

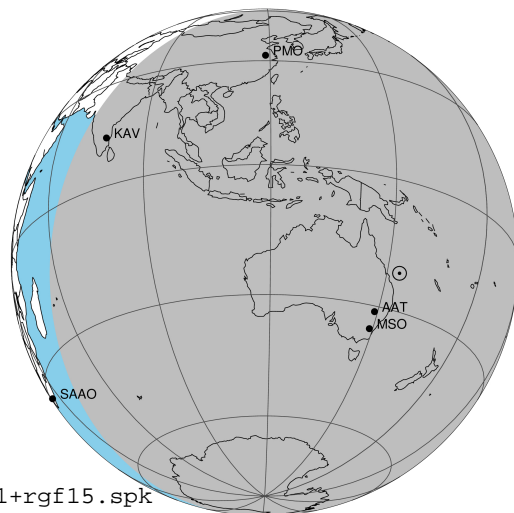
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-07-15T13:52:05.220  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4114507136936399488  
 2Mass ID (if available) : 17172582-2241320

Jupiter 2031-07-15T13:52:05 K9.39 G14.18 Pgt

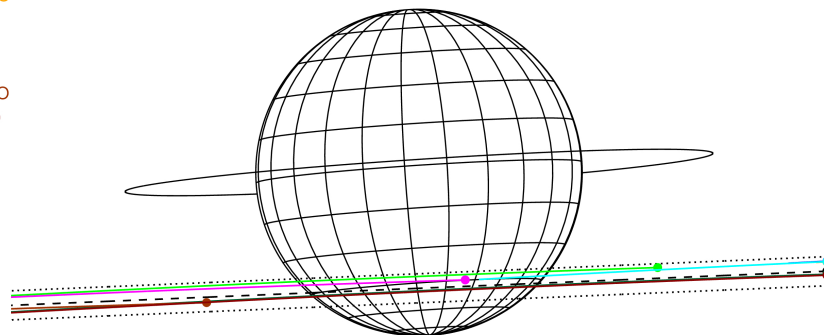
ICRS Star Coord at Epoch: 17h 17m 25.79072s -22:41:32.39944s

RUWE (>1.4 is poor) : 1.82  
 K magnitude : 9.386  
 G magnitude : 14.176  
 RP magnitude : 12.576  
 BP magnitude : 15.174  
 DUPflag : 0  
 Distance (au) : 4.383  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -11.99  
 Sun-Target sep (deg) : 147.72  
 Sun-Moon sep (deg) : 168.78  
 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 (") : 15.945  
 C/A sky separation (km) : 50683.3  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2031-07-15T13:52:05 K9.39 G14.18  
 Pgt



Earth  
 PAL  
 PMO  
 KPNO  
 IRTF  
 KAV  
 AAT  
 SAAO  
 MSO



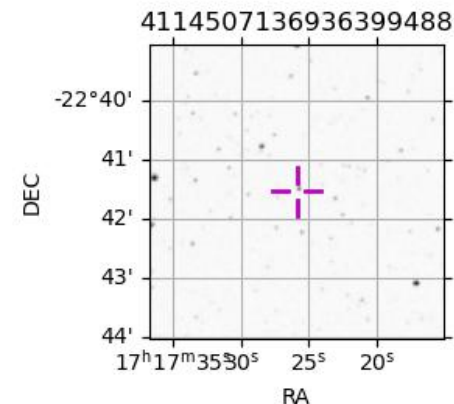
2031-07-15T13:52:05.2200 α: 17 17 25.7907 δ: -22 41 32.399 C/A \*\*\*\*\* PA 2.40 deg v\_sky -11.99 km/s D 04.38 AU

