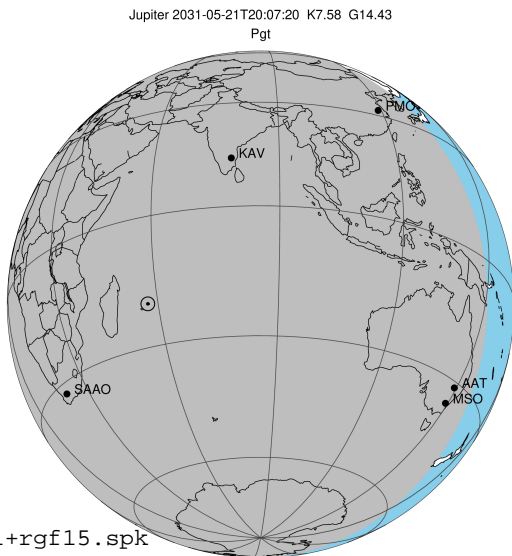


target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-21T20:07:20.820
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068852459276856576
 2Mass ID (if available) : 17450807-2253048

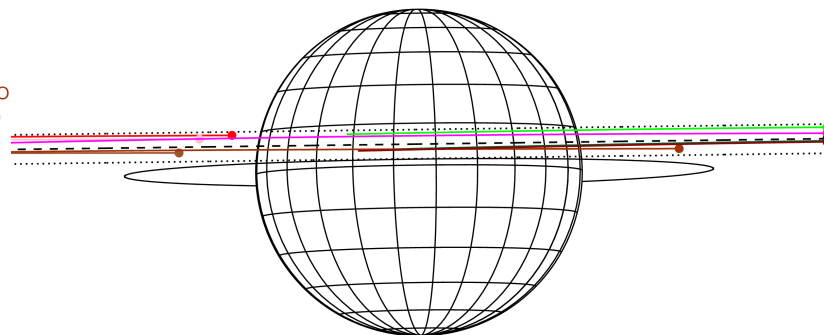
Jupiter 2031-05-21T20:07:20 K7.58 G14.43 Pgt

ICRS Star Coord at Epoch: 17h 45m 08.07800s -22:53:04.87281s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 7.580
 G magnitude : 14.432
 RP magnitude : 12.872
 BP magnitude : 18.341
 DUPflag : 0
 Distance (au) : 4.363
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -13.37
 Sun-Target sep (deg) : 153.57
 Sun-Moon sep (deg) : 159.54
 B (ring opening deg) : -2.61
 PA of pole (deg) : 0.76
 Pole direction: RA (deg): 268.05694
 Dec (deg): 64.49651
 C/A sky separation (") : 3.935
 C/A sky separation (km) : 12451.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk



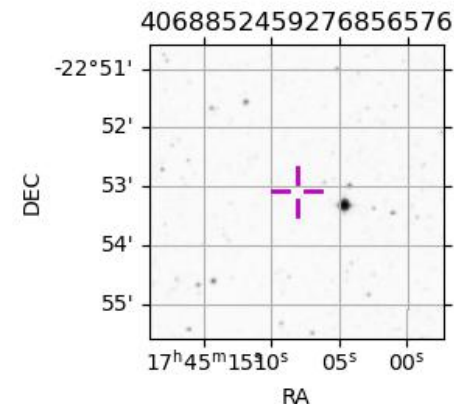
2031-05-21T20:07:20.8200 at: 17 45 08.0780 s: -22 53 04.873 C/A 3.923" PA 180.76 deg v_sky -13.38 km/s D 04.36 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PMO
 TEN
 KAV
 RIO
 AAT
 SAAO
 MSO



