

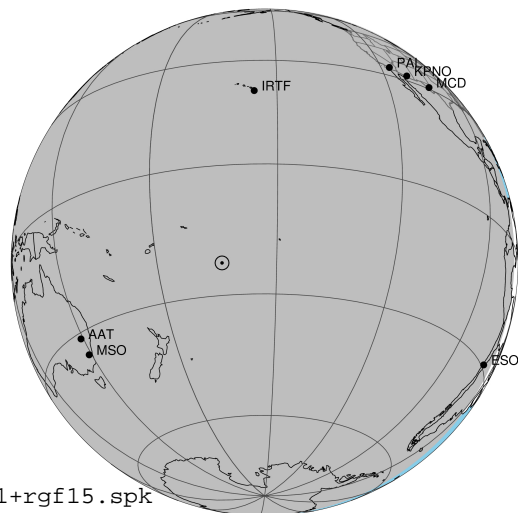
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-06-06T10:52:28.310  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4116743642325075328  
 2Mass ID (if available) : 17372351-2251199

Jupiter 2031-06-06T10:52:28 K9.91 G14.91 Pgt

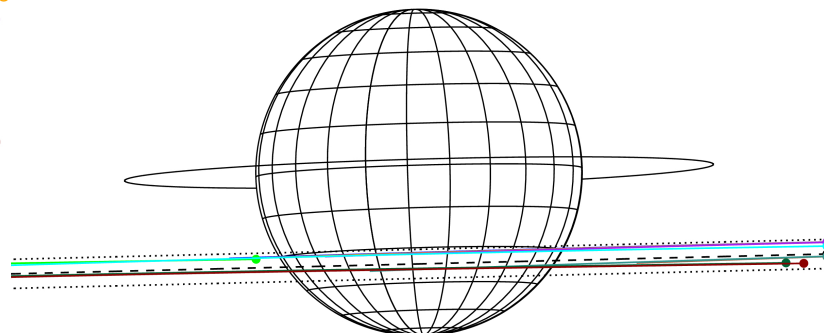
ICRS Star Coord at Epoch: 17h 37m 23.50949s -22:51:20.27648s

RUWE (>1.4 is poor) : 0.94  
 K magnitude : 9.911  
 G magnitude : 14.908  
 RP magnitude : 13.648  
 BP magnitude : 16.705  
 DUPflag : 0  
 Distance (au) : 4.281  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -16.02  
 Sun-Target sep (deg) : 170.33  
 Sun-Moon sep (deg) : 4.40  
 B (ring opening deg) : -2.60  
 PA of pole (deg) : 1.60  
 Pole direction: RA (deg): 268.05693  
 Dec (deg): 64.49651  
 C/A sky separation (") : 12.897  
 C/A sky separation (km) : 40039.4  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2031-06-06T10:52:28 K9.91 G14.91  
 Pgt



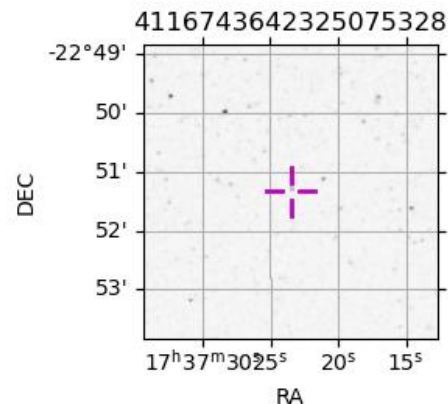
Earth  
 PAL  
 PMO  
 KPNO  
 MCD  
 IRTF  
 RIO  
 ESO  
 AAT  
 MSO



2031-06-06T10:52:28.3100 α: 17 37 23.5095 δ: -22 51 20.276 C/A \*\*\*\*\* PA 1.40 deg v\_sky -16.02 km/s D 04.28 AU  
 Credit: Styled after SORA/Lucky Star