Credit: Styled after SORA/Lucky Star

URKALLv1.spk  
 naif0012.tls  
 nep097.bsp  
 nep101.bsp  
 sat4401.bsp

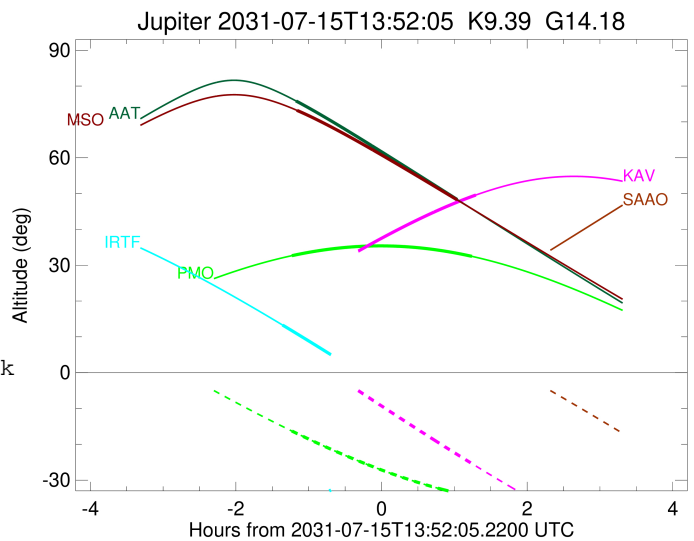
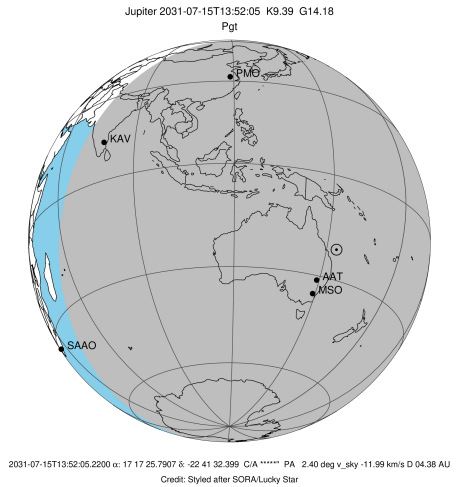
Observable events with sun below -5 deg and altitude above 5 deg

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	+ +	JUL 15 12:38 - 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 12:30 - JUL 15 12:30	Pin
KAV	Kavalur Observatory	12.6	78.8	+	JUL 15 15:09 - JUL 15 15:09	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 12:41 - JUL 15 14:54	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	JUL 15 12:42 - JUL 15 14:54	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-07-15T13:52:23.840
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      : 4114507136936399488
2Mass ID (if available) : 17172582-2241320
ICRS Star Coord at Epoch: 17h 17m 25.79072s -22:41:32.39944s
RUWE (>1.4 is poor) : 1.82
K magnitude          : 9.386
G magnitude          : 14.176
RP magnitude         : 12.576
BP magnitude         : 15.174
DUPflag             : 0
Distance (au)        : 4.383
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.99
Sun-Target sep (deg) : 147.72
Sun-Moon sep (deg)   : 168.77
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 ("): 14.311
C/A sky separation (km): 45490.6
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
    
