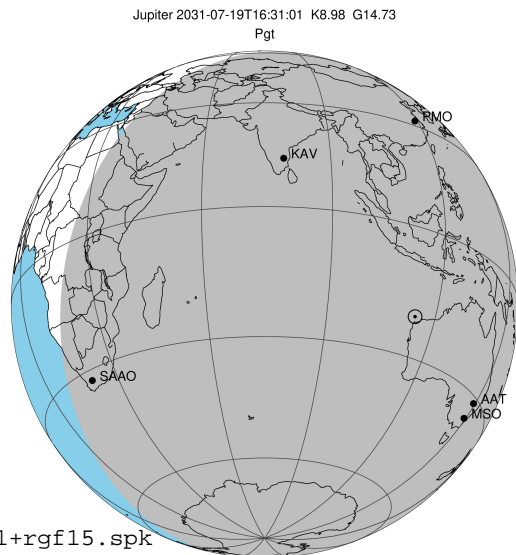


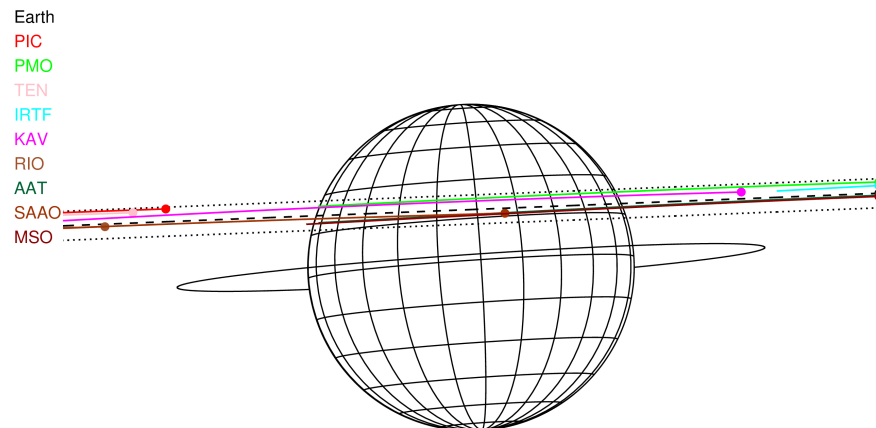
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-07-19T16:31:01.150
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4114516757657723648
 2Mass ID (if available) : 17155436-2240165

Jupiter 2031-07-19T16:31:01 K8.98 G14.73 Pgt

ICRS Star Coord at Epoch: 17h 15m 54.35043s -22:40:16.60806s
 RUWE (>1.4 is poor) : 1.09
 K magnitude : 8.976
 G magnitude : 14.734
 RP magnitude : 13.289
 BP magnitude : 17.524
 DUPflag : 0
 Distance (au) : 4.417
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -10.76
 Sun-Target sep (deg) : 143.44
 Sun-Moon sep (deg) : 141.97
 B (ring opening deg) : -2.55
 PA of pole (deg) : 3.90
 Pole direction: RA (deg): 268.05689
 Dec (deg): 64.49652
 C/A sky separation (") : 7.912
 C/A sky separation (km) : 25349.2
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

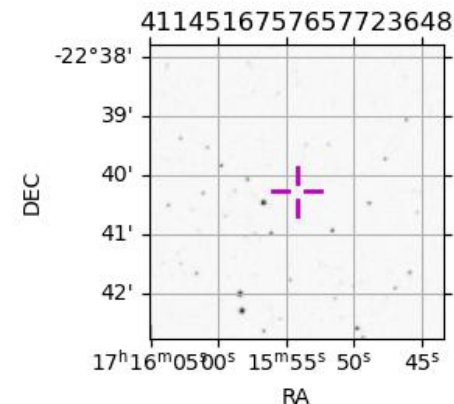


2031-07-19T16:31:01.1500 at: 17 15 54.3504 s: -22 40 16.608 C/A 7.912" PA 182.29 deg v_sky -10.76 km/s D 04.42 AU
 Credit: Styled after SORA/Lucky Star