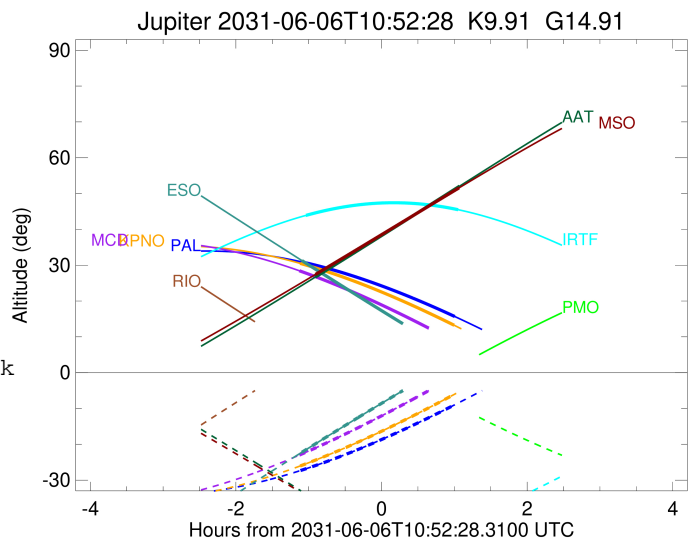
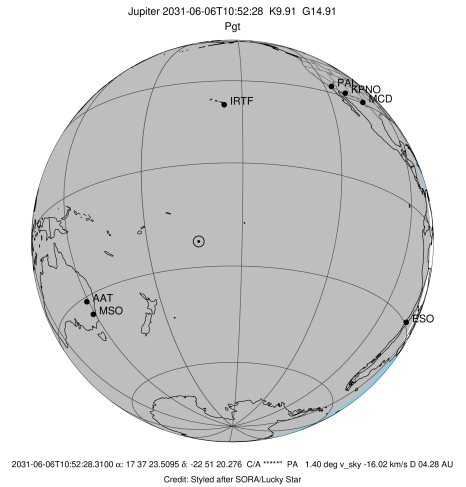
Observable events with sun below -5 deg and altitude above 5 deg

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	+ +	JUN 06 09:45 - JUN 06 11:52	Pie
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+ +	JUN 06 09:45 - JUN 06 11:52	Pie
MCD	McDonald Obs. 2.7m	30.7	256.0	+	JUN 06 09:44 - JUN 06 09:44	Pin
TEN	Teide Obs./Tenerife	28.3	343.5			Pnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ +	JUN 06 09:50 - JUN 06 11:55	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	+	JUN 06 09:46 - JUN 06 09:46	Pin
AAT	Siding Spring (AAT)	-31.3	149.1	+ +	JUN 06 09:58 - JUN 06 11:56	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	JUN 06 09:58 - JUN 06 11:56	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-06T10:49:11.740
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      : 4116743642325075328
2Mass ID (if available) : 17372351-2251199
ICRS Star Coord at Epoch: 17h 37m 23.50949s -22:51:20.27648s
RUWE (>1.4 is poor) : 0.94
K magnitude         : 9.911
G magnitude         : 14.908
RP magnitude        : 13.648
BP magnitude        : 16.705
DUPflag            : 0
Distance (au)       : 4.281
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.02
Sun-Target sep (deg) : 170.33
Sun-Moon sep (deg)  : 3.64
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.60
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 11.296
C/A sky separation (km) : 35069.8
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
    
