

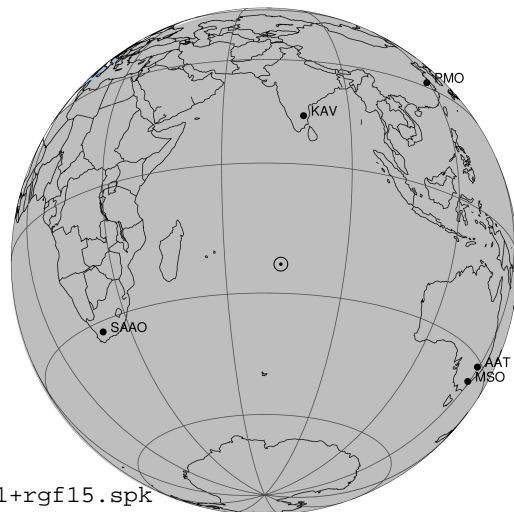
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-06-18T19:06:02.850  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4117490112002052736  
 2Mass ID (if available) : 17303623-2248141

Jupiter 2031-06-18T19:06:02 K8.83 G14.45 Pgt

ICRS Star Coord at Epoch: 17h 30m 36.23362s -22:48:14.34066s

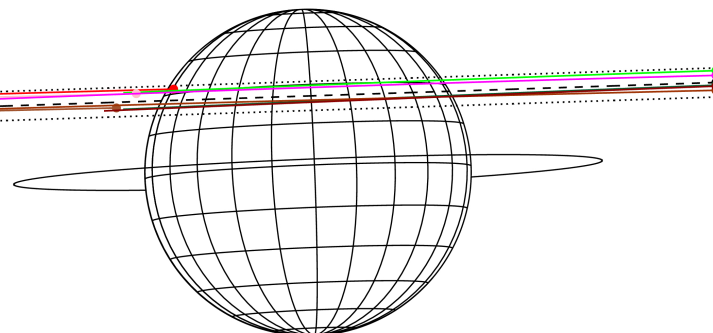
RUWE (>1.4 is poor) : 0.98  
 K magnitude : 8.828  
 G magnitude : 14.446  
 RP magnitude : 13.068  
 BP magnitude : 16.761  
 DUPflag : 0  
 Distance (au) : 4.265  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -16.43  
 Sun-Target sep (deg) : 176.27  
 Sun-Moon sep (deg) : 171.20  
 B (ring opening deg) : -2.60  
 PA of pole (deg) : 2.33  
 Pole direction: RA (deg): 268.05692  
 Dec (deg): 64.49651  
 C/A sky separation (") : 10.831  
 C/A sky separation (km) : 33504.0  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2031-06-18T19:06:02 K8.83 G14.45  
 Pgt



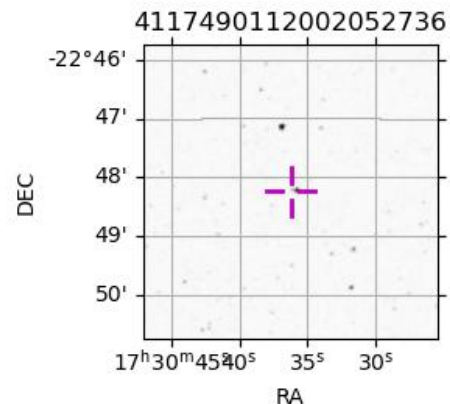
2031-06-18T19:06:02.8500 a: 17 30 36.2336 s: -22 48 14.341 C/A \*\*\*\*\* PA 181.89 deg v\_sky -16.43 km/s D 04.26 AU  
 Credit: Styled after SORA/Lucky Star