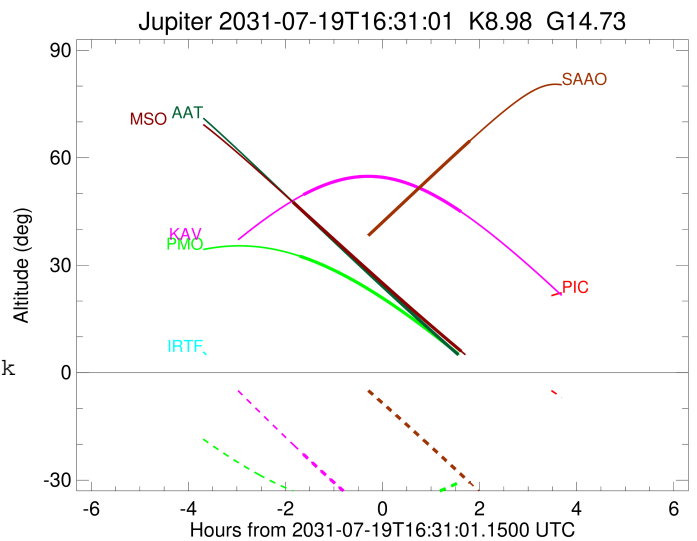
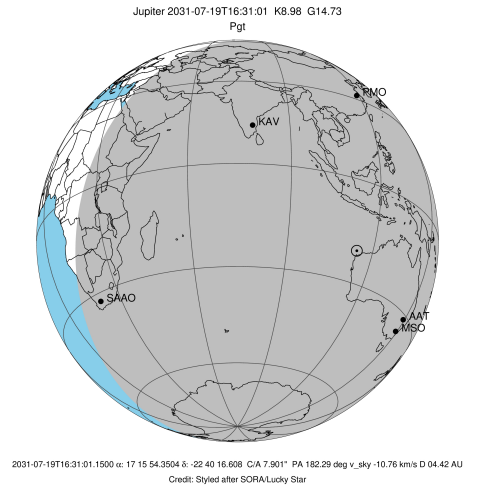
Observable events with sun below -5 deg and altitude above 5 deg

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 19 14:48 - JUL 19 18:04	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	+ +	JUL 19 14:53 - JUL 19 18:08	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	+	JUL 19 14:40 - JUL 19 14:40	Pin
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	JUL 19 18:19 - JUL 19 18:19	Pne
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	JUL 19 14:40 - JUL 19 18:08	Pie



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-07-19T16:25:57.040
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       : 4114516757657723648
2Mass ID (if available) : 17155436-2240165
ICRS Star Coord at Epoch: 17h 15m 54.35043s -22:40:16.60806s
RUWE (>1.4 is poor) : 1.09
K magnitude          : 8.976
G magnitude          : 14.734
RP magnitude         : 13.289
BP magnitude         : 17.524
DUPflag             : 0
Distance (au)        : 4.417
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -10.76
Sun-Target sep (deg) : 143.44
Sun-Moon sep (deg)   : 141.73
B (ring opening deg) : -2.55
PA of pole (deg)     : 3.90
Pole direction: RA (deg): 268.05689
Dec (deg): 64.49652
C/A sky separation ("): 9.399
C/A sky separation (km): 30112.5
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
    