```

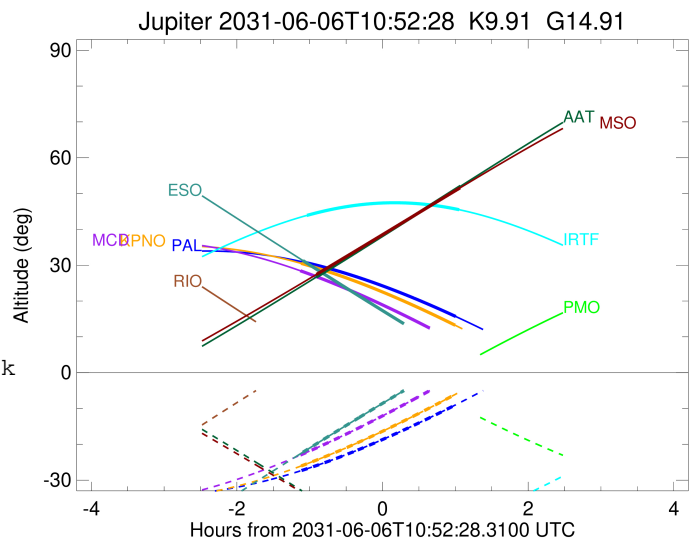
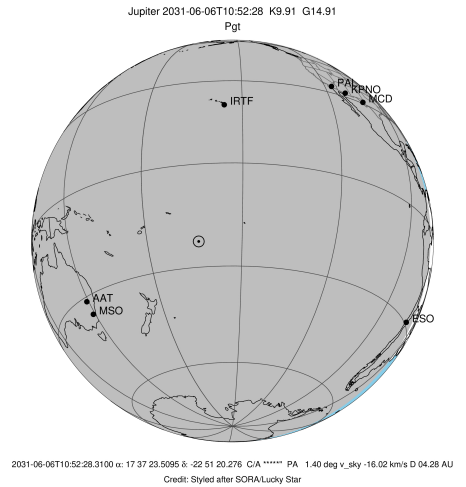


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-06T09:45:47.843	30.99	-27.31	71489.8	-29.33	-32.66
Jupiter	E	2031-06-06T11:52:49.272	15.68	-8.96	71489.8	-29.49	-32.83

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-06T10:48:42.720
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      : 4116743642325075328
2Mass ID (if available) : 17372351-2251199
ICRS Star Coord at Epoch: 17h 37m 23.50949s -22:51:20.27648s
RUWE (>1.4 is poor) : 0.94
K magnitude         : 9.911
G magnitude         : 14.908
RP magnitude        : 13.648
BP magnitude        : 16.705
DUPflag            : 0
Distance (au)       : 4.281
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.02
Sun-Target sep (deg) : 170.33
Sun-Moon sep (deg)  : 3.59
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.60
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 11.361
C/A sky separation (km) : 35269.8
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
    
```

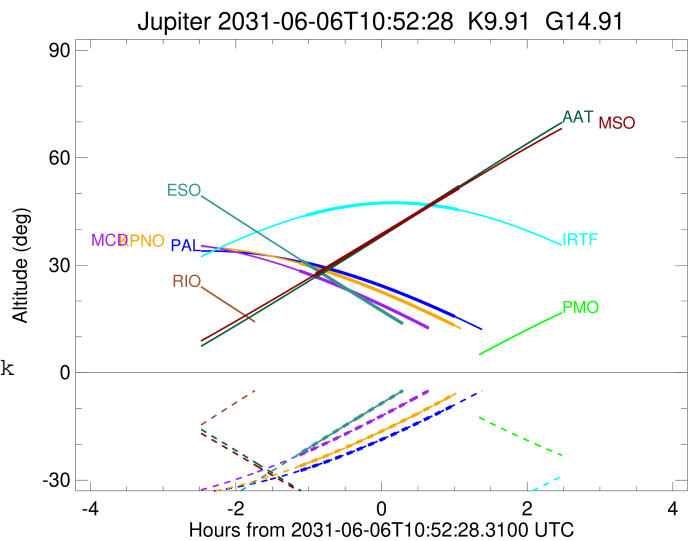
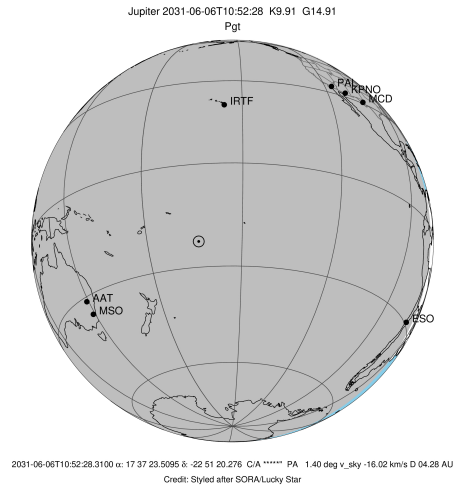


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-06T09:45:22.896	30.51	-26.05	71489.8	-29.47	-32.81
Jupiter	E	2031-06-06T11:52:18.249	13.24	-6.09	71489.7	-29.71	-33.06

