

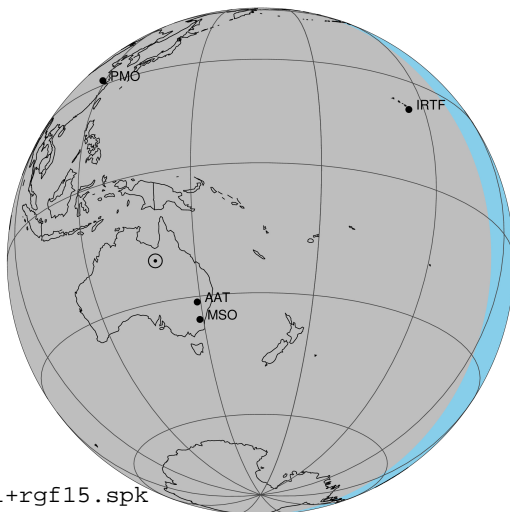
target : Jupiter  
 target radius (km) : 71492.00  
 C/A epoch : 2031-05-23T14:37:48.090  
 Event type : Pgt  
 : Jupiter occs: geocentric, topocentric  
 : Not a ringed target  
 Gaia source ID : 4116889808659868416  
 2Mass ID (if available) : 17442046-2253093

Jupiter 2031-05-23T14:37:48 K9.42 G14.27 Pgt

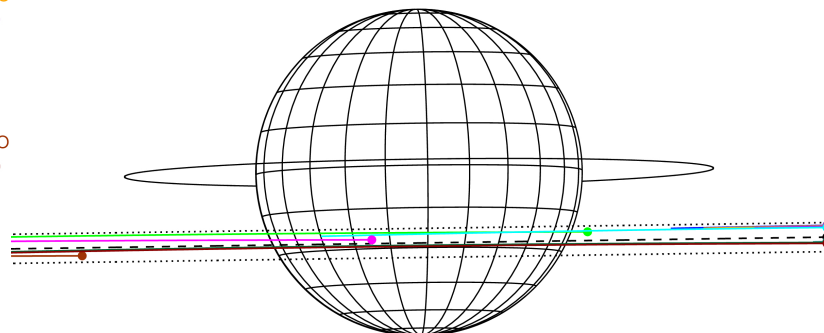
ICRS Star Coord at Epoch: 17h 44m 20.45867s -22:53:09.50342s

RUWE (>1.4 is poor) : 0.96  
 K magnitude : 9.421  
 G magnitude : 14.268  
 RP magnitude : 13.047  
 BP magnitude : 15.863  
 DUPflag : 0  
 Distance (au) : 4.350  
 f0 (km) : 0.00  
 g0 (km) : 0.00  
 skyplane vel. (km/s) : -13.79  
 Sun-Target sep (deg) : 155.46  
 Sun-Moon sep (deg) : 177.69  
 B (ring opening deg) : -2.60  
 PA of pole (deg) : 0.85  
 Pole direction: RA (deg): 268.05694  
 Dec (deg): 64.49651  
 C/A sky separation (") : 9.782  
 C/A sky separation (km) : 30865.4  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk

Jupiter 2031-05-23T14:37:48 K9.42 G14.27  
 Pgt



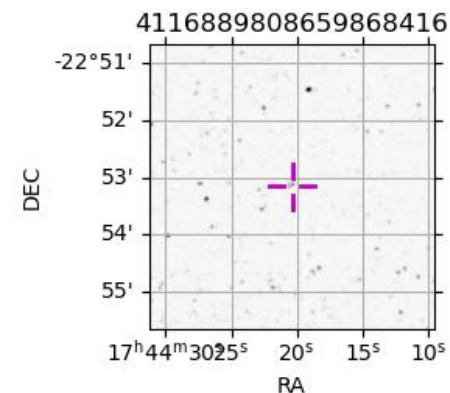
Earth  
 PAL  
 PMO  
 KPNO  
 MCD  
 IRTF  
 KAV  
 ESO  
 AAT  
 SAAO  
 MSO



