	78.8	+ +	JUN 08 15:16 - JUN 08 17:35	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	+ +	JUN 08 15:08 - JUN 08 17:30	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	JUN 08 17:39 - JUN 08 17:39	Pne
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	JUN 08 15:08 - JUN 08 17:30	Pie



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target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T16:22:16.840
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       : 4116786218422503680
2Mass ID (if available) : 17361119-2250373
ICRS Star Coord at Epoch: 17h 36m 11.17778s -22:50:37.50726s
RUWE (>1.4 is poor) : 0.82
K magnitude           : 8.077
G magnitude           : 14.696
RP magnitude          : 13.137
BP magnitude          : 18.233
DUPflag              : 0
Distance (au)        : 4.274
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.21
Sun-Target sep (deg) : 172.73
Sun-Moon sep (deg)   : 38.08
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.73
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 6.338
C/A sky separation (km) : 19647.9
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
    
```

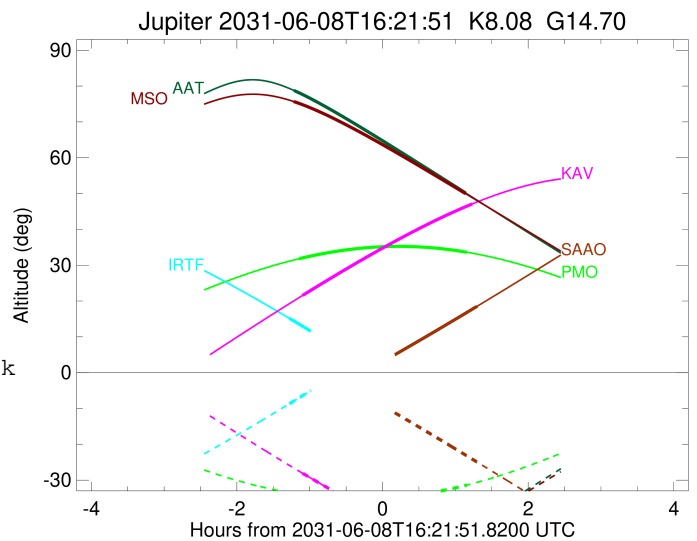
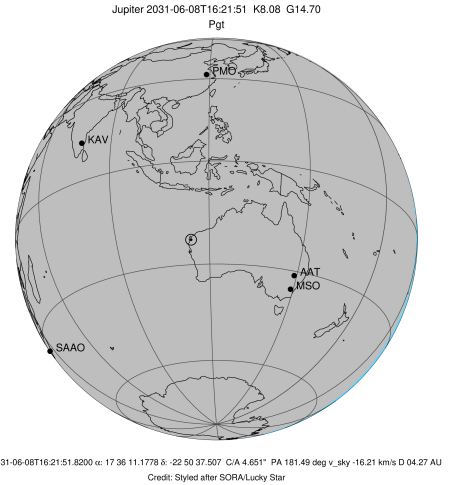


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T15:13:12.564	31.81	-33.93	71491.3	15.56	17.65
Jupiter	E	2031-06-08T17:31:18.432	33.62	-31.38	71491.3	16.15	18.31

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T16:16:00.060
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      : 4116786218422503680
2Mass ID (if available) : 17361119-2250373
ICRS Star Coord at Epoch: 17h 36m 11.17778s -22:50:37.50726s
RUWE (>1.4 is poor) : 0.82
K magnitude          : 8.077
G magnitude          : 14.696
RP magnitude         : 13.137
BP magnitude         : 18.233
DUPflag             : 0
Distance (au)       : 4.274
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.21
Sun-Target sep (deg) : 172.73
Sun-Moon sep (deg)  : 36.95
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.73
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 5.465
C/A sky separation (km) : 16942.7
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
    
```

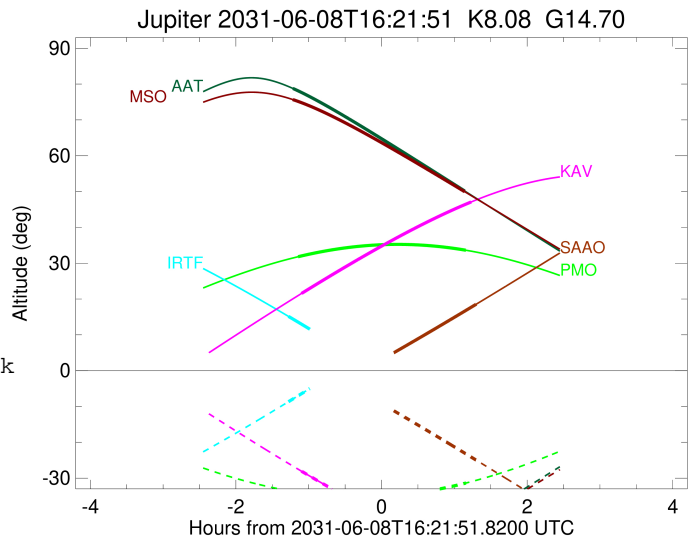


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T15:05:10.976	15.16	-8.67	71491.5	14.01	15.92
Jupiter	E	2031-06-08T17:27:22.844	-15.26x	22.26x	71491.5	13.33	15.16