```

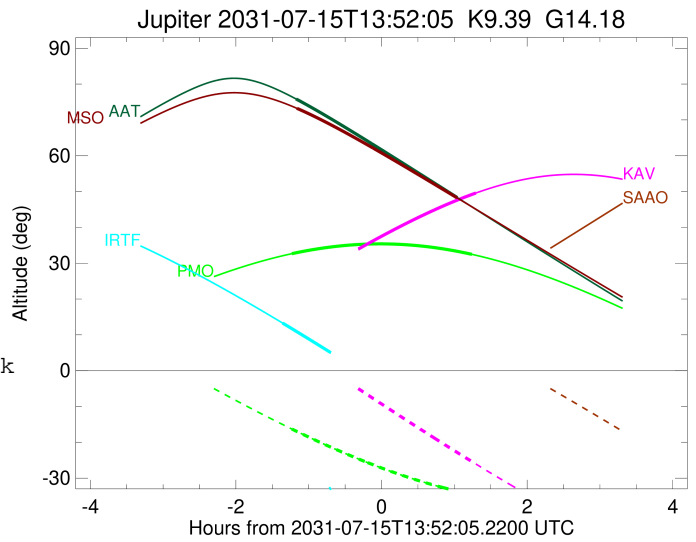
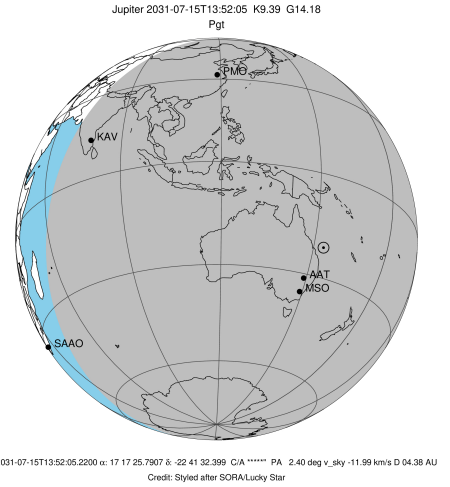


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-15T12:38:19.512	32.66	-16.31	71488.2	-40.99	-44.70
Jupiter	E	2031-07-15T15:06:32.442	32.47	-34.46	71488.6	-38.18	-41.86

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-07-15T13:42:59.700
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        : 4114507136936399488
2Mass ID (if available) : 17172582-2241320
ICRS Star Coord at Epoch: 17h 17m 25.79072s -22:41:32.39944s
RUWE (>1.4 is poor) : 1.82
K magnitude           : 9.386
G magnitude           : 14.176
RP magnitude          : 12.576
BP magnitude          : 15.174
DUPflag              : 0
Distance (au)         : 4.383
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -11.99
Sun-Target sep (deg) : 147.72
Sun-Moon sep (deg)   : 169.55
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 (" ) : 15.170
C/A sky separation (km) : 48219.4
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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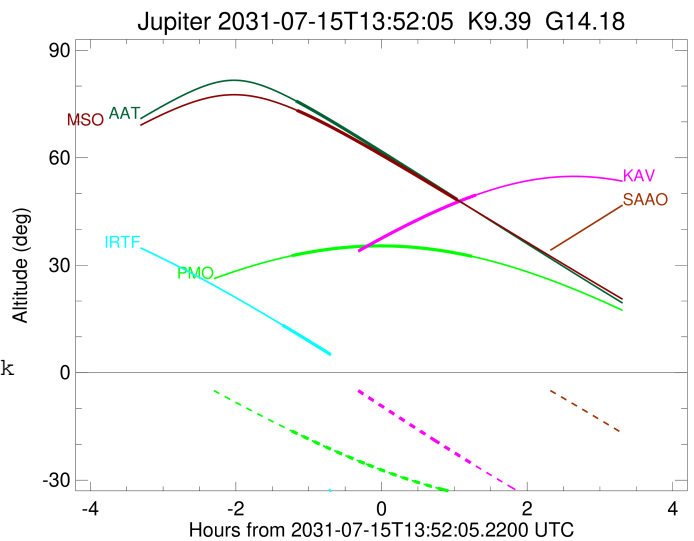
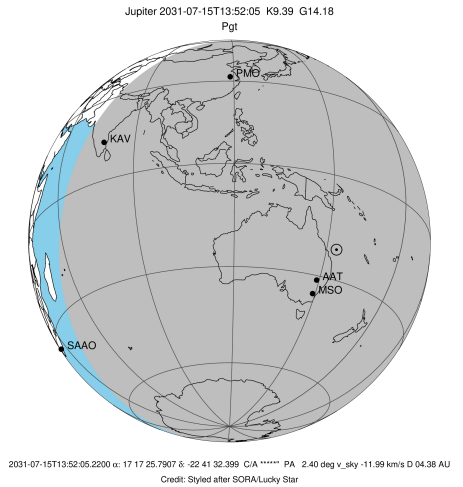


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-15T12:30:30.467	13.30	-39.05	71487.9	-42.96	-46.67
Jupiter	E	2031-07-15T14:56:25.399	-18.17x	-12.54	71488.0	-41.83	-45.55

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-07-15T13:58:15.560
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        : 4114507136936399488
2Mass ID (if available) : 17172582-2241320
ICRS Star Coord at Epoch: 17h 17m 25.79072s -22:41:32.39944s
RUWE (>1.4 is poor)  : 1.82
K magnitude           : 9.386
G magnitude           : 14.176
RP magnitude          : 12.576
BP magnitude          : 15.174
DUPflag              : 0
Distance (au)         : 4.383
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s)  : -11.99
Sun-Target sep (deg)  : 147.72
Sun-Moon sep (deg)    : 168.28
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 (") : 14.998
C/A sky separation (km) : 47673.6
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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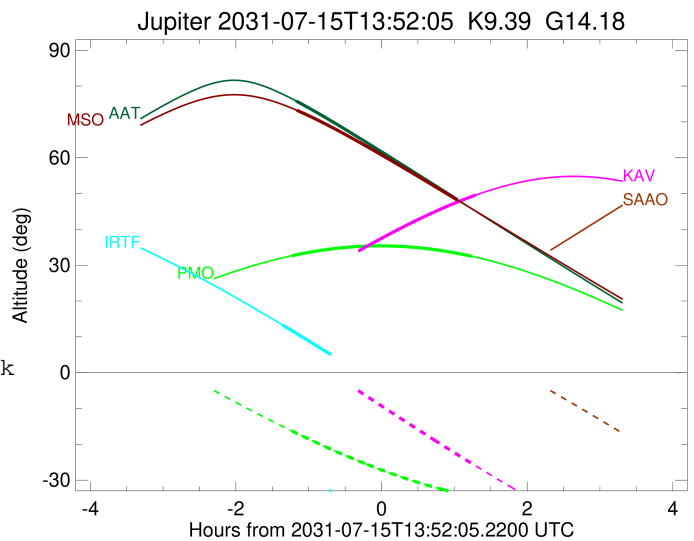
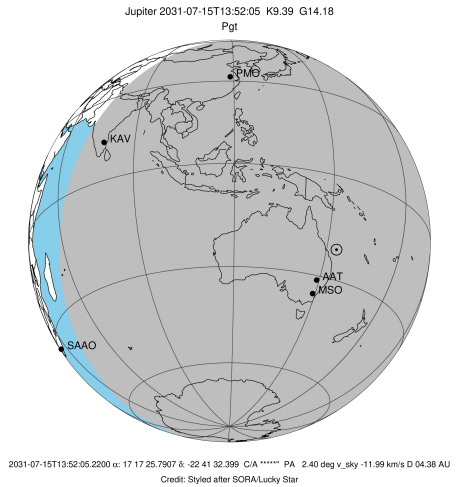


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-15T12:46:11.406	24.61	5.57x	71487.7	-43.76	-47.48
Jupiter	E	2031-07-15T15:09:52.145	49.59	-26.06	71488.3	-39.97	-43.68

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-07-15T13:47:56.180
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        : 4114507136936399488
2Mass ID (if available) : 17172582-2241320
ICRS Star Coord at Epoch: 17h 17m 25.79072s -22:41:32.39944s
RUWE (>1.4 is poor) : 1.82
K magnitude           : 9.386
G magnitude           : 14.176
RP magnitude          : 12.576
BP magnitude          : 15.174
DUPflag              : 0
Distance (au)         : 4.383
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -11.99
Sun-Target sep (deg)  : 147.72
Sun-Moon sep (deg)    : 169.34
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 (") : 16.290
C/A sky separation (km) : 51781.2
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
    
```