2031-05-23T14:37:48.0900 a: 17 44 20.45867 s: -22 53 09.503 C/A 9.794" PA 0.82 deg v\_sky -13.79 km/s D 04.35 AU  
 Credit: Styled after SORA/Lucky Star

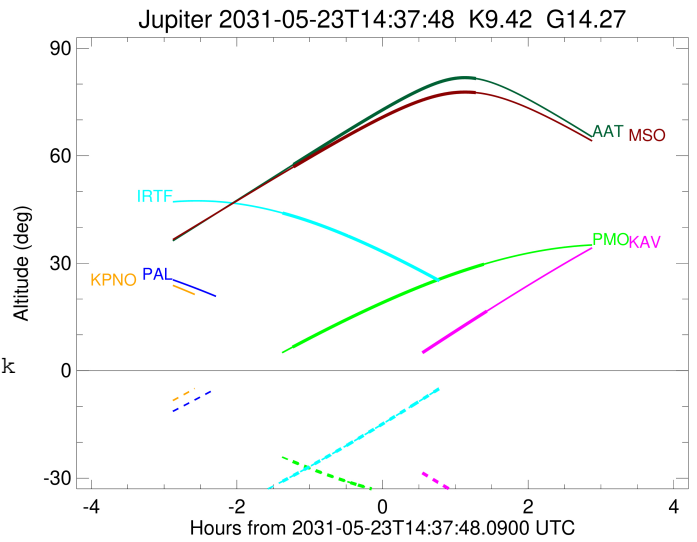
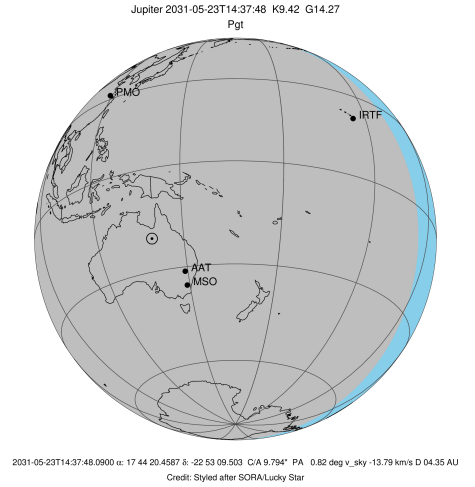
Observable events with sun below -5 deg and altitude above 5 deg

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	+ +	MAY 23 13:23 - MAY 23 16:01	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	+	MAY 23 13:15 - MAY 23 13:15	Pin
KAV	Kavalur Observatory	12.6	78.8	+	MAY 23 16:03 - MAY 23 16:03	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	+ +	MAY 23 13:24 - MAY 23 15:54	Pie
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8			Pnn
MSO	Mt. Stromlo Observatory	-35.3	149.0	+ +	MAY 23 13:24 - MAY 23 15:54	Pie



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target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-23T14:42:49.370
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       : 4116889808659868416
2Mass ID (if available) : 17442046-2253093
ICRS Star Coord at Epoch: 17h 44m 20.45867s -22:53:09.50342s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 9.421
G magnitude           : 14.268
RP magnitude          : 13.047
BP magnitude          : 15.863
DUPflag              : 0
Distance (au)        : 4.350
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.79
Sun-Target sep (deg) : 155.46
Sun-Moon sep (deg)   : 177.25
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.85
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 8.350
C/A sky separation (km): 26345.9
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
    
