

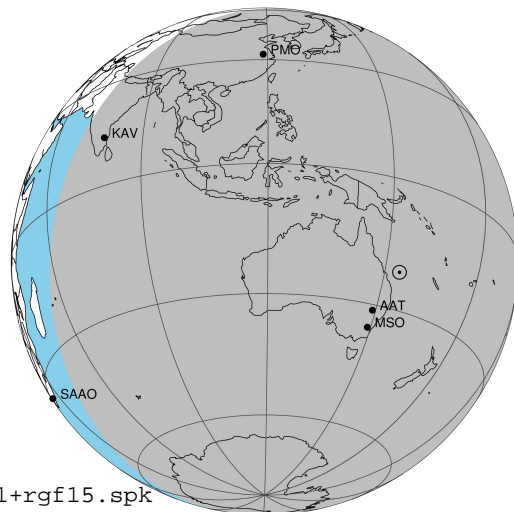
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-07-15T13:49:31.910  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4114507136900964352  
 2Mass ID (if available) : 17172582-2241320

Jupiter 2031-07-15T13:49:31 K9.39 G14.83 Pgt

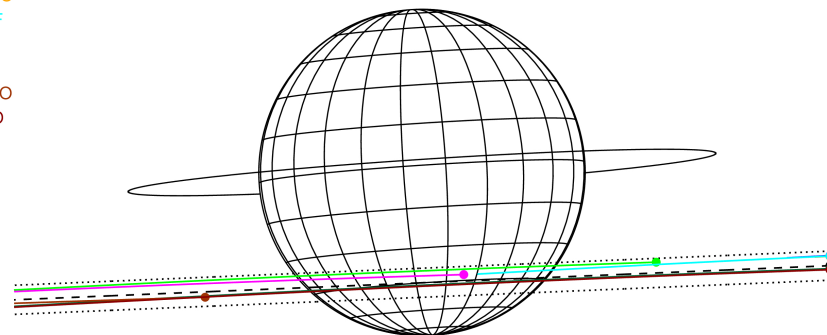
ICRS Star Coord at Epoch: 17h 17m 25.83480s -22:41:31.66252s

RUWE (>1.4 is poor) : 0.91  
 K magnitude : 9.386  
 G magnitude : 14.829  
 RP magnitude : 0.000  
 BP magnitude : 0.000  
 DUPflag : 0  
 Distance (au) : 4.383  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -12.00  
 Sun-Target sep (deg) : 147.72  
 Sun-Moon sep (deg) : 168.76  
 B (ring opening deg) : -2.55  
 PA of pole (deg) : 3.74  
 Pole direction: RA (deg): 268.05689  
 Dec (deg): 64.49652  
 C/A sky separation (") : 15.183  
 C/A sky separation (km) : 48261.9  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2031-07-15T13:49:31 K9.39 G14.83  
 Pgt



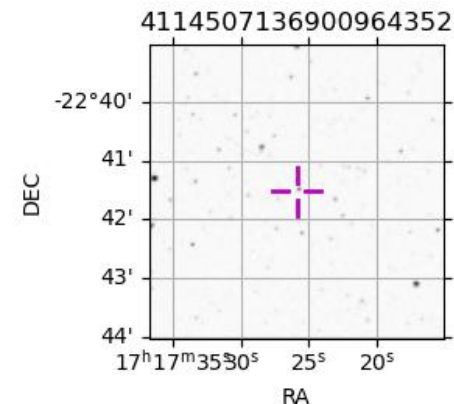
Earth  
 PAL  
 PMO  
 KPNO  
 IRTF  
 KAV  
 AAT  
 SAAO  
 MSO



2031-07-15T13:49:31.9100 α: 17 17 25.8348 δ: -22 41 31.663 C/A \*\*\*\*\* PA 2.40 deg v\_sky -12.00 km/s D 04.38 AU  
 Credit: Styled after SORA/Lucky Star