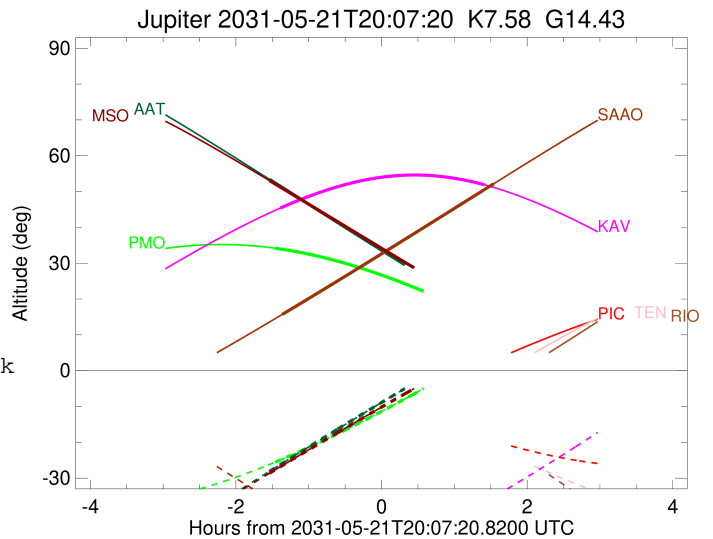
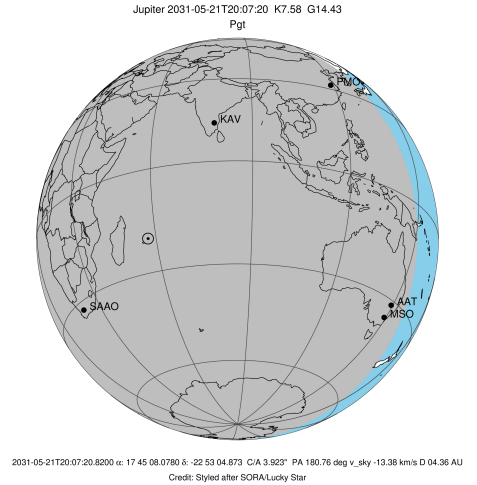
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OEncode
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 21 18:39 - MAY 21 18:39	Pin
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	+ +	MAY 21 18:44 - MAY 21 21:32	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	+	MAY 21 18:34 - MAY 21 18:34	Pin
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+ +	MAY 21 18:45 - MAY 21 21:39	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0	+	MAY 21 18:35 - MAY 21 18:35	Pin



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-21T20:03:55.650
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      : 4068852459276856576
2Mass ID (if available) : 17450807-2253048
ICRS Star Coord at Epoch: 17h 45m 08.07800s -22:53:04.87281s
RUWE (>1.4 is poor) : 1.01
K magnitude          : 7.580
G magnitude          : 14.432
RP magnitude         : 12.872
BP magnitude         : 18.341
DUPflag             : 0
Distance (au)       : 4.363
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.37
Sun-Target sep (deg) : 153.57
Sun-Moon sep (deg)  : 160.04
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.76
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 5.486
C/A sky separation (km) : 17360.9
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
    
```

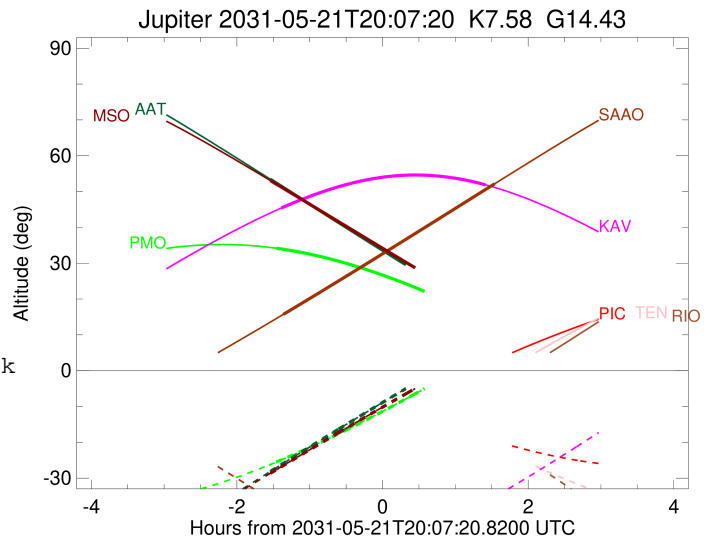
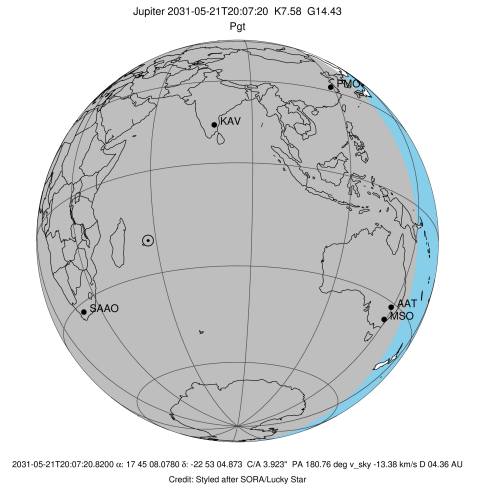


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-21T18:39:43.256	34.17	-25.52	71491.4	14.25	16.19
Jupiter	E	2031-05-21T21:28:31.121	15.03	3.98x	71491.5	13.62	15.48

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-21T20:08:14.830
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      : 4068852459276856576
2Mass ID (if available) : 17450807-2253048
ICRS Star Coord at Epoch: 17h 45m 08.07800s -22:53:04.87281s
RUWE (>1.4 is poor) : 1.01
K magnitude          : 7.580
G magnitude          : 14.432
RP magnitude         : 12.872
BP magnitude         : 18.341
DUPflag             : 0
Distance (au)       : 4.363
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.37
Sun-Target sep (deg) : 153.57
Sun-Moon sep (deg)  : 159.67
B (ring opening deg) : -2.61
PA of pole (deg)    : 0.76
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (" ) : 5.095
C/A sky separation (km) : 16122.0
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
    
```