Earth  
 PIC  
 PMO  
 TEN  
 KAV  
 RIO  
 AAT  
 SAAO  
 MSO



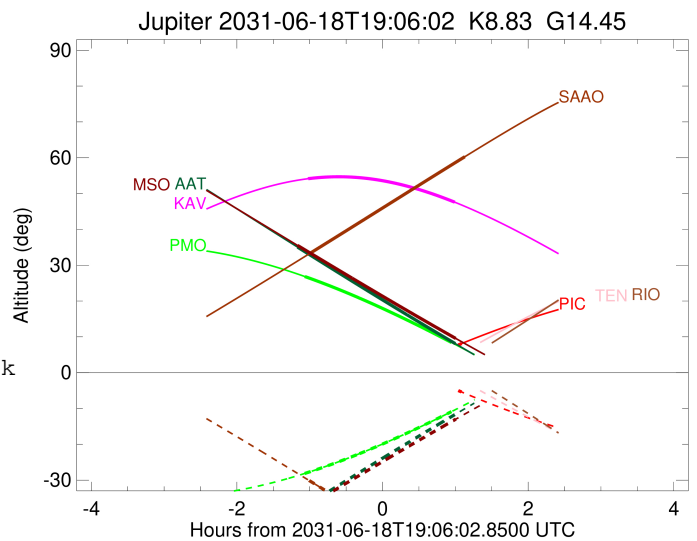
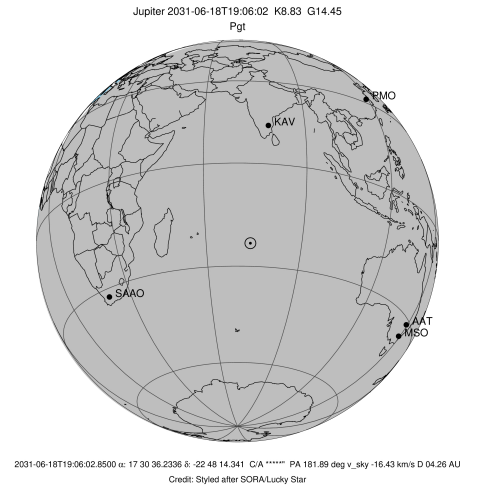
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+	JUN 18 20:11 - JUN 18 20:11	Pne
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8	+	JUN 18 18:02 - JUN 18 20:02	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			Pnn
KAV	Kavalur Observatory	12.6	78.8	+	JUN 18 18:04 - JUN 18 20:05	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 18 17:56 - JUN 18 20:06	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	JUN 18 18:05 - JUN 18 20:13	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	JUN 18 17:56 - JUN 18 20:06	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-18T19:10:18.570
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : PIC
Location           : Pic du Midi
Latitude (deg)     : 42.93656
E. Longitude (deg) : 0.14231
Altitude (km)     : 2.890
Gaia source ID     : 4117490112002052736
2Mass ID (if available) : 17303623-2248141
ICRS Star Coord at Epoch: 17h 30m 36.23362s -22:48:14.34066s
RUWE (>1.4 is poor) : 0.98
K magnitude        : 8.828
G magnitude        : 14.446
RP magnitude       : 13.068
BP magnitude       : 16.761
DUPflag           : 0
Distance (au)     : 4.265
f0 (km)           : 0.00
g0 (km)           : 0.00
skyplane vel. (km/s) : -16.43
Sun-Target sep (deg) : 176.27
Sun-Moon sep (deg) : 170.46
B (ring opening deg) : -2.60
PA of pole (deg)   : 2.33
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 12.292
C/A sky separation (km) : 38022.4
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
    