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-08T16:26:06.350
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       : 4116786218422503680
2Mass ID (if available) : 17361119-2250373
ICRS Star Coord at Epoch: 17h 36m 11.17778s -22:50:37.50726s
RUWE (>1.4 is poor) : 0.82
K magnitude           : 8.077
G magnitude           : 14.696
RP magnitude          : 13.137
BP magnitude          : 18.233
DUPflag              : 0
Distance (au)        : 4.274
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.21
Sun-Target sep (deg) : 172.73
Sun-Moon sep (deg)   : 38.59
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.73
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 5.619
C/A sky separation (km) : 17420.6
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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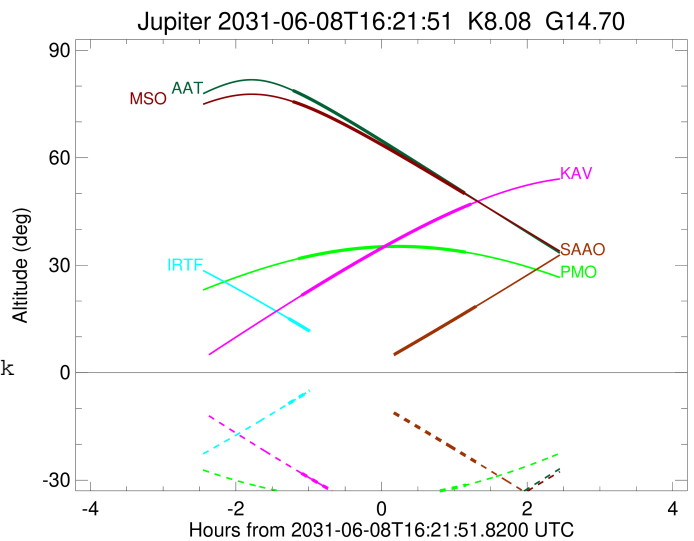
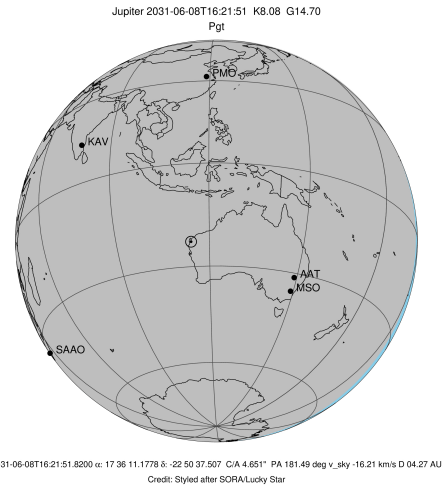


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T15:16:00.670	21.56	-28.08	71491.5	13.35	15.18
Jupiter	E	2031-06-08T17:35:47.774	47.09	-50.92	71491.4	14.69	16.68

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T16:19:24.370
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       : 4116786218422503680
2Mass ID (if available) : 17361119-2250373
ICRS Star Coord at Epoch: 17h 36m 11.17778s -22:50:37.50726s
RUWE (>1.4 is poor) : 0.82
K magnitude          : 8.077
G magnitude          : 14.696
RP magnitude         : 13.137
BP magnitude         : 18.233
DUPflag             : 0
Distance (au)        : 4.274
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.21
Sun-Target sep (deg) : 172.73
Sun-Moon sep (deg)   : 38.00
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.73
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 4.315
C/A sky separation (km): 13377.6
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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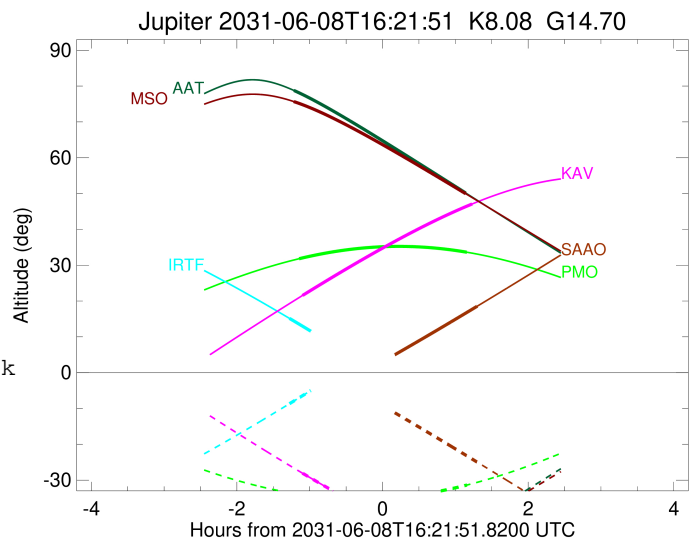
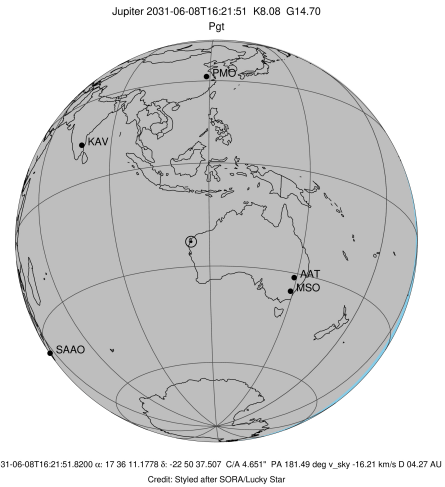