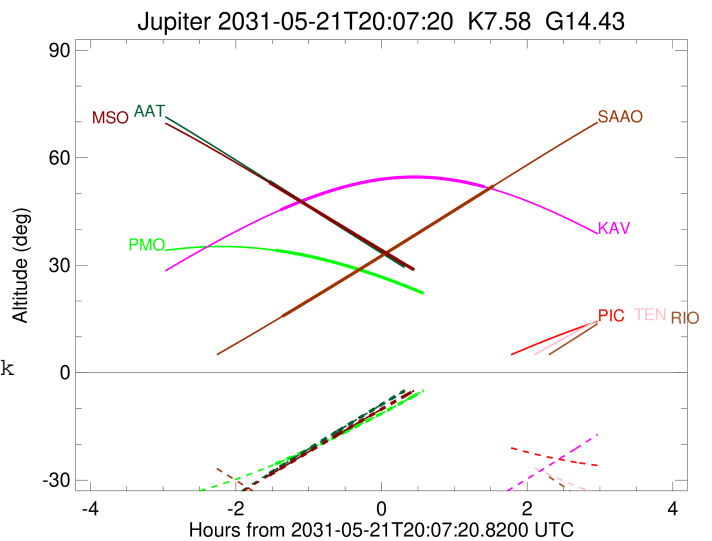
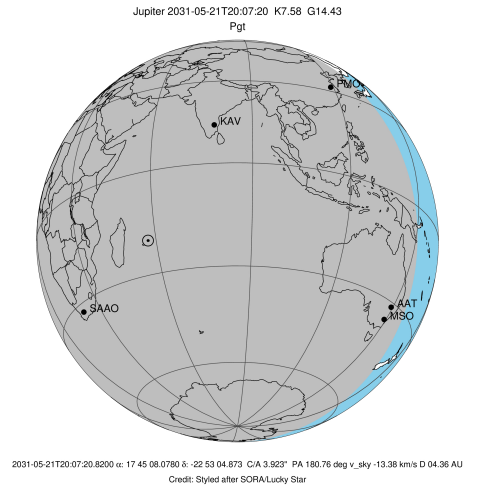


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-21T18:44:04.942	45.41	-57.24	71491.5	12.78	14.53
Jupiter	E	2031-05-21T21:32:12.905	51.88	-36.71	71491.5	12.99	14.77

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-21T20:01:27.060
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        : 4068852459276856576
2Mass ID (if available) : 17450807-2253048
ICRS Star Coord at Epoch: 17h 45m 08.07800s -22:53:04.87281s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 7.580
G magnitude           : 14.432
RP magnitude          : 12.872
BP magnitude          : 18.341
DUPflag              : 0
Distance (au)         : 4.363
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -13.37
Sun-Target sep (deg)  : 153.57
Sun-Moon sep (deg)   : 160.37
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.76
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (" ) : 3.307
C/A sky separation (km) : 10465.3
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
    