```

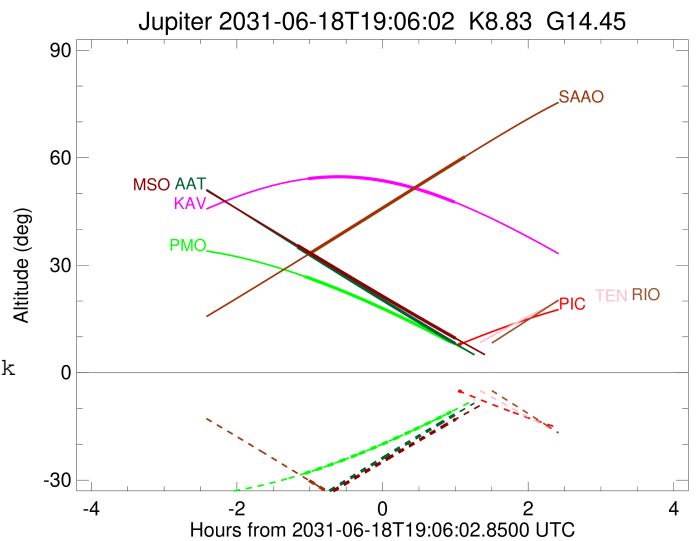
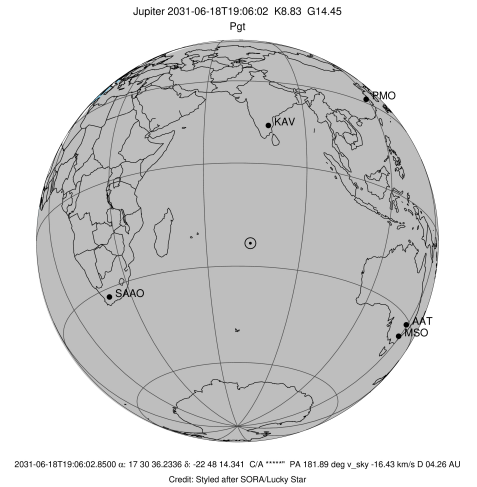


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-18T18:09:09.636	-11.04x	14.15x	71489.5	31.21	34.64
Jupiter	E	2031-06-18T20:11:09.453	8.11	-5.38	71489.3	32.94	36.46

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-18T19:02:20.660
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       : 4117490112002052736
2Mass ID (if available) : 17303623-2248141
ICRS Star Coord at Epoch: 17h 30m 36.23362s -22:48:14.34066s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 8.828
G magnitude           : 14.446
RP magnitude          : 13.068
BP magnitude          : 16.761
DUPflag              : 0
Distance (au)        : 4.265
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.43
Sun-Target sep (deg) : 176.27
Sun-Moon sep (deg)   : 171.66
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.33
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 12.326
C/A sky separation (km): 38127.1
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
    
```

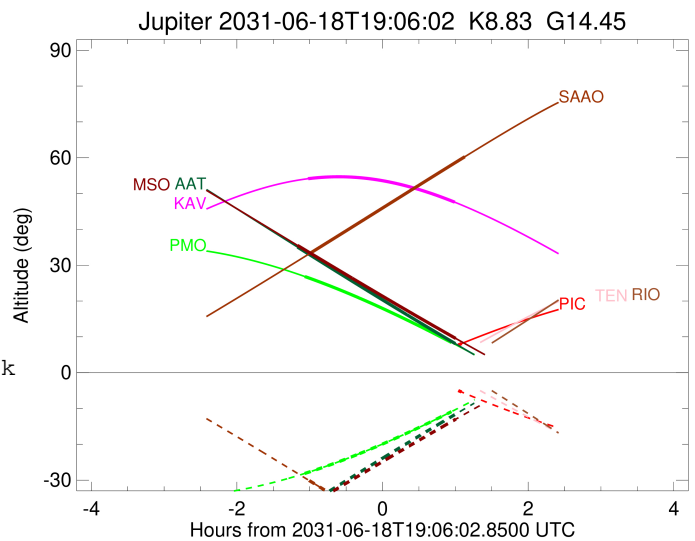
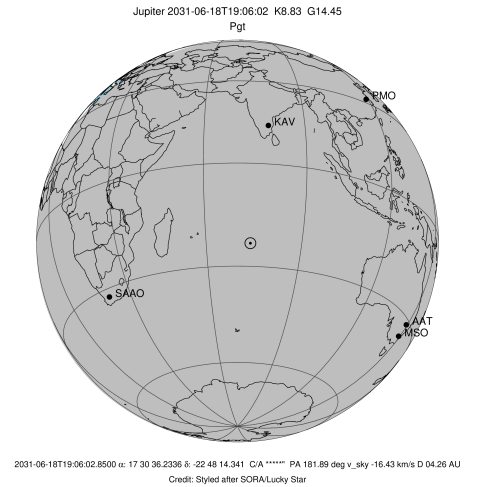


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-18T18:02:03.292	26.83	-28.12	71489.4	32.07	35.55
Jupiter	E	2031-06-18T20:02:54.518	8.43	-10.87	71489.4	32.22	35.70

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-18T19:05:13.100
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        : 4117490112002052736
2Mass ID (if available) : 17303623-2248141
ICRS Star Coord at Epoch: 17h 30m 36.23362s -22:48:14.34066s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 8.828
G magnitude           : 14.446
RP magnitude          : 13.068
BP magnitude          : 16.761
DUPflag              : 0
Distance (au)         : 4.265
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.43
Sun-Target sep (deg) : 176.27
Sun-Moon sep (deg)   : 171.34
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.33
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 12.023
C/A sky separation (km) : 37189.3
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
    