```

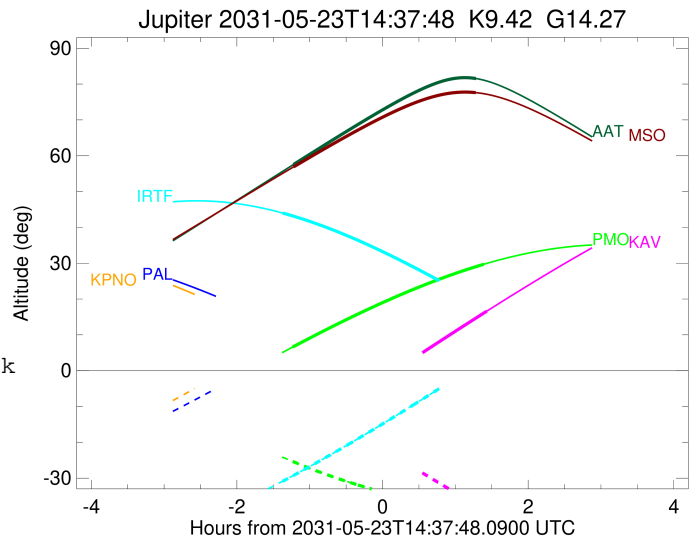
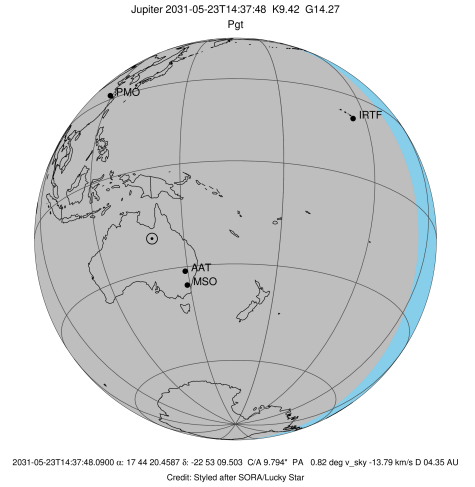


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-23T13:23:46.632	6.59	-25.34	71490.7	-22.16	-24.94
Jupiter	E	2031-05-23T16:01:15.168	29.70	-37.48	71490.8	-21.20	-23.89

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-23T14:33:13.590
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        : 4116889808659868416
2Mass ID (if available) : 17442046-2253093
ICRS Star Coord at Epoch: 17h 44m 20.45867s -22:53:09.50342s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 9.421
G magnitude           : 14.268
RP magnitude          : 13.047
BP magnitude          : 15.863
DUPflag              : 0
Distance (au)         : 4.350
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -13.79
Sun-Target sep (deg)  : 155.46
Sun-Moon sep (deg)    : 177.00
B (ring opening deg) : -2.60
PA of pole (deg)      : 0.85
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 8.553
C/A sky separation (km) : 26985.5
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
    
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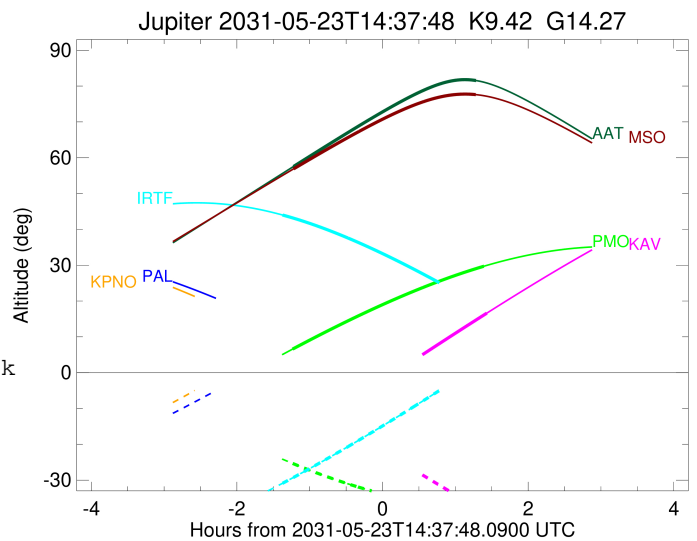
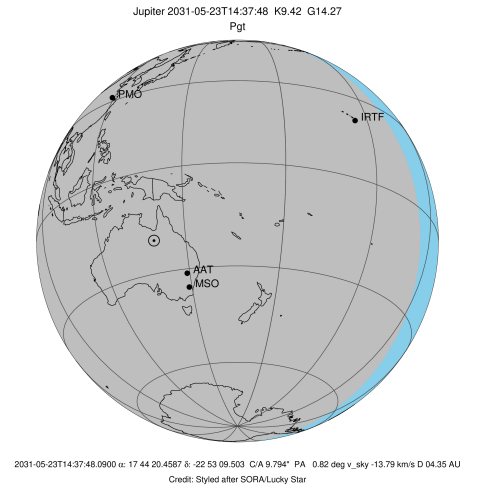


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-23T13:15:26.204	44.00	-30.88	71490.7	-21.88	-24.64
Jupiter	E	2031-05-23T15:51:27.171	20.02	0.82x	71490.6	-22.62	-25.44

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-23T14:45:46.410
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       : 4116889808659868416
2Mass ID (if available) : 17442046-2253093
ICRS Star Coord at Epoch: 17h 44m 20.45867s -22:53:09.50342s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 9.421