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T15:08:49.559	78.78	-73.17	71491.7	10.66	12.15
Jupiter	E	2031-06-08T17:30:11.814	50.19	-43.49	71491.7	10.73	12.22

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T16:27:08.250
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      : 4116786218422503680
2Mass ID (if available) : 17361119-2250373
ICRS Star Coord at Epoch: 17h 36m 11.17778s -22:50:37.50726s
RUWE (>1.4 is poor) : 0.82
K magnitude          : 8.077
G magnitude          : 14.696
RP magnitude         : 13.137
BP magnitude         : 18.233
DUPflag             : 0
Distance (au)       : 4.274
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.21
Sun-Target sep (deg) : 172.73
Sun-Moon sep (deg)  : 38.46
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.73
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 3.497
C/A sky separation (km) : 10840.1
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
    
```

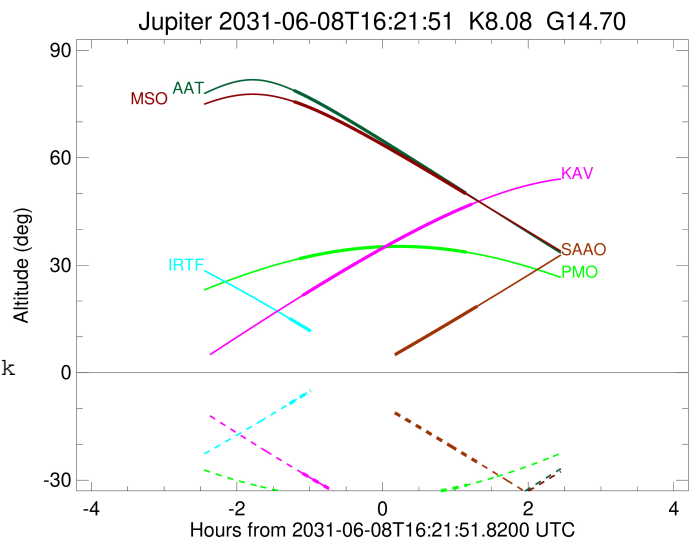
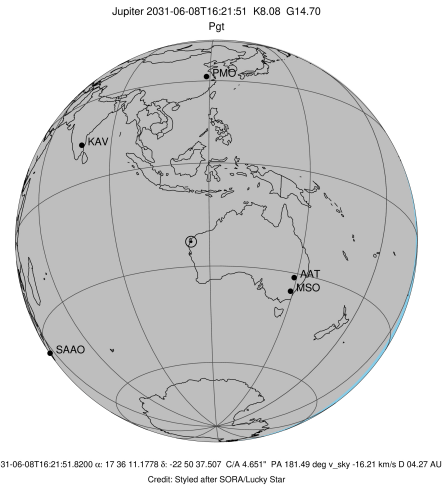


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-08T15:13:53.283	-9.45x	3.77x	71491.8	7.97	9.10
Jupiter	E	2031-06-08T17:39:49.315	18.53	-24.96	71491.7	9.48	10.81

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T16:19:30.420
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       : 4116786218422503680
2Mass ID (if available) : 17361119-2250373
ICRS Star Coord at Epoch: 17h 36m 11.17778s -22:50:37.50726s
RUWE (>1.4 is poor) : 0.82
K magnitude           : 8.077
G magnitude           : 14.696
RP magnitude          : 13.137
BP magnitude          : 18.233
DUPflag              : 0
Distance (au)         : 4.274
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.21
Sun-Target sep (deg) : 172.73
Sun-Moon sep (deg)   : 38.01
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.73
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (" ) : 4.176
C/A sky separation (km) : 12944.6
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	2031-06-08T15:08:46.449	75.67	-71.15	71491.7	10.31	11.74
Jupiter	E	2031-06-08T17:30:26.478	49.95	-43.57	71491.7	10.39	11.84