```

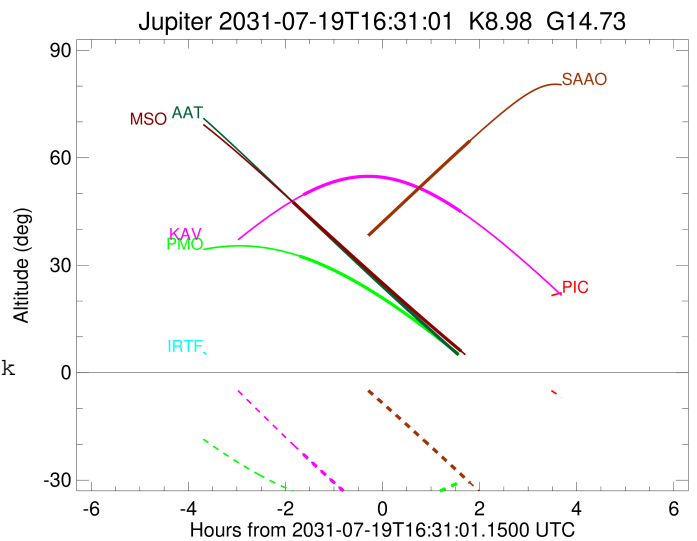
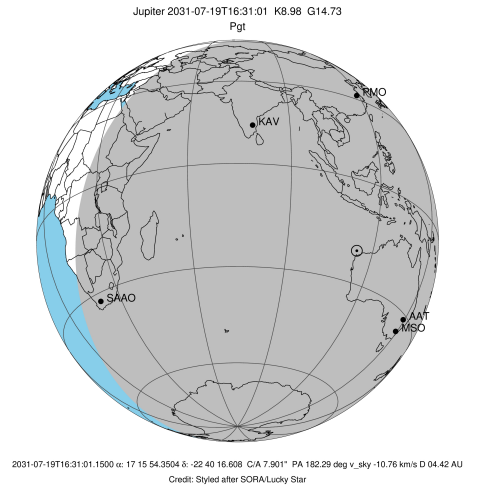


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-19T14:48:33.570	32.54	-33.73	71490.6	23.61	26.52
Jupiter	E	2031-07-19T18:04:29.585	5.25	-30.75	71490.3	25.89	28.99

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-07-19T16:30:29.630
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      : 4114516757657723648
2Mass ID (if available) : 17155436-2240165
ICRS Star Coord at Epoch: 17h 15m 54.35043s -22:40:16.60806s
RUWE (>1.4 is poor) : 1.09
K magnitude          : 8.976
G magnitude          : 14.734
RP magnitude         : 13.289
BP magnitude         : 17.524
DUPflag             : 0
Distance (au)       : 4.417
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -10.76
Sun-Target sep (deg) : 143.44
Sun-Moon sep (deg)  : 142.35
B (ring opening deg) : -2.55
PA of pole (deg)    : 3.90
Pole direction: RA (deg): 268.05689
Dec (deg): 64.49652
C/A sky separation (" ) : 9.062
C/A sky separation (km) : 29033.2
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
    
```

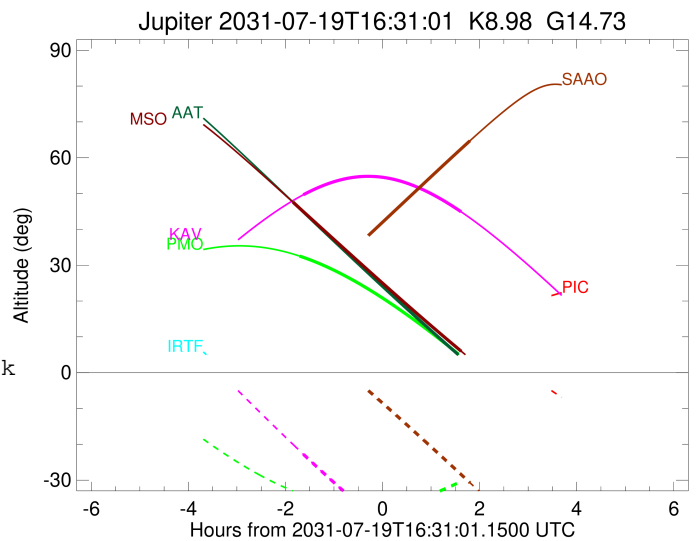
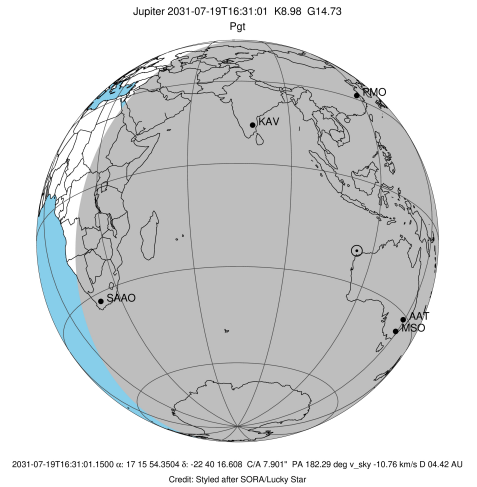