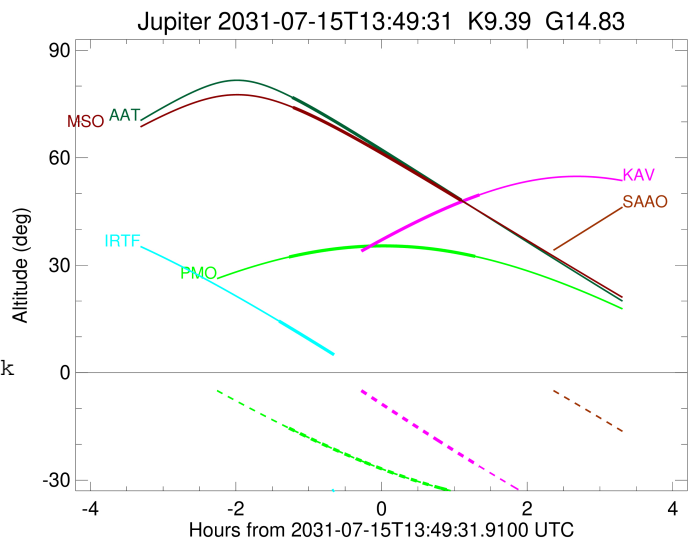
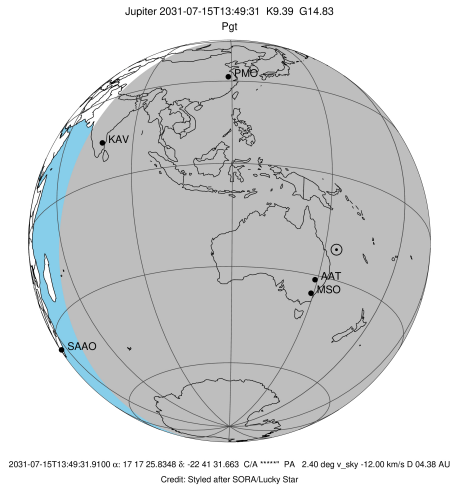
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OEcode
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	+ +	JUL 15 12:33 - JUL 15 15:06	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	+	JUL 15 12:25 - JUL 15 12:25	Pin
KAV	Kavalur Observatory	12.6	78.8	+	JUL 15 15:10 - JUL 15 15:10	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	+ +	JUL 15 12:35 - JUL 15 14:55	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	JUL 15 12:36 - JUL 15 14:55	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-07-15T13:49:55.640
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        : 4114507136900964352
2Mass ID (if available) : 17172582-2241320
ICRS Star Coord at Epoch: 17h 17m 25.83480s -22:41:31.66252s
RUWE (>1.4 is poor)  : 0.91
K magnitude           : 9.386
G magnitude           : 14.829
RP magnitude          : 0.000
BP magnitude          : 0.000
DUPflag              : 0
Distance (au)         : 4.383
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s)  : -12.00
Sun-Target sep (deg)  : 147.72
Sun-Moon sep (deg)    : 168.74
B (ring opening deg)  : -2.55
PA of pole (deg)      : 3.74
Pole direction: RA (deg): 268.05689
Dec (deg): 64.49652
C/A sky separation (") : 13.550
C/A sky separation (km) : 43071.4
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
    