G magnitude           : 14.268
RP magnitude         : 13.047
BP magnitude         : 15.863
DUPflag              : 0
Distance (au)        : 4.350
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.79
Sun-Target sep (deg) : 155.46
Sun-Moon sep (deg)   : 177.71
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.85
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 9.339
C/A sky separation (km) : 29465.1
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
    
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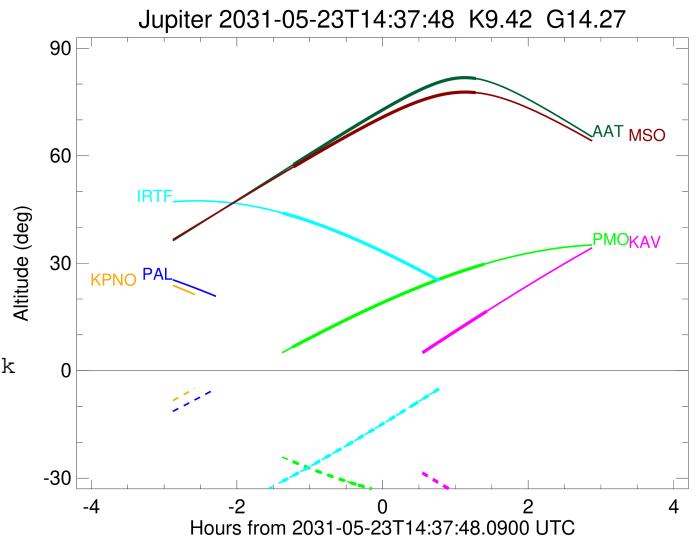
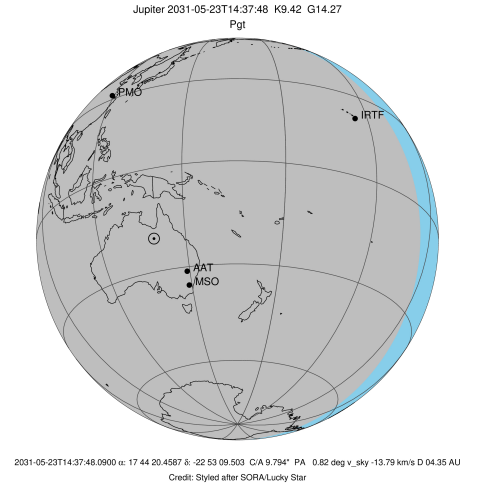


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-23T13:26:47.868	-18.54x	-5.94	71490.3	-25.07	-28.10
Jupiter	E	2031-05-23T16:03:47.666	16.62	-39.03	71490.5	-23.58	-26.49

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-23T14:39:47.710
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       : 4116889808659868416
2Mass ID (if available) : 17442046-2253093
ICRS Star Coord at Epoch: 17h 44m 20.45867s -22:53:09.50342s
RUWE (>1.4 is poor) : 0.96
K magnitude           : 9.421
G magnitude           : 14.268
RP magnitude         : 13.047
BP magnitude         : 15.863
DUPflag              : 0
Distance (au)        : 4.350
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.79
Sun-Target sep (deg) : 155.46
Sun-Moon sep (deg)   : 177.94
B (ring opening deg) : -2.60
PA of pole (deg)     : 0.85
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 10.104
C/A sky separation (km): 31880.5
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
    
```

