

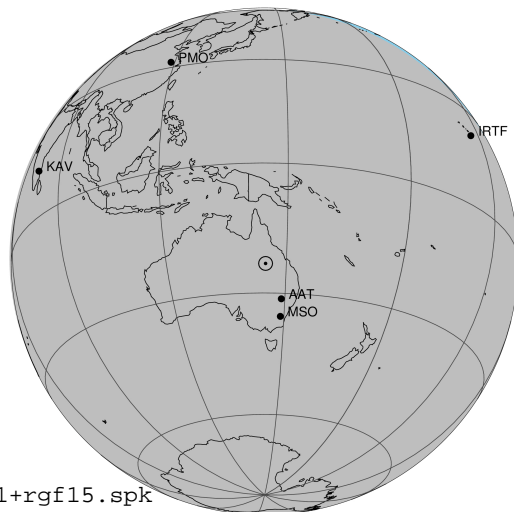
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-06-15T14:20:55.870  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4117445513056684800  
 2Mass ID (if available) : 17322247-2249212

Jupiter 2031-06-15T14:20:55 K8.62 G14.35 Pgt

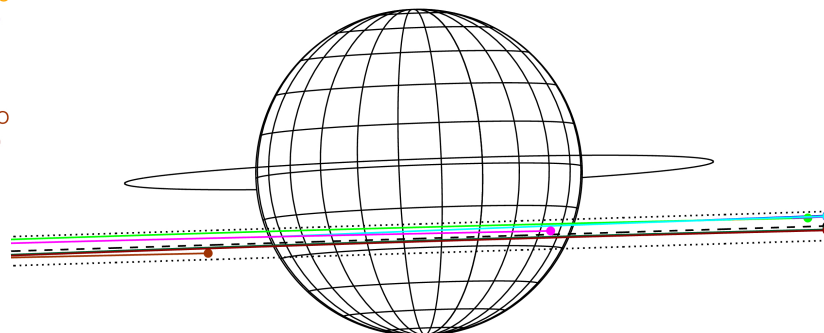
ICRS Star Coord at Epoch: 17h 32m 22.47743s -22:49:21.51601s

RUWE (>1.4 is poor) : 1.00  
 K magnitude : 8.616  
 G magnitude : 14.345  
 RP magnitude : 12.976  
 BP magnitude : 16.631  
 DUPflag : 0  
 Distance (au) : 4.265  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -16.48  
 Sun-Target sep (deg) : 179.48  
 Sun-Moon sep (deg) : 132.01  
 B (ring opening deg) : -2.60  
 PA of pole (deg) : 2.14  
 Pole direction: RA (deg): 268.05692  
 Dec (deg): 64.49651  
 C/A sky separation (") : 9.354  
 C/A sky separation (km) : 28931.2  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2031-06-15T14:20:55 K8.62 G14.35  
 Pgt



Earth  
 PAL  
 PMO  
 KPNO  
 MCD  
 IRTF  
 KAV  
 AAT  
 SAAO  
 MSO

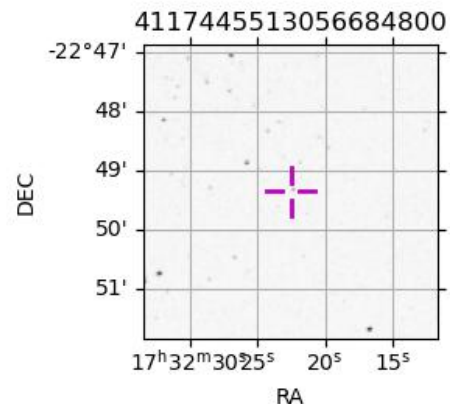


2031-06-15T14:20:55.8700 a: 17 32 22.4774 d: -22 49 21.516 C/A 9.366" PA 1.77 deg v\_sky -16.48 km/s D 04.26 AU