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-06T10:48:05.130
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      : 4116743642325075328
2Mass ID (if available) : 17372351-2251199
ICRS Star Coord at Epoch: 17h 37m 23.50949s -22:51:20.27648s
RUWE (>1.4 is poor) : 0.94
K magnitude         : 9.911
G magnitude         : 14.908
RP magnitude        : 13.648
BP magnitude        : 16.705
DUPflag            : 0
Distance (au)       : 4.281
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.02
Sun-Target sep (deg) : 170.33
Sun-Moon sep (deg)  : 3.52
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.60
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 11.448
C/A sky separation (km) : 35541.4
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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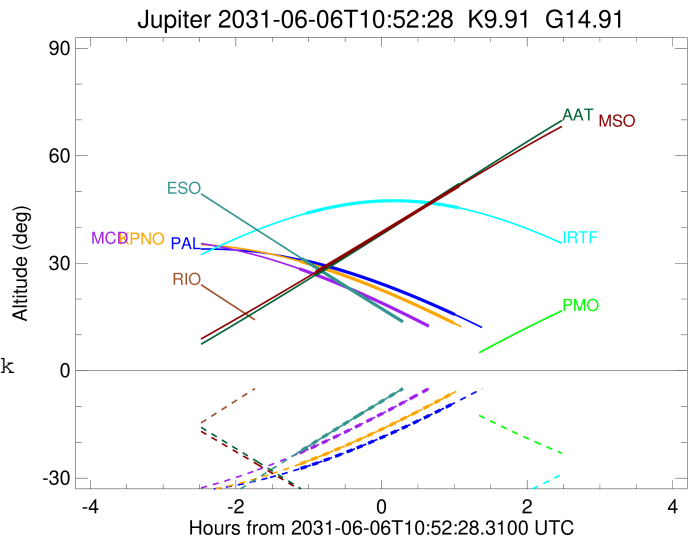
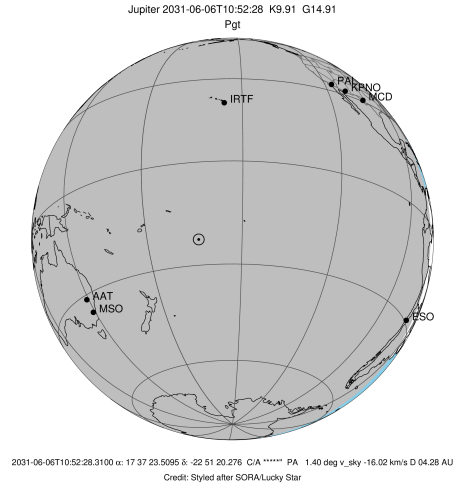


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-06T09:44:48.686	28.44	-23.00	71489.7	-29.65	-33.00
Jupiter	E	2031-06-06T11:51:39.979	8.83	-1.19x	71489.7	-30.01	-33.38

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-06T10:52:51.980
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       : 4116743642325075328
2Mass ID (if available) : 17372351-2251199
ICRS Star Coord at Epoch: 17h 37m 23.50949s -22:51:20.27648s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 9.911
G magnitude           : 14.908
RP magnitude          : 13.648
BP magnitude          : 16.705
DUPflag              : 0
Distance (au)         : 4.281
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.02
Sun-Target sep (deg) : 170.33
Sun-Moon sep (deg)   : 4.21
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.60
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation ("): 11.509
C/A sky separation (km): 35731.5
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
    
