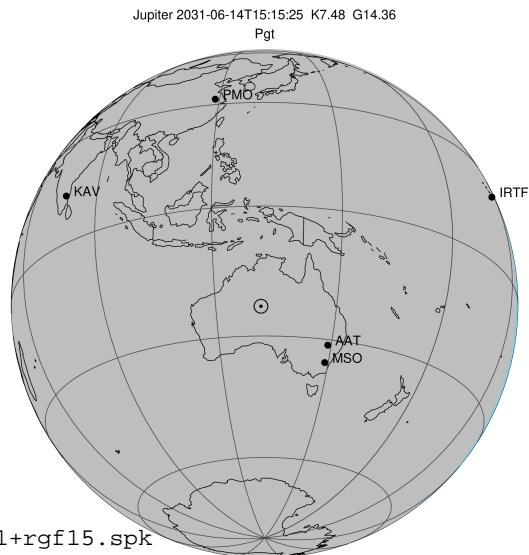


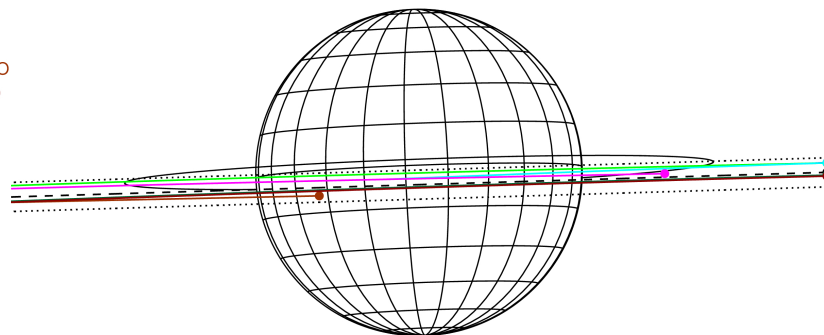
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-06-14T15:15:25.250  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4117457195381784576  
 2Mass ID (if available) : 17325450-2249271

Jupiter 2031-06-14T15:15:25 K7.48 G14.36 Pgt

ICRS Star Coord at Epoch: 17h 32m 54.49842s -22:49:27.40610s  
 RUWE (>1.4 is poor) : 1.08  
 K magnitude : 7.483  
 G magnitude : 14.355  
 RP magnitude : 12.815  
 BP magnitude : 17.963  
 DUPflag : 0  
 Distance (au) : 4.265  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -16.47  
 Sun-Target sep (deg) : 179.07  
 Sun-Moon sep (deg) : 119.83  
 B (ring opening deg) : -2.60  
 PA of pole (deg) : 2.08  
 Pole direction: RA (deg): 268.05692  
 Dec (deg): 64.49651  
 C/A sky separation (") : 1.720  
 C/A sky separation (km) : 5319.6  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk



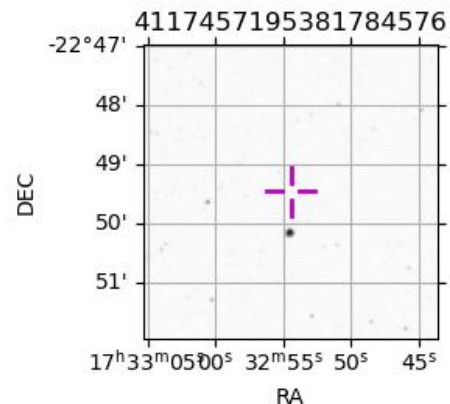
Earth  
 PAL  
 PMO  
 IRTF  
 KAV  
 AAT  
 SAAO  
 MSO



2031-06-14T15:15:25.2500 a: 17 32 54.4984 ð -22 49 27.406 C/A 1.732" PA 1.73 deg v\_sky -16.47 km/s D 04.27 AU  
 Credit: Styled after SORA/Lucky Star