```

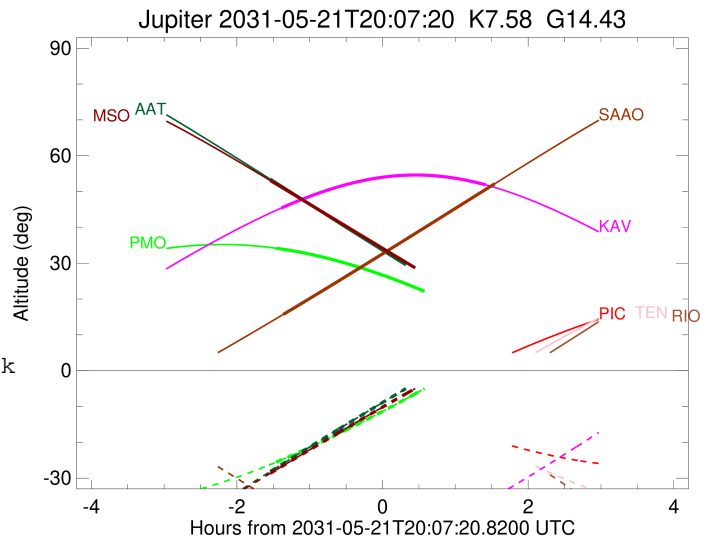
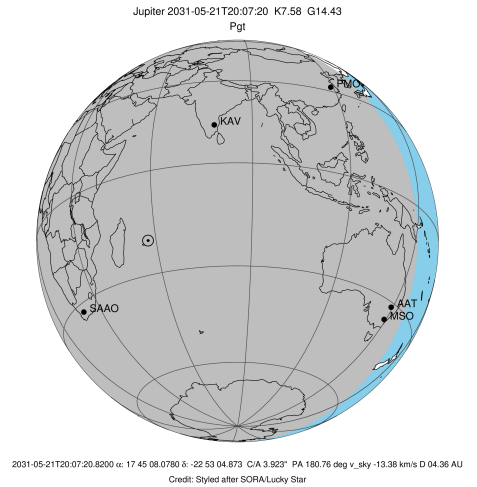


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-21T18:34:52.614	53.43	-28.14	71491.8	8.89	10.14
Jupiter	E	2031-05-21T21:28:46.561	16.60	7.07x	71491.8	7.80	8.90

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-21T20:13:11.830
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       : 4068852459276856576
2Mass ID (if available) : 17450807-2253048
ICRS Star Coord at Epoch: 17h 45m 08.07800s -22:53:04.87281s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 7.580
G magnitude           : 14.432
RP magnitude          : 12.872
BP magnitude          : 18.341
DUPflag              : 0
Distance (au)         : 4.363
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -13.37
Sun-Target sep (deg) : 153.57
Sun-Moon sep (deg)   : 159.07
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.76
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 3.228
C/A sky separation (km): 10215.7
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
    
```

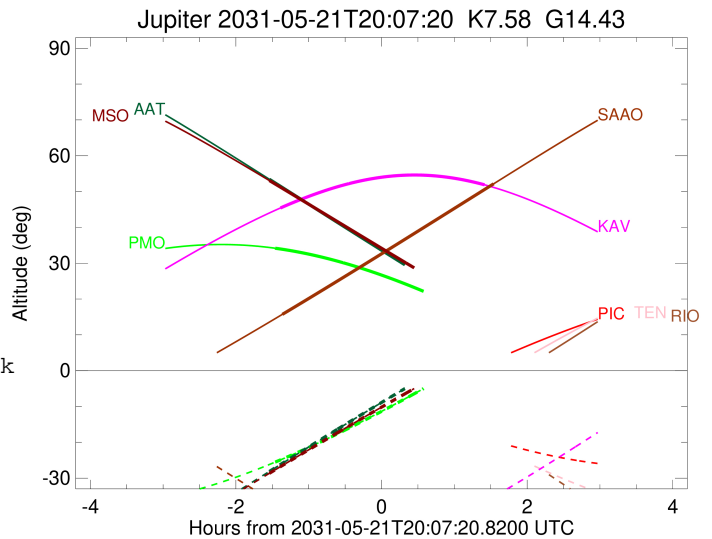
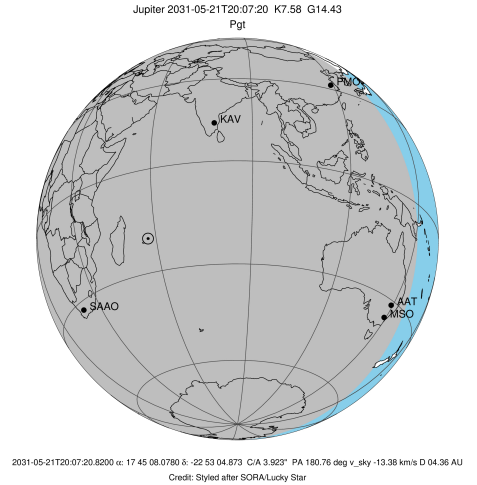


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-21T18:45:39.805	15.72	-38.15	71491.8	7.57	8.64
Jupiter	E	2031-05-21T21:39:47.930	52.16	-73.10	71491.8	8.73	9.96

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-21T20:01:42.390
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       : 4068852459276856576
2Mass ID (if available) : 17450807-2253048
ICRS Star Coord at Epoch: 17h 45m 08.07800s -22:53:04.87281s
RUWE (>1.4 is poor) : 1.01
K magnitude           : 7.580
G magnitude           : 14.432
RP magnitude         : 12.872
BP magnitude         : 18.341
DUPflag              : 0
Distance (au)        : 4.363
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -13.37
Sun-Target sep (deg) : 153.57
Sun-Moon sep (deg)   : 160.35
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.76
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 3.183
C/A sky separation (km): 10072.7
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	2031-05-21T18:34:59.546	53.06	-28.64	71491.8	8.55	9.76
Jupiter	E	2031-05-21T21:29:08.181	17.72	5.13x	71491.8	7.51	8.57