```

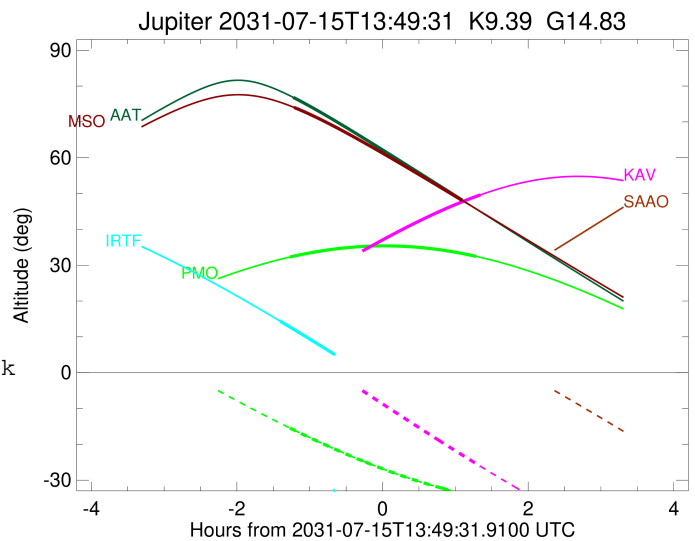
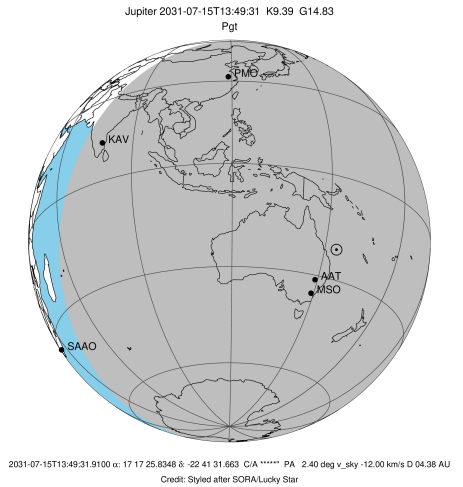


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-15T12:33:16.777	32.28	-15.47	71488.5	-38.53	-42.22
Jupiter	E	2031-07-15T15:06:38.558	32.46	-34.47	71489.0	-35.71	-39.33

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-07-15T13:40:30.090
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      : 4114507136900964352
2Mass ID (if available) : 17172582-2241320
ICRS Star Coord at Epoch: 17h 17m 25.83480s -22:41:31.66252s
RUWE (>1.4 is poor) : 0.91
K magnitude          : 9.386
G magnitude          : 14.829
RP magnitude         : 0.000
BP magnitude         : 0.000
DUPflag             : 0
Distance (au)       : 4.383
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.00
Sun-Target sep (deg) : 147.72
Sun-Moon sep (deg)  : 169.53
B (ring opening deg) : -2.55
PA of pole (deg)    : 3.74
Pole direction: RA (deg): 268.05689
Dec (deg): 64.49652
C/A sky separation (") : 14.400
C/A sky separation (km) : 45772.9
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
    
```

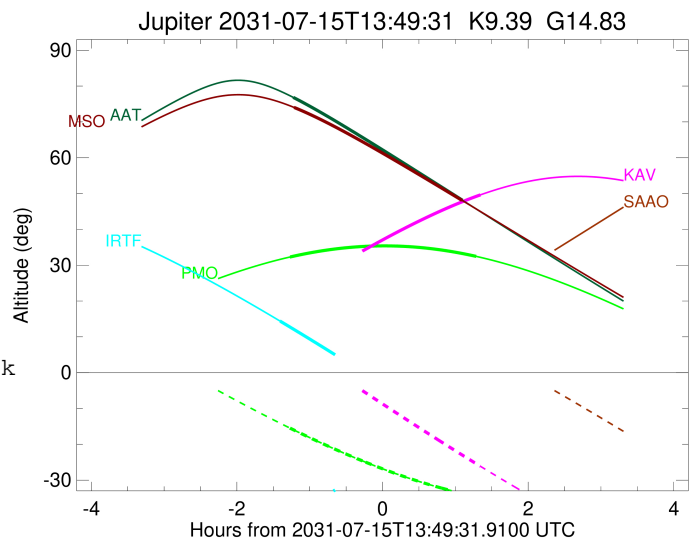
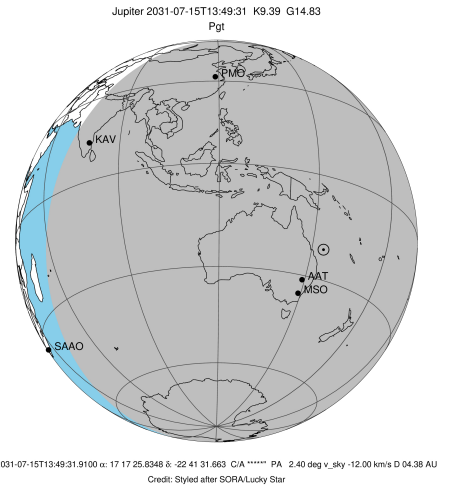