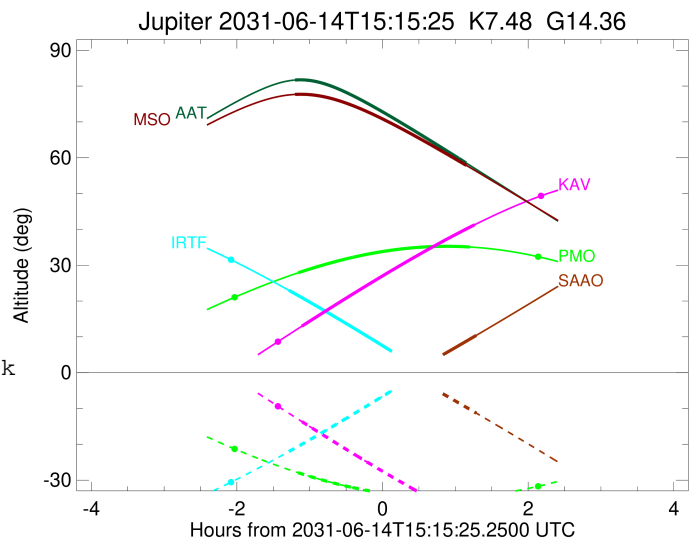
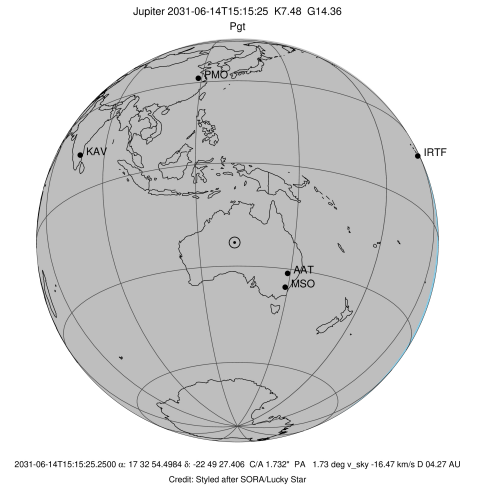
Observable events with sun below -5 deg and altitude above 5 deg

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 14 14:06 - JUN 14 16:27	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 14 13:58 - JUN 14 13:58	Pin
KAV	Kavalur Observatory	12.6	78.8	+ +	JUN 14 14:09 - JUN 14 16:31	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 14 14:03 - JUN 14 16:24	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	JUN 14 16:32 - JUN 14 16:32	Pne
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	JUN 14 14:03 - JUN 14 16:24	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-14T15:16:47.320
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      : 4117457195381784576
2Mass ID (if available) : 17325450-2249271
ICRS Star Coord at Epoch: 17h 32m 54.49842s -22:49:27.40610s
RUWE (>1.4 is poor) : 1.08
K magnitude          : 7.483
G magnitude          : 14.355
RP magnitude         : 12.815
BP magnitude         : 17.963
DUPflag             : 0
Distance (au)       : 4.265
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.47
Sun-Target sep (deg) : 179.07
Sun-Moon sep (deg)  : 120.19
B (ring opening deg) : -2.60
PA of pole (deg)    : 2.08
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (" ) : 0.066
C/A sky separation (km) : 204.7
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
    
```

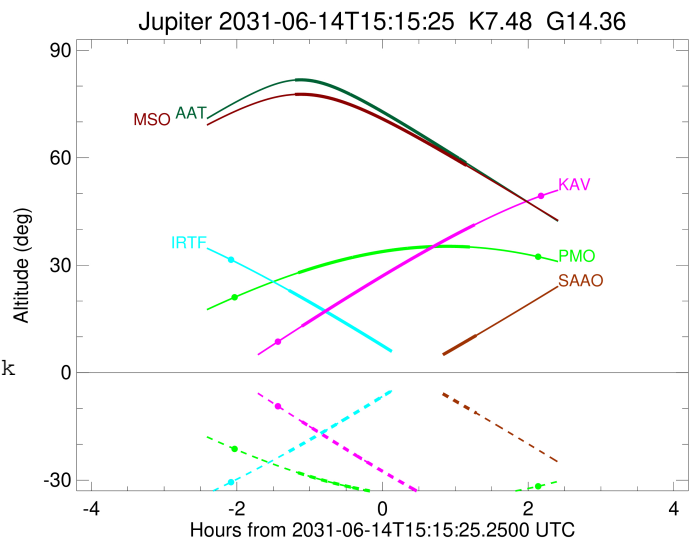
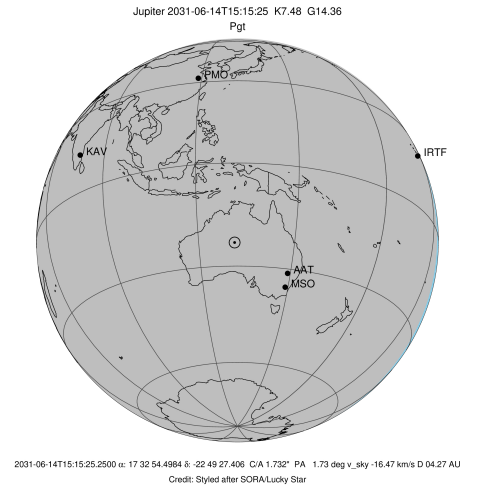


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-14T14:05:59.514	27.88	-27.94	71492.0	-0.74	-0.85
Jupiter	E	2031-06-14T16:27:27.905	35.07	-34.58	71492.0	0.26	0.29

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-14T15:09:43.620
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        : 4117457195381784576
2Mass ID (if available) : 17325450-2249271
ICRS Star Coord at Epoch: 17h 32m 54.49842s -22:49:27.40610s
RUWE (>1.4 is poor) : 1.08
K magnitude           : 7.483
G magnitude           : 14.355
RP magnitude          : 12.815
BP magnitude          : 17.963
DUPflag              : 0
Distance (au)         : 4.265
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.47
Sun-Target sep (deg)  : 179.07
Sun-Moon sep (deg)    : 120.36
B (ring opening deg) : -2.60
PA of pole (deg)      : 2.08
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 0.784
C/A sky separation (km) : 2426.0
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
    
```