Credit: Styled after SORA/Lucky Star

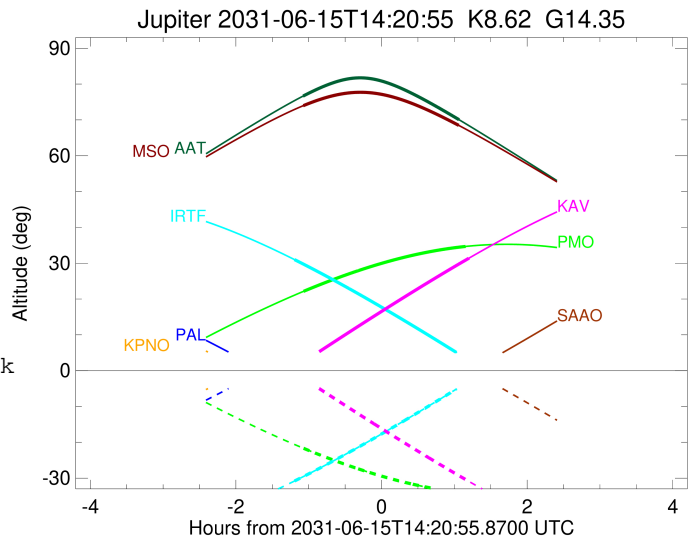
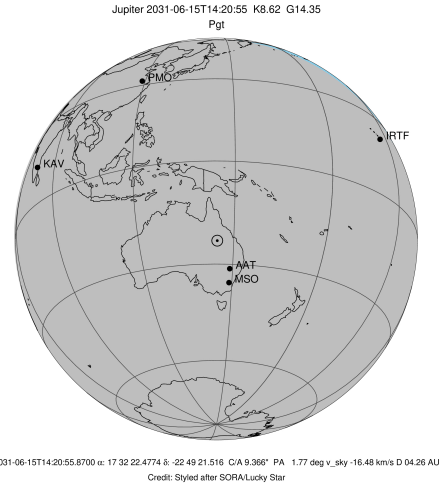
Observable events with sun below -5 deg and altitude above 5 deg

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 15 13:16 - JUN 15 15:30	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 15 13:09 - JUN 15 15:22	Pie
KAV	Kavalur Observatory	12.6	78.8	+ +	JUN 15 15:32 - JUN 15 15:32	Pne
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 15 13:16 - JUN 15 15:24	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	JUN 15 13:16 - JUN 15 15:24	Pie



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target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-15T14:23:30.450
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       : 4117445513056684800
2Mass ID (if available) : 17322247-2249212
ICRS Star Coord at Epoch: 17h 32m 22.47743s -22:49:21.51601s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 8.616
G magnitude           : 14.345
RP magnitude          : 12.976
BP magnitude          : 16.631
DUPflag              : 0
Distance (au)        : 4.265
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.48
Sun-Target sep (deg) : 179.48
Sun-Moon sep (deg)   : 132.13
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.14
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 7.757
C/A sky separation (km): 23993.4
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
    
```

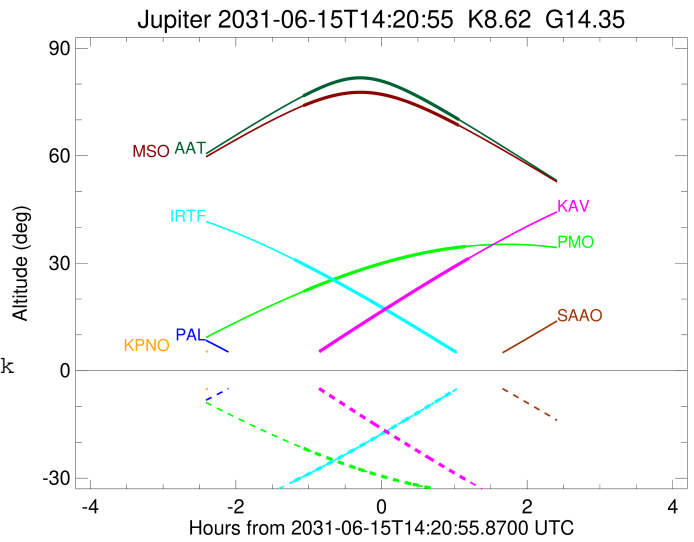
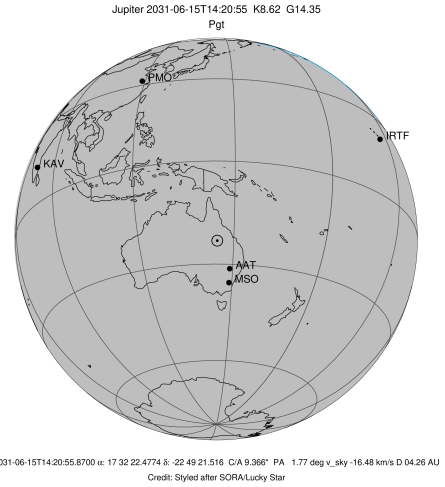


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-15T13:16:43.681	22.15	-21.67	71490.9	-20.28	-22.88
Jupiter	E	2031-06-15T15:30:05.242	34.67	-34.16	71491.0	-19.04	-21.51

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-15T14:15:37.480
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       : 4117445513056684800
2Mass ID (if available) : 17322247-2249212
ICRS Star Coord at Epoch: 17h 32m 22.47743s -22:49:21.51601s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 8.616
G magnitude           : 14.345
RP magnitude          : 12.976
BP magnitude          : 16.631
DUPflag              : 0
Distance (au)        : 4.265
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.48
Sun-Target sep (deg) : 179.48
Sun-Moon sep (deg)   : 132.73
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.14
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 8.274
C/A sky separation (km): 25593.0
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
    
```