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-19T14:53:15.870	49.67	-22.79	71490.7	22.12	24.90
Jupiter	E	2031-07-19T18:08:00.008	44.93	-55.10	71490.4	25.38	28.43

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-07-19T16:23:17.150
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      : 4114516757657723648
2Mass ID (if available) : 17155436-2240165
ICRS Star Coord at Epoch: 17h 15m 54.35043s -22:40:16.60806s
RUWE (>1.4 is poor) : 1.09
K magnitude          : 8.976
G magnitude          : 14.734
RP magnitude         : 13.289
BP magnitude         : 17.524
DUPflag             : 0
Distance (au)       : 4.417
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -10.76
Sun-Target sep (deg) : 143.44
Sun-Moon sep (deg)  : 141.63
B (ring opening deg) : -2.55
PA of pole (deg)    : 3.90
Pole direction: RA (deg): 268.05689
Dec (deg): 64.49652
C/A sky separation ("): 7.220
C/A sky separation (km) : 23131.8
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
    
```

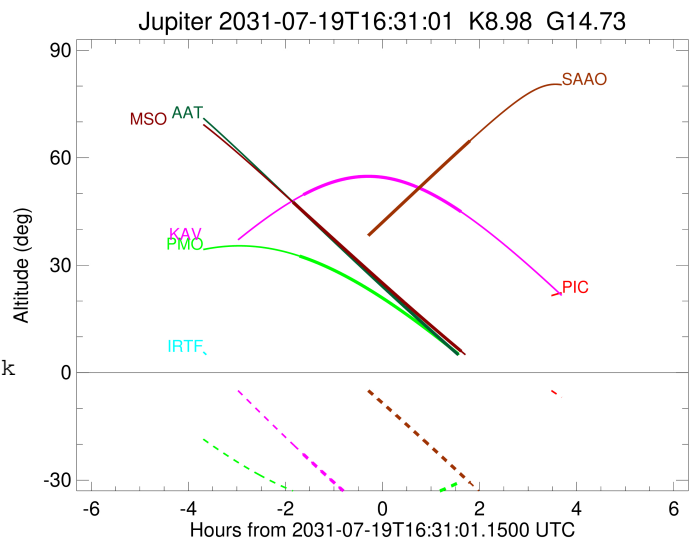
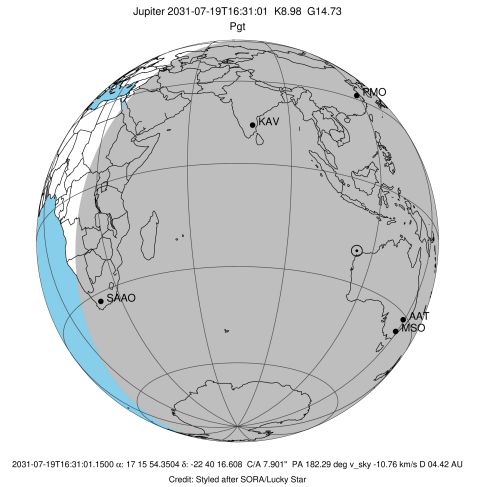


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-19T14:40:30.136	47.62	-77.64	71491.2	17.90	20.25
Jupiter	E	2031-07-19T18:07:50.865	4.41x	-36.18	71491.0	19.67	22.21

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-07-19T16:37:04.710
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      : 4114516757657723648
2Mass ID (if available) : 17155436-2240165
ICRS Star Coord at Epoch: 17h 15m 54.35043s -22:40:16.60806s
RUWE (>1.4 is poor) : 1.09
K magnitude          : 8.976
G magnitude          : 14.734
RP magnitude        : 13.289
BP magnitude        : 17.524
DUPflag             : 0
Distance (au)       : 4.417
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -10.76
Sun-Target sep (deg) : 143.44
Sun-Moon sep (deg)  : 142.83
B (ring opening deg) : -2.55
PA of pole (deg)    : 3.90
Pole direction: RA (deg): 268.05689
Dec (deg): 64.49652
C/A sky separation (") : 7.285
C/A sky separation (km) : 23341.5
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
    
```