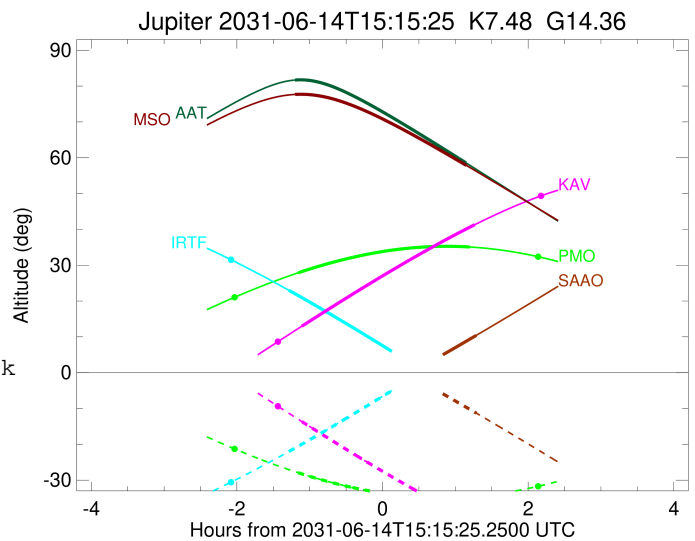
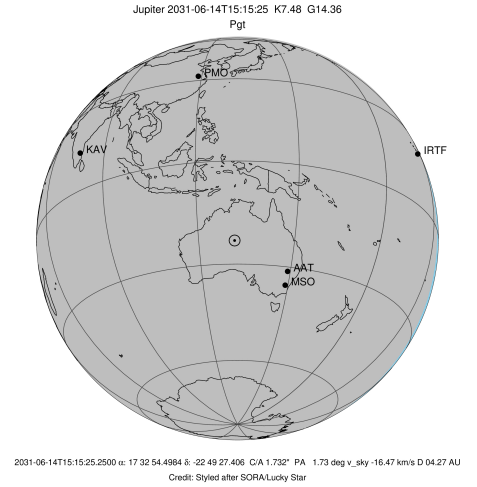


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-14T13:58:19.104	22.98	-22.01	71492.0	-1.80	-2.06
Jupiter	E	2031-06-14T16:21:41.257	-6.67x	7.54x	71492.0	-2.16	-2.47

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-14T15:20:29.130
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      : 4117457195381784576
2Mass ID (if available) : 17325450-2249271
ICRS Star Coord at Epoch: 17h 32m 54.49842s -22:49:27.40610s
RUWE (>1.4 is poor) : 1.08
K magnitude          : 7.483
G magnitude          : 14.355
RP magnitude         : 12.815
BP magnitude         : 17.963
DUPflag             : 0
Distance (au)       : 4.265
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.47
Sun-Target sep (deg) : 179.07
Sun-Moon sep (deg)  : 119.83
B (ring opening deg) : -2.60
PA of pole (deg)    : 2.08
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 0.871
C/A sky separation (km) : 2693.5
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
    