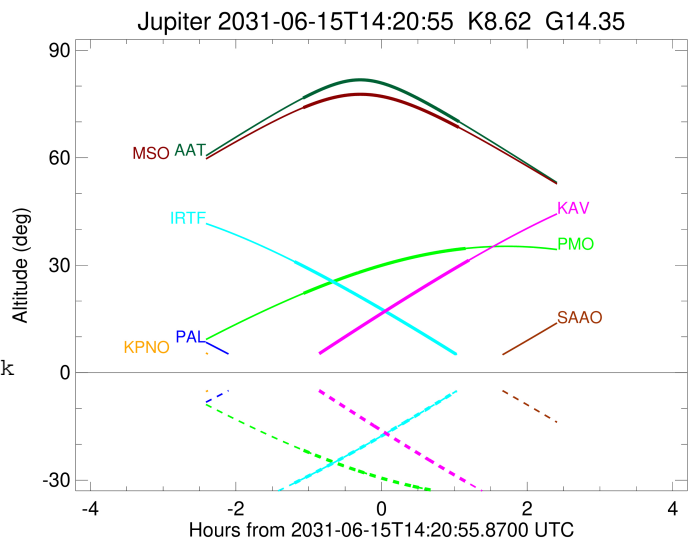
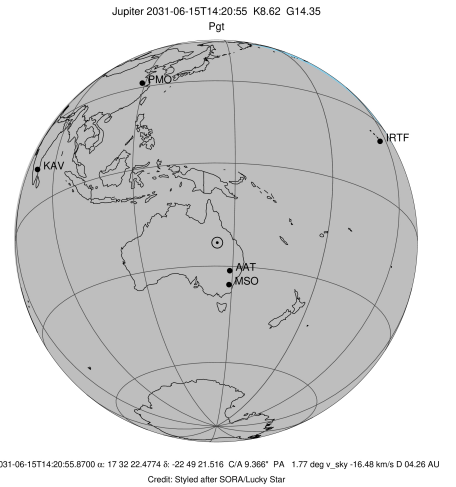


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-15T13:09:15.845	30.99	-30.80	71490.8	-20.90	-23.57
Jupiter	E	2031-06-15T15:22:25.018	5.13	-5.18	71490.8	-21.11	-23.79

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-15T14:26:56.240
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       : 4117445513056684800
2Mass ID (if available) : 17322247-2249212
ICRS Star Coord at Epoch: 17h 32m 22.47743s -22:49:21.51601s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 8.616
G magnitude           : 14.345
RP magnitude         : 12.976
BP magnitude         : 16.631
DUPflag              : 0
Distance (au)        : 4.265
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.48
Sun-Target sep (deg) : 179.48
Sun-Moon sep (deg)   : 131.66
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.14
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 8.655
C/A sky separation (km): 26769.0
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
    