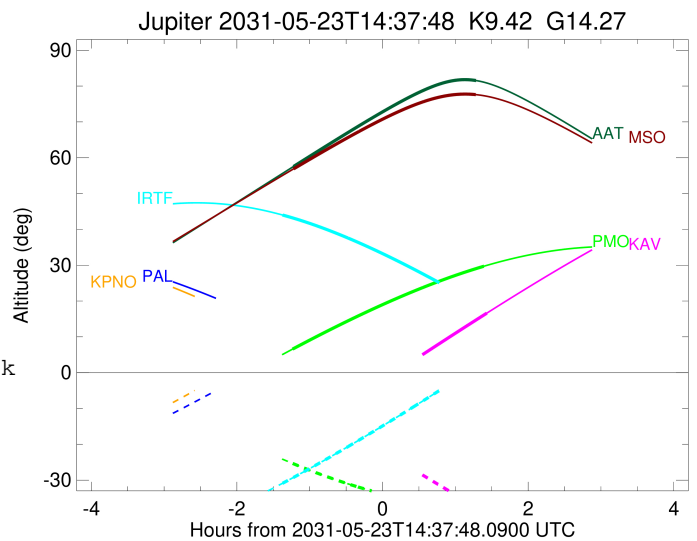
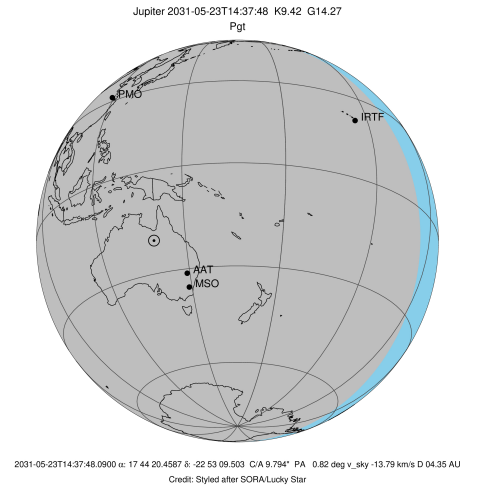


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-23T13:24:26.974	57.54	-76.74	71490.1	-26.77	-29.93
Jupiter	E	2031-05-23T15:54:52.872	81.53	-62.33	71490.2	-26.33	-29.46

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-23T14:39:42.560
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      : 4116889808659868416
2Mass ID (if available) : 17442046-2253093
ICRS Star Coord at Epoch: 17h 44m 20.45867s -22:53:09.50342s
RUWE (>1.4 is poor) : 0.96
K magnitude          : 9.421
G magnitude          : 14.268
RP magnitude         : 13.047
BP magnitude         : 15.863
DUPflag             : 0
Distance (au)       : 4.350
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -13.79
Sun-Target sep (deg) : 155.46
Sun-Moon sep (deg)  : 177.99
B (ring opening deg) : -2.60
PA of pole (deg)    : 0.85
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (" ) : 10.243
C/A sky separation (km) : 32317.6
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	2031-05-23T13:24:32.063	56.88	-73.43	71490.1	-27.15	-30.34
Jupiter	E	2031-05-23T15:54:38.034	77.61	-61.11	71490.1	-26.73	-29.89