```

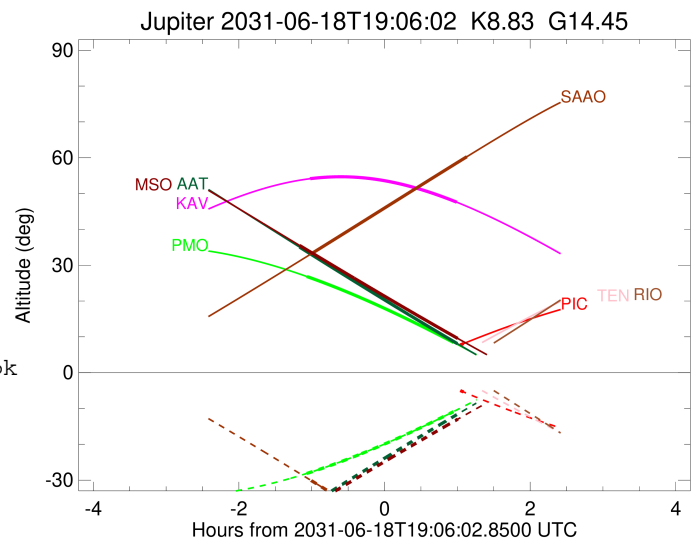
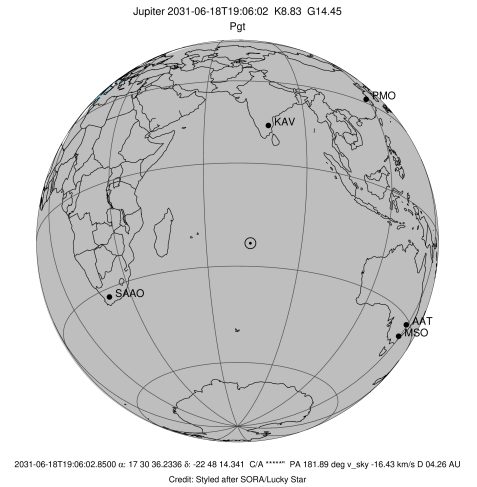


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-18T18:04:52.665	54.14	-52.73	71489.6	30.84	34.26
Jupiter	E	2031-06-18T20:05:37.371	47.58	-49.14	71489.5	31.62	35.08

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-18T19:00:50.370
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       : 4117490112002052736
2Mass ID (if available) : 17303623-2248141
ICRS Star Coord at Epoch: 17h 30m 36.23362s -22:48:14.34066s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 8.828
G magnitude           : 14.446
RP magnitude         : 13.068
BP magnitude         : 16.761
DUPflag              : 0
Distance (au)        : 4.265
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.43
Sun-Target sep (deg) : 176.27
Sun-Moon sep (deg)   : 172.04
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.33
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 10.045
C/A sky separation (km): 31071.1
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
    
```

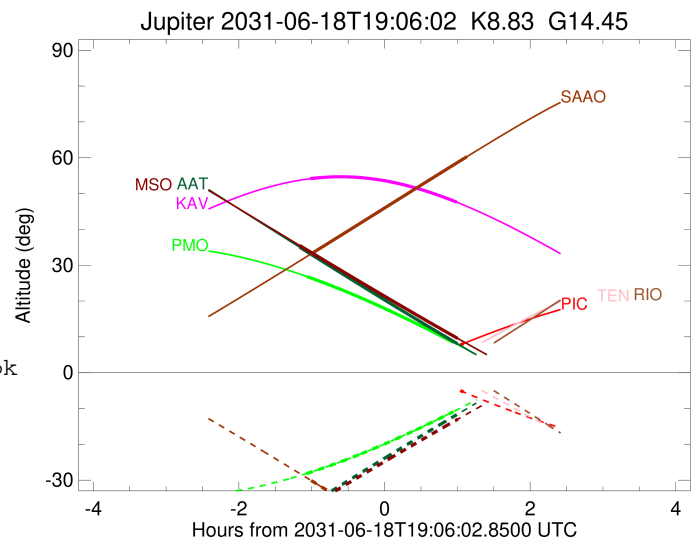
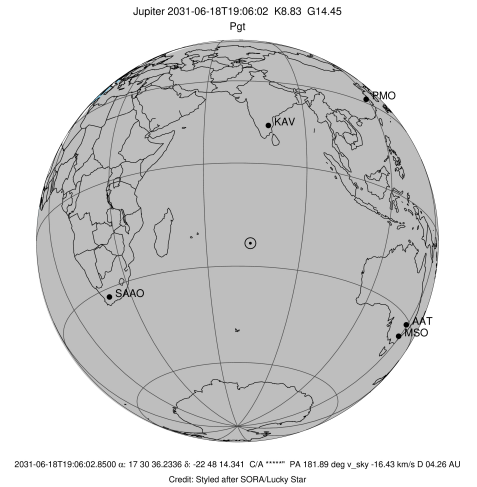