```

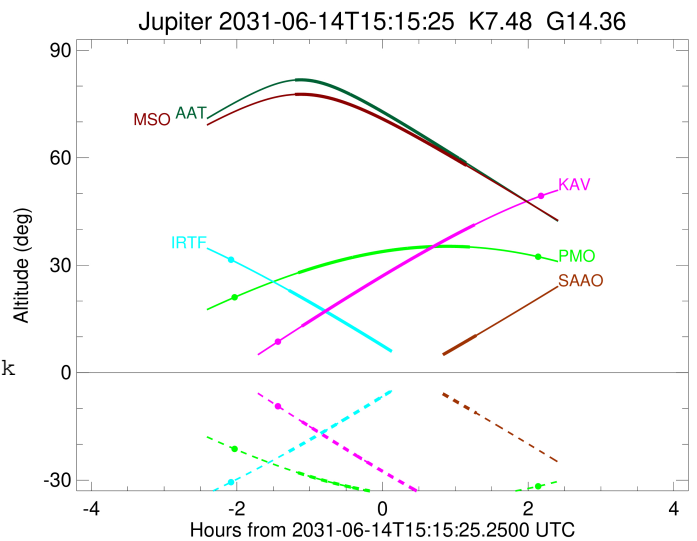
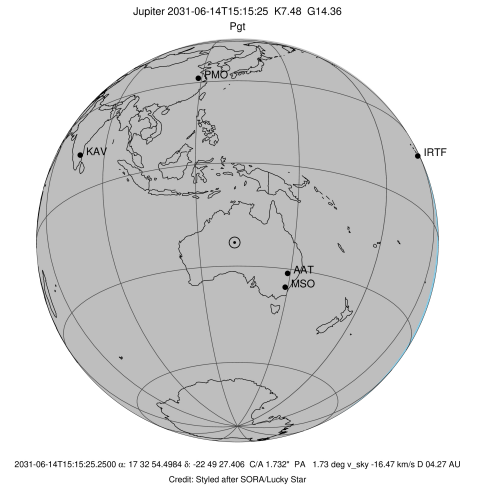


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-14T14:09:06.982	13.00	-13.68	71492.0	-3.05	-3.49
Jupiter	E	2031-06-14T16:31:22.790	41.29	-41.55	71492.0	-1.37	-1.57

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-14T15:13:48.530
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       : 4117457195381784576
2Mass ID (if available) : 17325450-2249271
ICRS Star Coord at Epoch: 17h 32m 54.49842s -22:49:27.40610s
RUWE (>1.4 is poor) : 1.08
K magnitude           : 7.483
G magnitude           : 14.355
RP magnitude          : 12.815
BP magnitude          : 17.963
DUPflag              : 0
Distance (au)        : 4.265
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.47
Sun-Target sep (deg) : 179.07
Sun-Moon sep (deg)   : 120.71
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.08
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 2.031
C/A sky separation (km) : 6281.2
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
    
```

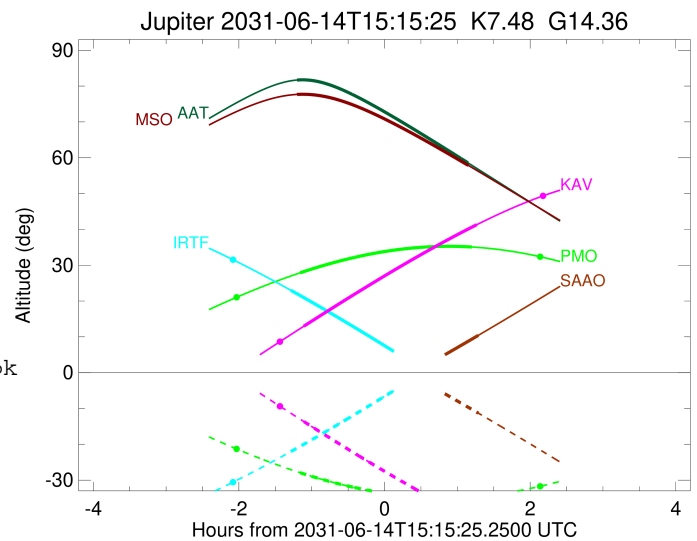
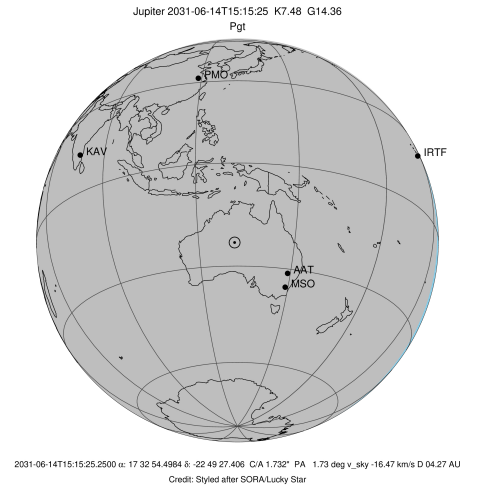