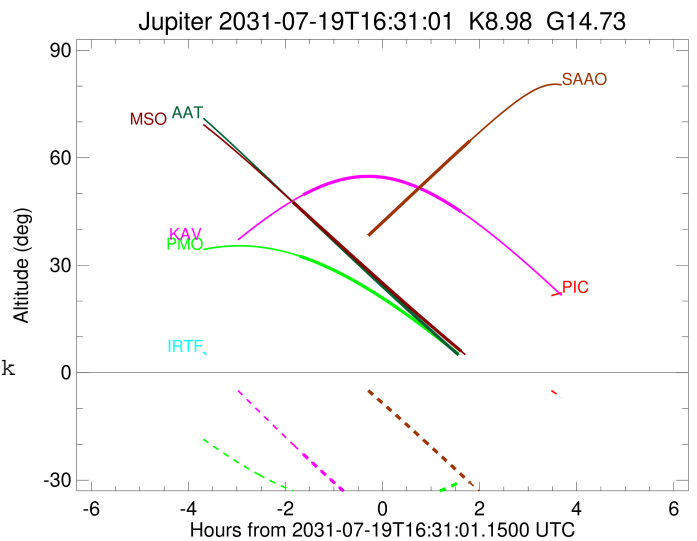
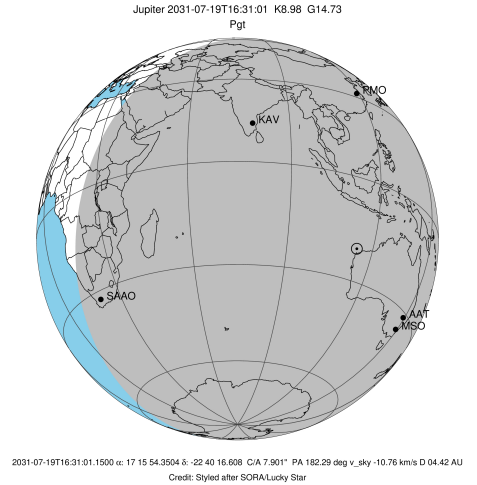


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-07-19T14:53:59.151	21.64	9.98x	71491.3	16.68	18.90
Jupiter	E	2031-07-19T18:19:06.322	64.72	-30.72	71490.8	21.20	23.89

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-07-19T16:23:35.980
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        : 4114516757657723648
2Mass ID (if available) : 17155436-2240165
ICRS Star Coord at Epoch: 17h 15m 54.35043s -22:40:16.60806s
RUWE (>1.4 is poor) : 1.09
K magnitude           : 8.976
G magnitude           : 14.734
RP magnitude          : 13.289
BP magnitude          : 17.524
DUPflag              : 0
Distance (au)         : 4.417
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -10.76
Sun-Target sep (deg)  : 143.44
Sun-Moon sep (deg)    : 141.67
B (ring opening deg) : -2.55
PA of pole (deg)      : 3.90
Pole direction: RA (deg): 268.05689
Dec (deg): 64.49652
C/A sky separation (") : 7.101
C/A sky separation (km) : 22748.8
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	2031-07-19T14:40:32.181	47.54	-74.20	71491.2	17.54	19.86
Jupiter	E	2031-07-19T18:08:22.802	5.97	-36.30	71491.0	19.39	21.90