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-18T17:56:03.088	35.04	-38.62	71490.3	25.78	28.87
Jupiter	E	2031-06-18T20:06:03.368	8.10	-11.62	71490.3	25.63	28.71

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-18T19:09:49.730
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       : 4117490112002052736
2Mass ID (if available) : 17303623-2248141
ICRS Star Coord at Epoch: 17h 30m 36.23362s -22:48:14.34066s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 8.828
G magnitude           : 14.446
RP magnitude          : 13.068
BP magnitude          : 16.761
DUPflag              : 0
Distance (au)        : 4.265
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.43
Sun-Target sep (deg) : 176.27
Sun-Moon sep (deg)   : 170.77
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.33
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 10.233
C/A sky separation (km): 31654.6
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
    
```

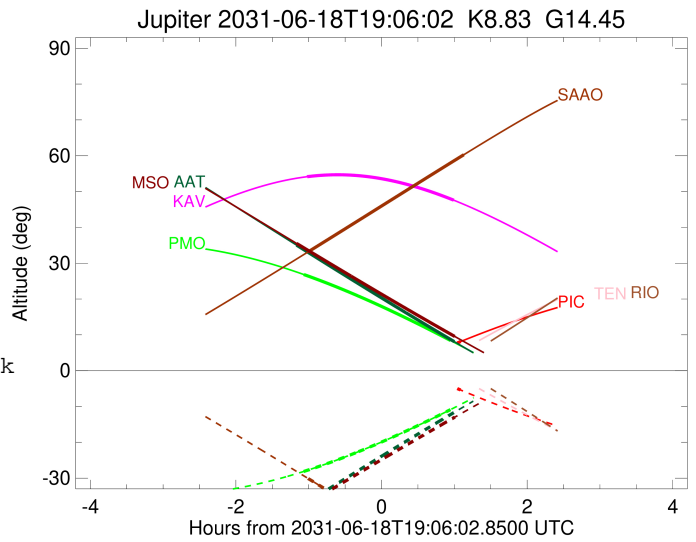
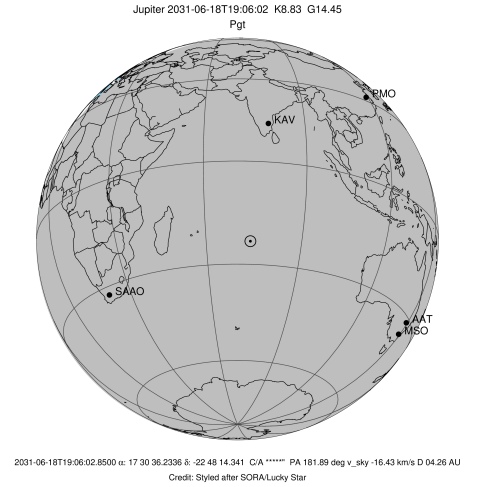


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-18T18:05:36.445	33.16	-30.10	71490.3	25.36	28.42
Jupiter	E	2031-06-18T20:13:44.715	60.25	-57.09	71490.1	27.05	30.23

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-18T19:01:03.420
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       : 4117490112002052736
2Mass ID (if available) : 17303623-2248141
ICRS Star Coord at Epoch: 17h 30m 36.23362s -22:48:14.34066s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 8.828
G magnitude           : 14.446
RP magnitude          : 13.068
BP magnitude          : 16.761
DUPflag              : 0
Distance (au)        : 4.265
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.43
Sun-Target sep (deg) : 176.27
Sun-Moon sep (deg)   : 172.02
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.33
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 9.924
C/A sky separation (km): 30698.9
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	2031-06-18T17:56:03.965	35.51	-39.00	71490.3	25.43	28.49
Jupiter	E	2031-06-18T20:06:27.612	9.54	-12.97	71490.3	25.33	28.38