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-15T12:25:07.740	14.39	-39.81	71488.3	-40.36	-44.08
Jupiter	E	2031-07-15T14:56:53.268	-18.28x	-12.44	71488.4	-39.23	-42.93

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-07-15T13:55:45.090
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       : 4114507136900964352
2Mass ID (if available) : 17172582-2241320
ICRS Star Coord at Epoch: 17h 17m 25.83480s -22:41:31.66252s
RUWE (>1.4 is poor) : 0.91
K magnitude           : 9.386
G magnitude           : 14.829
RP magnitude         : 0.000
BP magnitude         : 0.000
DUPflag              : 0
Distance (au)        : 4.383
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.00
Sun-Target sep (deg) : 147.72
Sun-Moon sep (deg)   : 168.25
B (ring opening deg) : -2.55
PA of pole (deg)     : 3.74
Pole direction: RA (deg): 268.05689
Dec (deg): 64.49652
C/A sky separation ("): 14.242
C/A sky separation (km): 45270.6
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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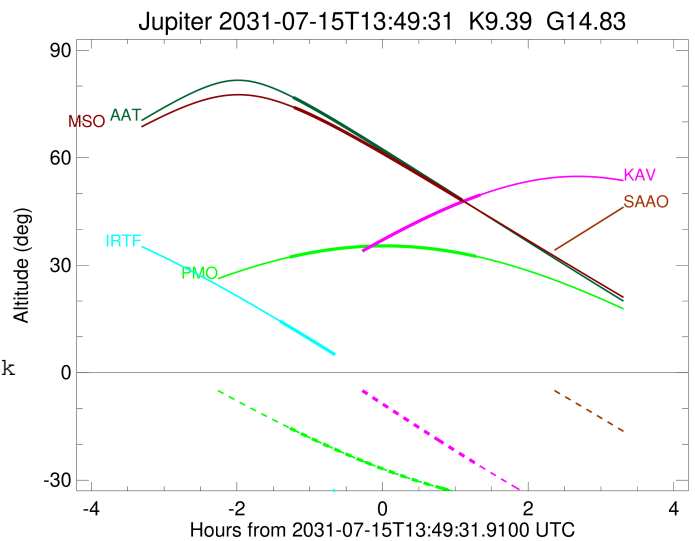
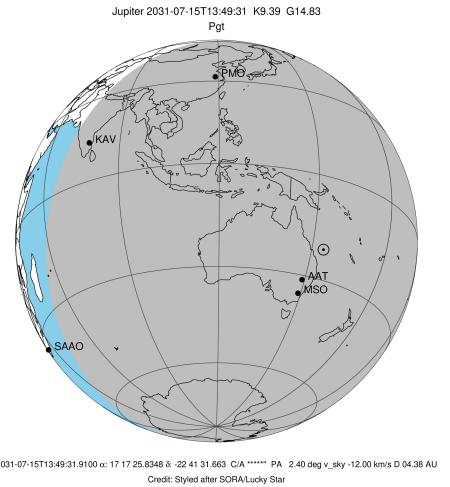


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-15T12:40:51.677	23.51	6.78x	71488.1	-41.24	-44.96
Jupiter	E	2031-07-15T15:10:08.339	49.62	-26.11	71488.7	-37.44	-41.10