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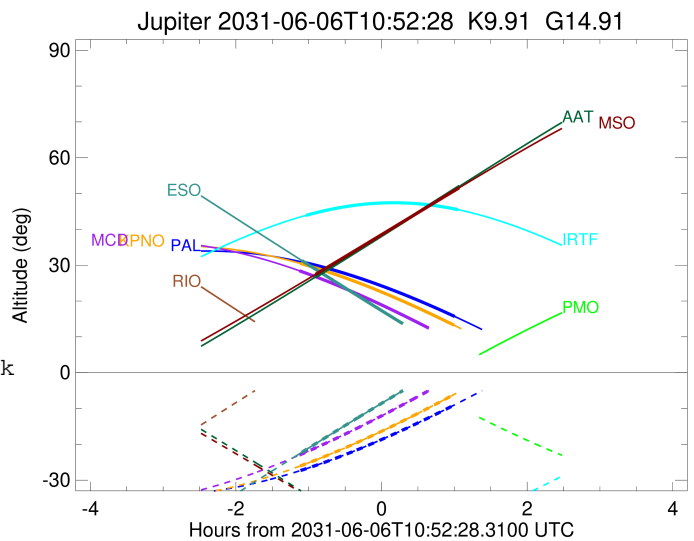
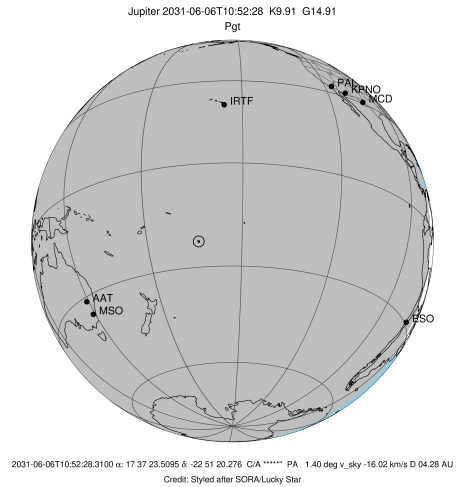


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-06T09:50:10.844	43.90	-47.00	71489.6	-30.29	-33.68
Jupiter	E	2031-06-06T11:55:30.876	45.49	-41.72	71489.7	-29.78	-33.14

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-06T10:46:16.590
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : ESO
Location            : European Southern Obs. (3.6m)
Latitude (deg)      : -29.26097
E. Longitude (deg) : 289.26831
Altitude (km)       : 2.400
Gaia source ID      : 4116743642325075328
2Mass ID (if available) : 17372351-2251199
ICRS Star Coord at Epoch: 17h 37m 23.50949s -22:51:20.27648s
RUWE (>1.4 is poor) : 0.94
K magnitude          : 9.911
G magnitude          : 14.908
RP magnitude         : 13.648
BP magnitude         : 16.705
DUPflag             : 0
Distance (au)       : 4.281
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.02
Sun-Target sep (deg) : 170.33
Sun-Moon sep (deg)  : 3.92
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.60
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 13.667
C/A sky separation (km) : 42430.9
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
    
```

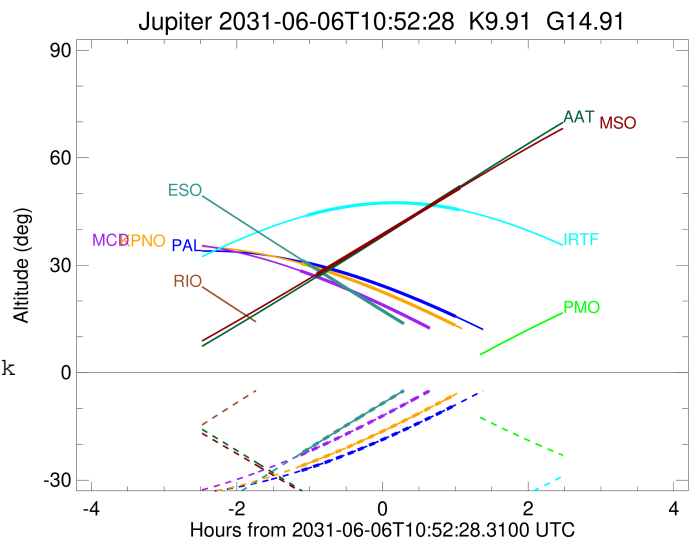
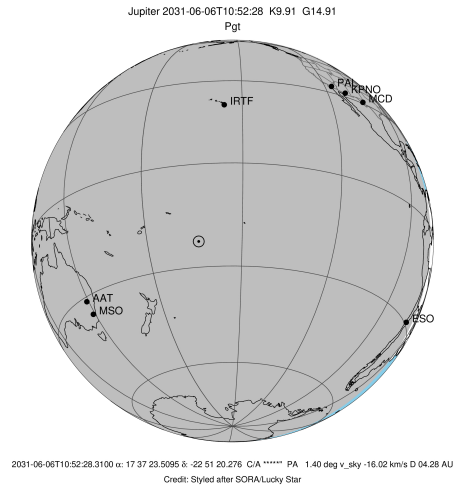


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-06T09:46:53.199	31.28	-22.21	71488.8	-36.04	-39.67
Jupiter	E	2031-06-06T11:46:02.779	6.29	2.08x	71488.7	-36.72	-40.37

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-06T10:57:32.090
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       : 4116743642325075328
2Mass ID (if available) : 17372351-2251199
ICRS Star Coord at Epoch: 17h 37m 23.50949s -22:51:20.27648s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 9.911
G magnitude           : 14.908
RP magnitude          : 13.648
BP magnitude          : 16.705
DUPflag              : 0
Distance (au)         : 4.281
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.02
Sun-Target sep (deg) : 170.33
Sun-Moon sep (deg)   : 5.25
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.60
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (" ) : 13.531
C/A sky separation (km) : 42006.1
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
    
```