```

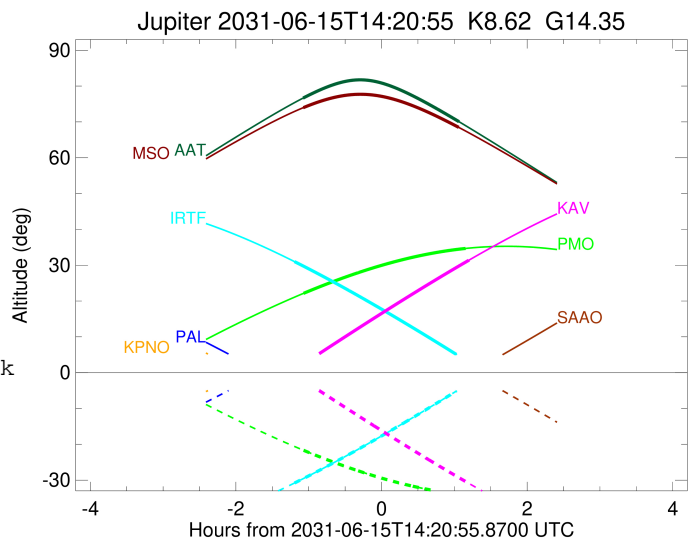
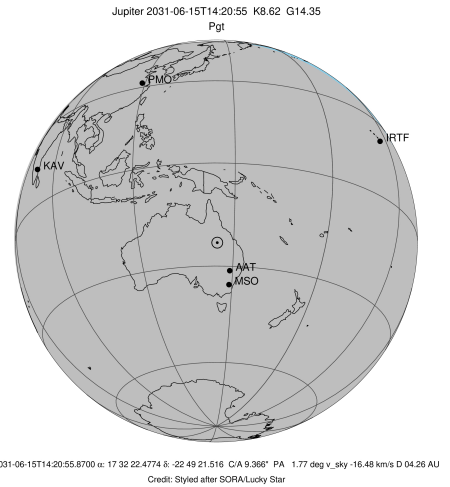


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-15T13:20:25.249	3.25x	-2.97x	71490.6	-22.92	-25.78
Jupiter	E	2031-06-15T15:32:58.573	31.39	-30.91	71490.8	-21.08	-23.76

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-15T14:20:29.460
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       : 4117445513056684800
2Mass ID (if available) : 17322247-2249212
ICRS Star Coord at Epoch: 17h 32m 22.47743s -22:49:21.51601s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 8.616
G magnitude           : 14.345
RP magnitude         : 12.976
BP magnitude         : 16.631
DUPflag              : 0
Distance (au)        : 4.265
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.48
Sun-Target sep (deg) : 179.48
Sun-Moon sep (deg)   : 132.72
B (ring opening deg) : -2.60
PA of pole (deg)     : 2.14
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 9.648
C/A sky separation (km): 29841.8
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
    
```

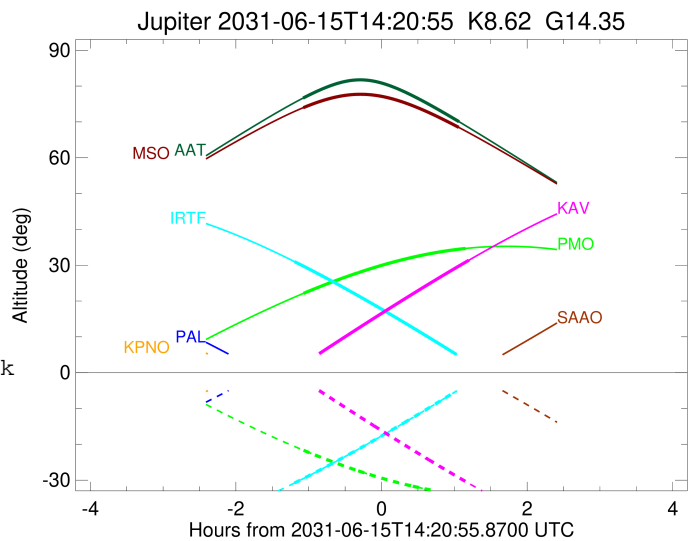
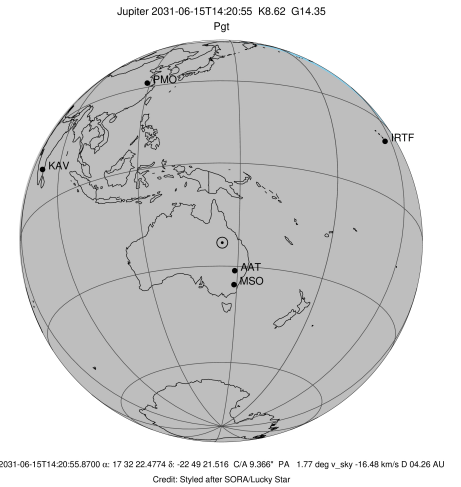


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-06-15T13:16:21.090	76.65	-76.82	71490.3	-25.08	-28.12
Jupiter	E	2031-06-15T15:24:39.427	70.08	-70.54	71490.4	-24.35	-27.33

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-15T14:20:30.160
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       : 4117445513056684800
2Mass ID (if available) : 17322247-2249212
ICRS Star Coord at Epoch: 17h 32m 22.47743s -22:49:21.51601s
RUWE (>1.4 is poor) : 1.00
K magnitude          : 8.616
G magnitude          : 14.345
RP magnitude         : 12.976
BP magnitude         : 16.631
DUPflag             : 0
Distance (au)       : 4.265
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.48
Sun-Target sep (deg) : 179.48
Sun-Moon sep (deg)  : 132.71
B (ring opening deg) : -2.60
PA of pole (deg)    : 2.14
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 9.791
C/A sky separation (km) : 30282.7
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	2031-06-15T13:16:29.769	73.97	-74.23	71490.3	-25.47	-28.53
Jupiter	E	2031-06-15T15:24:32.053	68.47	-68.98	71490.4	-24.74	-27.74