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-14T14:03:25.157	81.68	-82.16	71491.9	-5.35	-6.11
Jupiter	E	2031-06-14T16:24:20.198	58.53	-57.98	71491.9	-4.88	-5.58

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-14T15:20:31.400
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      : 4117457195381784576
2Mass ID (if available) : 17325450-2249271
ICRS Star Coord at Epoch: 17h 32m 54.49842s -22:49:27.40610s
RUWE (>1.4 is poor) : 1.08
K magnitude          : 7.483
G magnitude          : 14.355
RP magnitude         : 12.815
BP magnitude         : 17.963
DUPflag             : 0
Distance (au)       : 4.265
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.47
Sun-Target sep (deg) : 179.07
Sun-Moon sep (deg)  : 119.39
B (ring opening deg) : -2.60
PA of pole (deg)    : 2.08
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 3.007
C/A sky separation (km): 9302.3
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
    
```

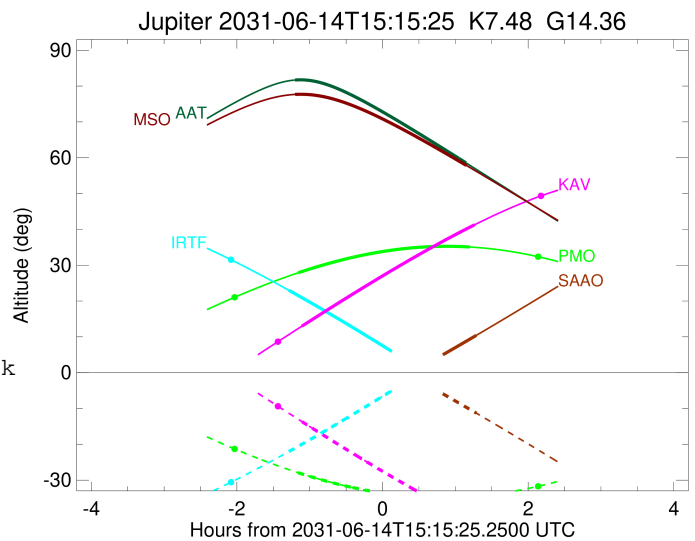
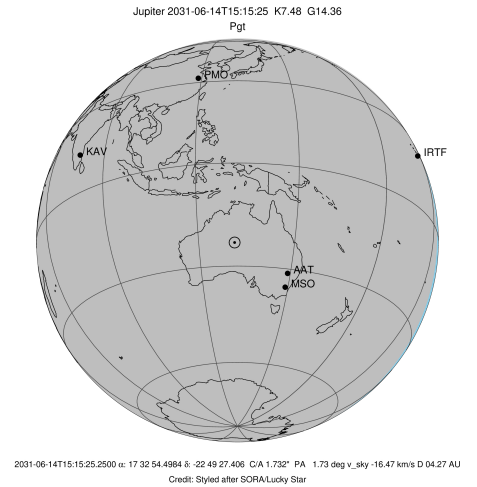


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-14T14:07:55.153	-16.00x	15.09x	71491.8	-8.27	-9.43
Jupiter	E	2031-06-14T16:32:36.641	10.39	-11.27	71491.9	-6.61	-7.54

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-14T15:13:52.290
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       : 4117457195381784576
2Mass ID (if available) : 17325450-2249271
ICRS Star Coord at Epoch: 17h 32m 54.49842s -22:49:27.40610s
RUWE (>1.4 is poor) : 1.08
K magnitude           : 7.483
G magnitude           : 14.355
RP magnitude          : 12.815
BP magnitude          : 17.963
DUPflag              : 0
Distance (au)        : 4.265
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.47
Sun-Target sep (deg) : 179.07
Sun-Moon sep (deg)   : 120.69
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.08
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 2.172
C/A sky separation (km): 6719.6
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	2031-06-14T14:03:26.858	77.66	-78.13	71491.9	-5.70	-6.52
Jupiter	E	2031-06-14T16:24:25.627	57.86	-57.41	71491.9	-5.22	-5.97