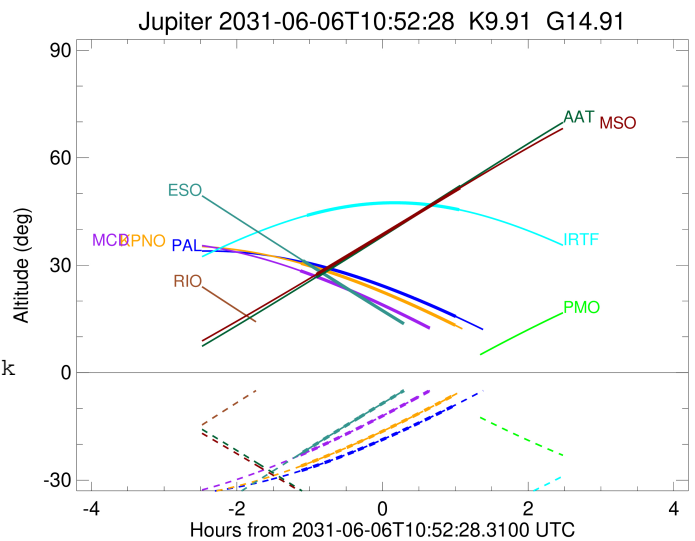
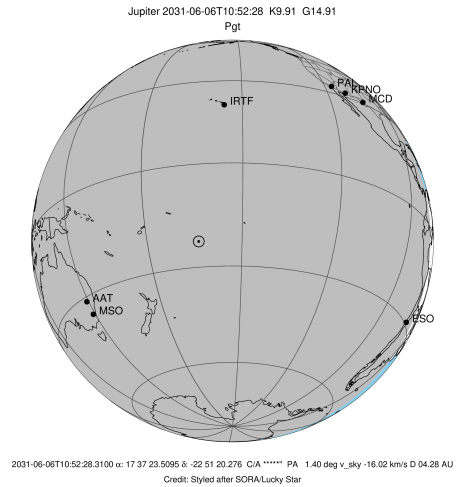


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-06T09:58:00.989	26.70	-35.51	71488.7	-36.65	-40.29
Jupiter	E	2031-06-06T11:56:43.082	52.03	-60.84	71488.9	-35.31	-38.92

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-06T10:57:18.320
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       : 4116743642325075328
2Mass ID (if available) : 17372351-2251199
ICRS Star Coord at Epoch: 17h 37m 23.50949s -22:51:20.27648s
RUWE (>1.4 is poor) : 0.94
K magnitude           : 9.911
G magnitude           : 14.908
RP magnitude          : 13.648
BP magnitude          : 16.705
DUPflag              : 0
Distance (au)         : 4.281
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.02
Sun-Target sep (deg) : 170.33
Sun-Moon sep (deg)   : 5.25
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.60
Pole direction: RA (deg): 268.05693
Dec (deg): 64.49651
C/A sky separation (") : 13.658
C/A sky separation (km) : 42402.8
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
    
```



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	2031-06-06T09:58:03.276	27.42	-35.86	71488.6	-37.02	-40.68
Jupiter	E	2031-06-06T11:56:14.258	51.56	-59.82	71488.8	-35.73	-39.35