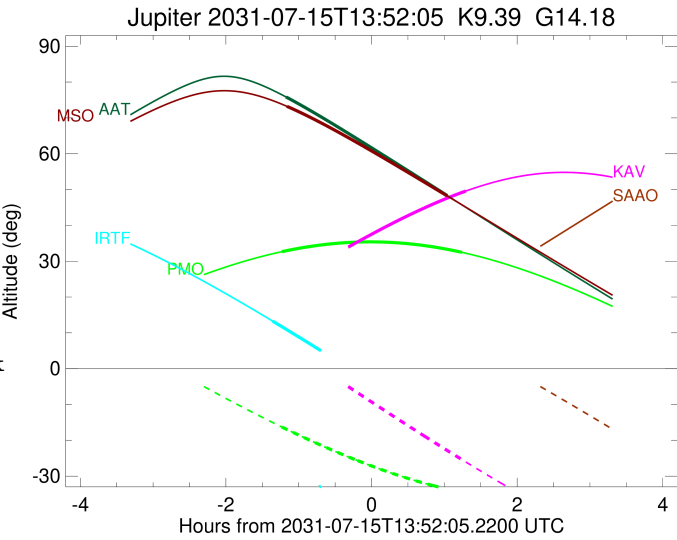
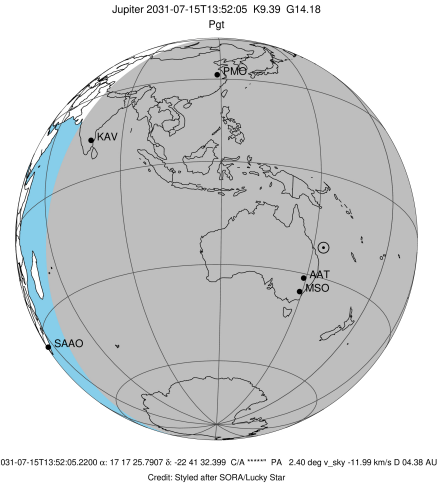


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-15T12:41:40.158	75.84	-68.11	71487.1	-47.50	-51.16
Jupiter	E	2031-07-15T14:54:34.313	48.30	-76.10	71487.5	-45.40	-49.09

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-07-15T13:48:05.810
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       : 4114507136936399488
2Mass ID (if available) : 17172582-2241320
ICRS Star Coord at Epoch: 17h 17m 25.79072s -22:41:32.39944s
RUWE (>1.4 is poor) : 1.82
K magnitude           : 9.386
G magnitude           : 14.176
RP magnitude         : 12.576
BP magnitude         : 15.174
DUPflag              : 0
Distance (au)        : 4.383
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.99
Sun-Target sep (deg) : 147.72
Sun-Moon sep (deg)   : 169.33
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 ("): 16.426
C/A sky separation (km): 52213.7
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	2031-07-15T12:42:21.117	73.22	-66.47	71487.1	-48.01	-51.66
Jupiter	E	2031-07-15T14:54:11.481	48.27	-73.26	71487.4	-45.88	-49.57