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-07-15T13:45:28.730
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      : 4114507136900964352
2Mass ID (if available) : 17172582-2241320
ICRS Star Coord at Epoch: 17h 17m 25.83480s -22:41:31.66252s
RUWE (>1.4 is poor) : 0.91
K magnitude         : 9.386
G magnitude         : 14.829
RP magnitude        : 0.000
BP magnitude        : 0.000
DUPflag            : 0
Distance (au)       : 4.383
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -12.00
Sun-Target sep (deg) : 147.72
Sun-Moon sep (deg)  : 169.31
B (ring opening deg) : -2.55
PA of pole (deg)    : 3.74
Pole direction: RA (deg): 268.05689
Dec (deg): 64.49652
C/A sky separation (") : 15.526
C/A sky separation (km) : 49350.7
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
    
```

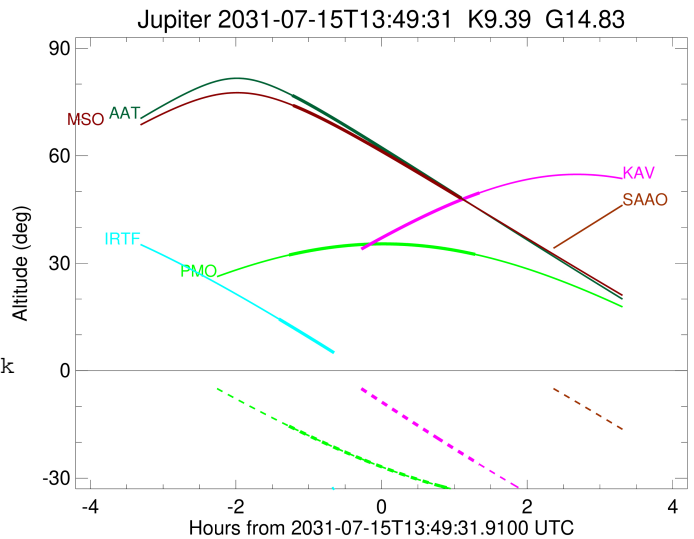
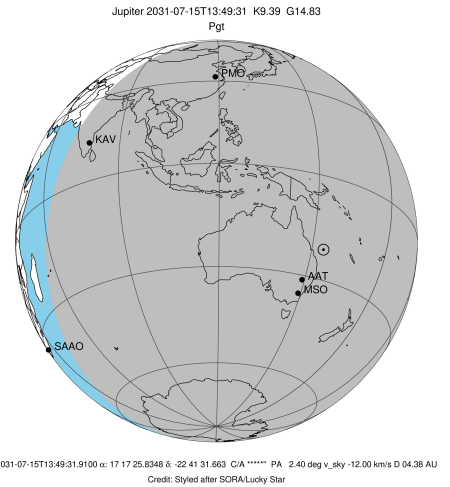


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-15T12:35:57.029	76.84	-66.95	71487.6	-44.76	-48.47
Jupiter	E	2031-07-15T14:55:24.315	48.12	-75.97	71487.9	-42.64	-46.36

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-07-15T13:45:38.110
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       : 4114507136900964352
2Mass ID (if available) : 17172582-2241320
ICRS Star Coord at Epoch: 17h 17m 25.83480s -22:41:31.66252s
RUWE (>1.4 is poor) : 0.91
K magnitude           : 9.386
G magnitude           : 14.829
RP magnitude         : 0.000
BP magnitude         : 0.000
DUPflag             : 0
Distance (au)        : 4.383
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -12.00
Sun-Target sep (deg) : 147.72
Sun-Moon sep (deg)   : 169.30
B (ring opening deg) : -2.55
PA of pole (deg)     : 3.74
Pole direction: RA (deg): 268.05689
Dec (deg): 64.49652
C/A sky separation (" ) : 15.662
C/A sky separation (km) : 49783.5
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	2031-07-15T12:36:34.061	74.05	-65.43	71487.5	-45.25	-48.95
Jupiter	E	2031-07-15T14:55:04.878	48.09	-73.14	71487.8	-43.11	-46.82